P8.5 The UAH/NSSTC Advanced Radar for Meteorological and Operational Research (ARMOR)

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History and Specifications

Huntsville 1977 NWS local warning radar (WSR-74C)

Donated to UAH in 2002

UAH/NASA/WHNT-19 collaborate to upgrade ARMOR to Dual-Pol , 2004 [SIGMET AMR]

New Baron ServicesTransmitter 2005

New Orbit Antenna/Pedestal 2006

Specifications

- Location : Huntsville International Airport
- Altitude (antenna MSL): 200 m
- Transmit frequency: 5625 MHz
- Peak Power: 350 kW
- Pulse width: 0.4 – 2.0 ms
- Maximum PRF: 250-2000 s^{-1}
- Antenna Diameter 3.7 m (12 ft CF Parabolic)
- Antenna Beam width: 1.1°
- First side-lobe: -28 dB
- Maximum rotation rate: 36° s^{-1}
- Transmit polarization: Simultaneous H and V, or H
- Receive polarization: Dual-channel; H and V
- Signal Process: SIGMET RVP/8
- Variables: Z, V, W, ZDR, f_{DP}, KDP, r_{hv}, LDR

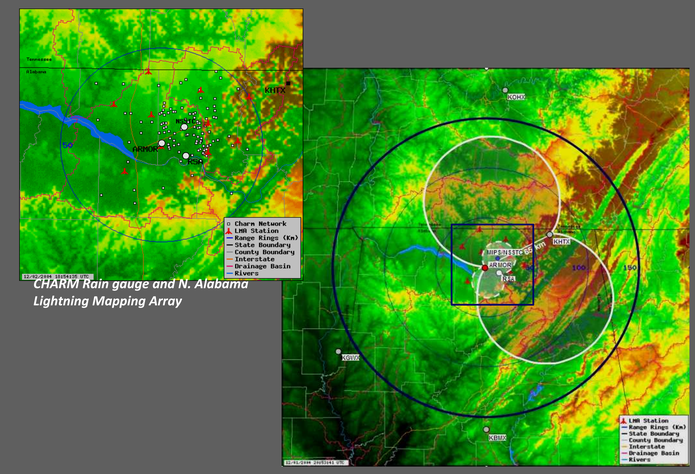
ARMOR is Used for Education and Research

- Hydrometeorology and Precipitation Science
- Severe Storms, Cloud Physics, Lightning Research
- Boundary Layer Meteorology
- UAH Graduate Student Education

ARMOR is Used for Decision Support:

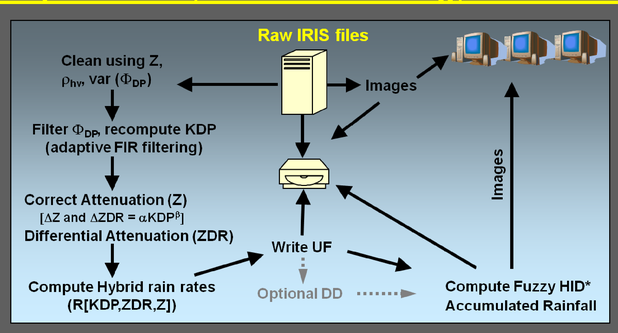
- *First dual-polarimetric radar in the world to be used on air by broadcast meteorologists* (WHNT-19)
- NWS WFO Huntsville : Real time data feed
- TVA River Operations/Management

