

# OU photogrammetry

Deployment review 2009

# Intended goal

- Acquire stereo photogrammetry of cloud boundary of the storm's backside
- Determine relative location of cloud boundary to precipitation

# Data acquisition

May 27, 0125 UTC

- For each team:
- Imagery: 1 Nikon D300 shooting 12mp 12/min mounted on a platform , 20mm focal length ( $\sim 67^\circ$ )
- Camera Roll and Pitch: Two orthogonally mounted digital protractors (accuracy = 0.1 deg)
- Camera position: Magellan ProMark 3 GPS base station mounted over camera
- Azimuth reference: Second ProMark 3 GPS rover in the field of view (FOV) of the camera
- Horizon level information provided by a water level measured in two places in camera FOV

# Deployments and reality check

	20090513	OK HP supercell	none
	20090515	OK squall line	Fair frontside 1 depl
	20090520	Weak supercell AIA	poor
	20090523	Small multicell Grant	Fair 1 depl
	20090526	Left mover Decatur	rear side 1 depl
	20090529	Multicells Taylor NE	No side 1 depl
	20090531	Squall line Hebron	none
	20090604	2 supercells CYS	Rear side on 1 <sup>st</sup>
Fully processed 	20090605	Tornado WY	Front side then rear
	20090606	Supercell Thedford	Rear side 1 depl
	20090607	Supercell Oregon	Rear side 1 depl
Fully processed 	20090609	Supercell DDC	Rear side 2 depl
	20090610	HP/bow DDC	Front side 2 depl
	20090611	Supercell LAA	Rear side 3 depl
	20090613	Weak sup AMA	South side 2 depl

04 June – 2302 UTC



05 June – 2207 UTC



June 9 – 2326 UTC then 2358 UTC



June 11 (10) – 0101 UTC (1901 CST)





June 12 – 0059 UTC

June 12 – 0157 UTC



# Post processing

- Imagery: Distortion correction (PTL lense)
- Reference Azimuth:
  - Processed raw GPS data through GNSS solutions software
  - Output is
    - lat/lon of base and rover in WGS84 datum
    - Northing and easting in m from regional reference pt using NAD27 datum
    - Base to rover azimuth calculated from northing and easting
- Horizon coordinates
  - In X&Y pixels in distortion corrected imagery determined by marking miniscus level.
  - Roll derived from two horizon coordinates

# Tests

- Distortion, roll and tilt, and horizon:
  - Checked by shooting straight at a wall with a known grid
  - Protractor calibrations
- GPS-derived azimuth
  - Multiple tests with level and tilted GPS antenna base with rover
  - Lat/lon compared to known reference point

# Data format

- Imagery in .jpg
- Image times, focal length, in EXIF header of jpgs
- Times/lat/lon/roll/tilt/horizon/image file names
  - Excel spreadsheet.
  - Raw GPS files are available – process with GNSS solutions

# Known issues

- Forgot to log sign of roll from protractor
  - Workaround is to either try one sign or the other, or use horizon level
  - Not an issue if roll was  $<0.1$  deg
- Some horizon levels are flawed due to various errors

# What to do for 2010?

- Increase our deployment skill
- Label the sign of the roll
- Still need to determine if we've got the accuracy
- Would love 4 vehicles
- Better weather
- Possible short-wave IR camera

# SWIR imagery



# SWIR imagery 2

