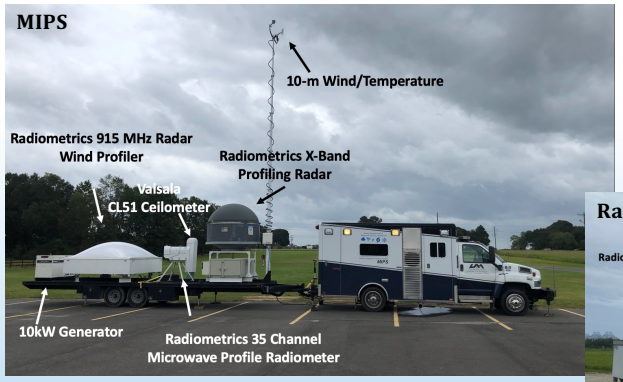
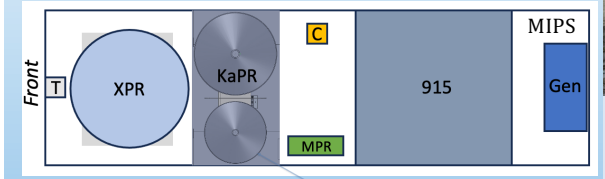
MAPNet: Mobile Atmospheric Profiling Network
General Overview

Research, Education & Outreach

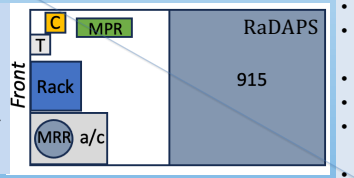
- Boundary Layer processes
- Precipitation processes
- Cloud structure and evolution
- Mesoscale processes
- Severe storms
- Landfalling tropical systems
- Supporting measurements for Air Quality studies
- Entomology and Ornithology

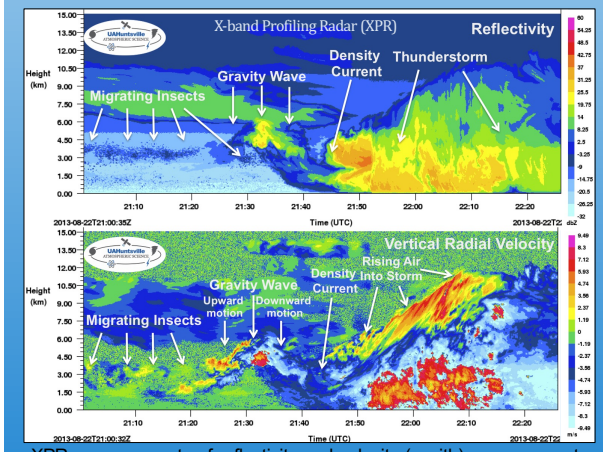




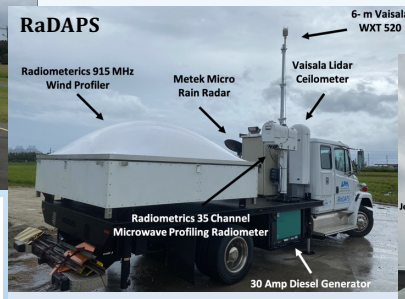
Plan view of instruments on the beds of the MIPS and RaDAPS

- 915: Radar wind profiler
- MPR: Microwave radiometer
- C: lidar ceilometer
- XPR: X-band Profiling Radar
- MRR: Micro-Rain Radar
- T: tower



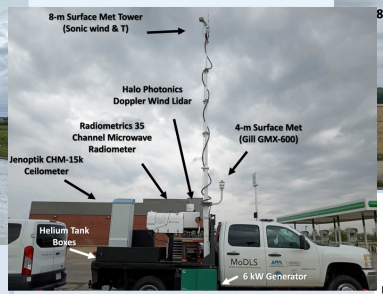


XPR measurements of reflectivity and velocity (zenith) measurements within deep convection over a stable boundary layer, 8/22/13. Insect layers, gravity wave, solitary wave, and laminar, striated updraft are annotated. Similar measurements will be available from the KaPR.