NSSTC Southeast Hazardous Weather Testbed

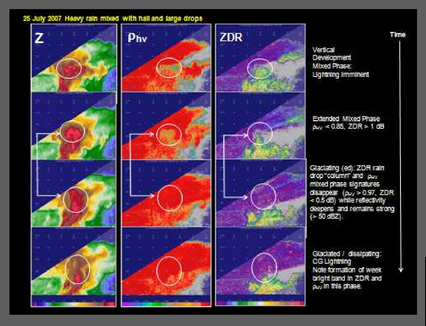


CHARM Rain gauge and N. Alabama Lightning Mapping Array

24/7 Operations , Data Processing, and Archive

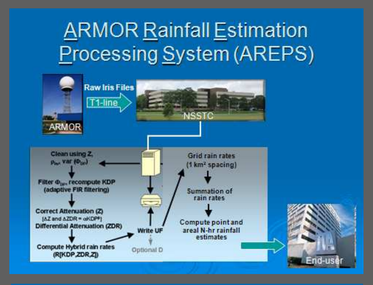


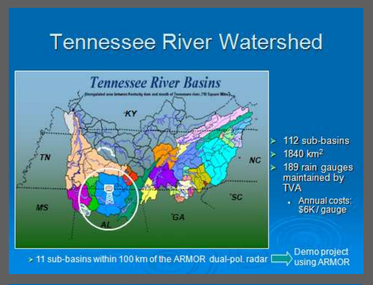
Convection and Severe Storms

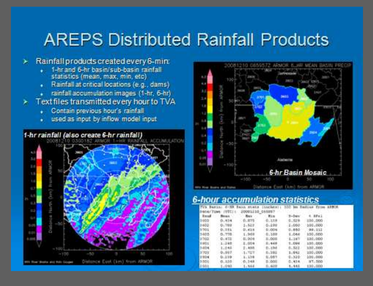


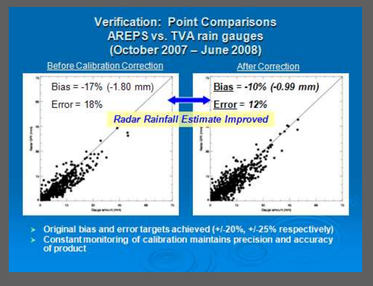
Thunderstorm microphysics and electrical evolution

Hydrometeorology: Operational Rain Mapping



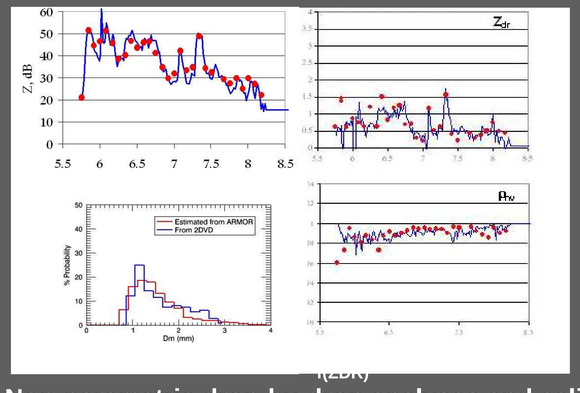






Operational rain mapping for the Tennessee Valley Authority. Enhanced river operations management through distributed rainfall estimation. Cost savings via removal of expensive-to-maintain rain gauge networks.

Precipitation Science

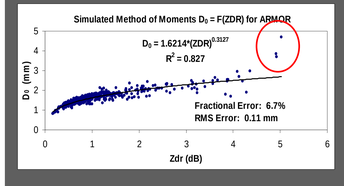


Non-parametric drop-by-drop analyses and calibration of ARMOR: NASA-PMM DSD Studies in mixed stratiform – convective event (Thurai et al. 2008)

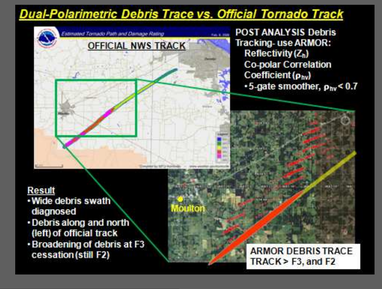
Parametric DSD Retrievals

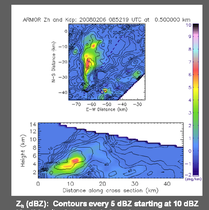
Fitting of 2DVD D0 and modeled ZDR. Note Mie Resonance at ZDR>5 dB]

Errors in D0 (0.11 mm and 6.7%) similar to Bringi et al. (2006).

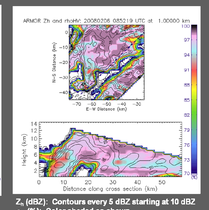


Hail, Lightning, storm kinematics and hydrometeor ID



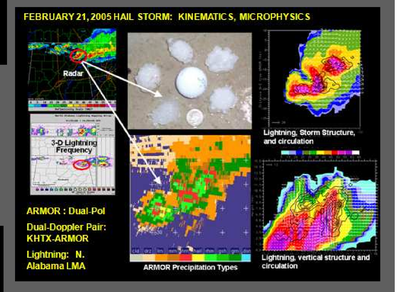


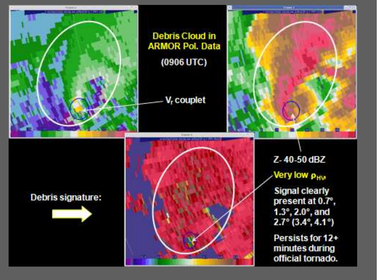
Zh (dBZ): Contours every 5 dBZ starting at 10 dBZ
KDP (° km⁻¹): Color shaded as shown



Zh (dBZ): Contours every 5 dBZ starting at 10 dBZ
ρhv (%): Color shaded as shown

Tornadoes: Dynamics, microphysics, debris signatures.
Outbreak: February, 2008





***Summary*: ARMOR will continue to serve research, operational, and educational communities in the Southeastern U.S. and we welcome opportunities for collaboration.**

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