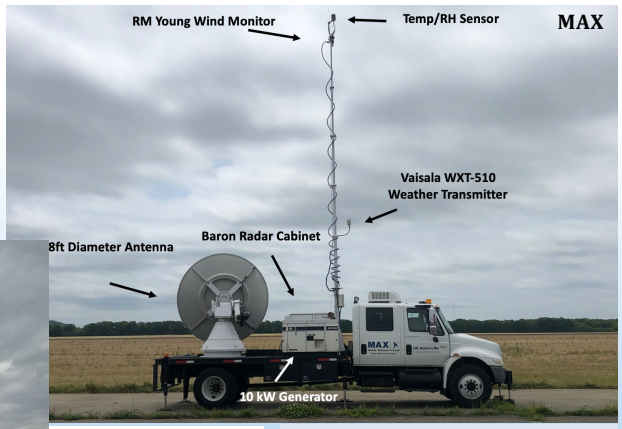
MIPS and RaDAPS instruments

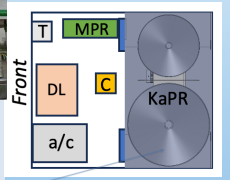
- 915 MHz Radar Wind Profiler on each
- X-band Profiling Radar on MIPS
- Micro Rain Radar (Metek) on RaDAPS
- Microwave Radiometer (35 channel) on each
- Vaisala CL51 ceilometer on each
- iMet sounding system on each
- Surface: T/RH (2 m), p, solar radiation, wind (10 m) on each; also electric field
- Parsivel disdrometer on each
- Doppler sodar (option on each)



MoDLS instruments

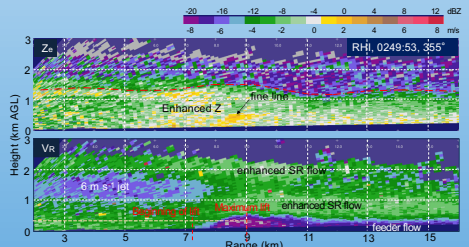
- Halo scanning Doppler lidar (1.5 μm)
- Microwave Radiometer (35 channel)
- Jenoptic CHM-15k ceilometer
- Vertically pointing K_a band radar (forthcoming)
- iMet sounding system
- Surface: T/RH (2 m), p, solar radiation, wind (8 m), electric field
- Sonic anemometer (8 m)



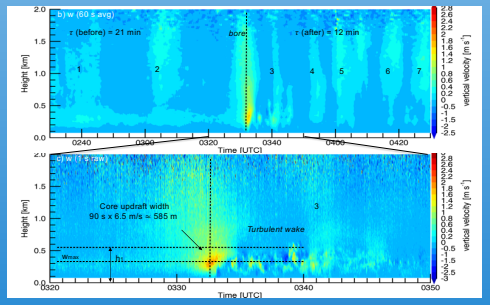


MAX instruments

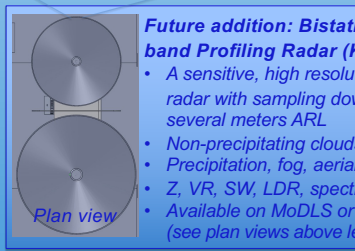
- Scanning X-band dual polarization radar
- Surface: T/RH, p (3 m), solar radiation, wind (10 m)
- Windsond sounding (option)



MAX measurements of a shallow nocturnal bore over N Alabama ("clear" air) on 23 August 2013. Knupp et al. (2023)

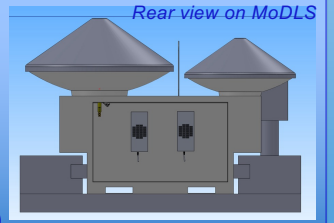


Doppler lidar measurements of the bore feature shown in the MAX picture above. Maximum vertical motion is about 2 m/s. Background wave updrafts are labeled with numbers. Bores, gust fronts and other boundaries have been active research topics.



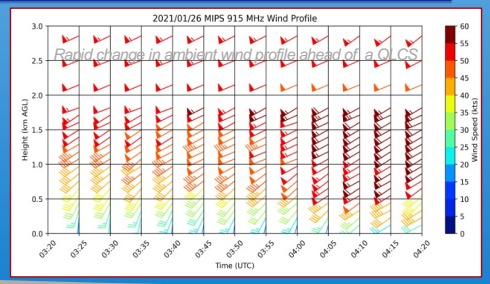
Future addition: Bistatic K_a-band Profiling Radar (KaPR)

- *A sensitive, high resolution radar with sampling down to several meters ARL*
- *Non-precipitating clouds, Precipitation, fog, aerial fauna*
- *Z, VR, SW, LDR, spectra, I/Q*
- *Available on MoDLS or MIPS (see plan views above left/right)*



MAPNet profile measurements

- Horizontal wind (5 min)
- Vertical air motion (1 s, 5 min)
- T, RH, water vapor density (2-5 min)
- Precipitation & hydrometeor motion (6 Hz from XPR, 1 Hz from KaPR)
- Cloud base height and aerosol backscatter (1-5 s)
- Dual wavelength ratio (X/K_a, future)
- Particle ID (future)
- Aerial fauna (XPR, KaPR, 915)



THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

MAPNet PIs
Kevin Knupp
Lawrence Carey
Ryan Wade

Field campaigns (air quality, winter precipitation, boundary layer, deep convection

SOS	TexAQS	MIRAGE			
PLOWS	OWLeS	CAMEX	BAMEX	2017 Eclipse	
IHOP	ABIDE	PECAN	PERiLS	HaL	VORTEX-SE

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