

The background is a light blue gradient with several realistic water droplets of various sizes scattered across the surface. The droplets have highlights and shadows, giving them a three-dimensional appearance.

LOW LEVEL WEATHER CHALLENGES

JUSTIN HILLIARD – UPS FLIGHT FORWARD

Topics

- Forecast model resolution
- METAR
- Satellite
- Radar
- Ceiling and Visibility Wind
- Input makes output accurate

RESOLUTION: WHERE WE NEED TO BE

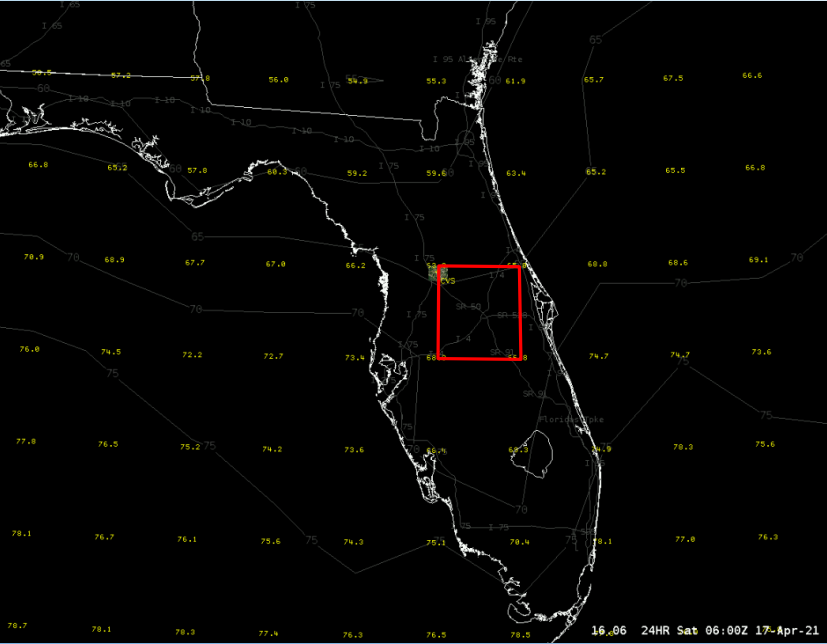
MICRO-WEATHER

CURRENT WEATHER DATA

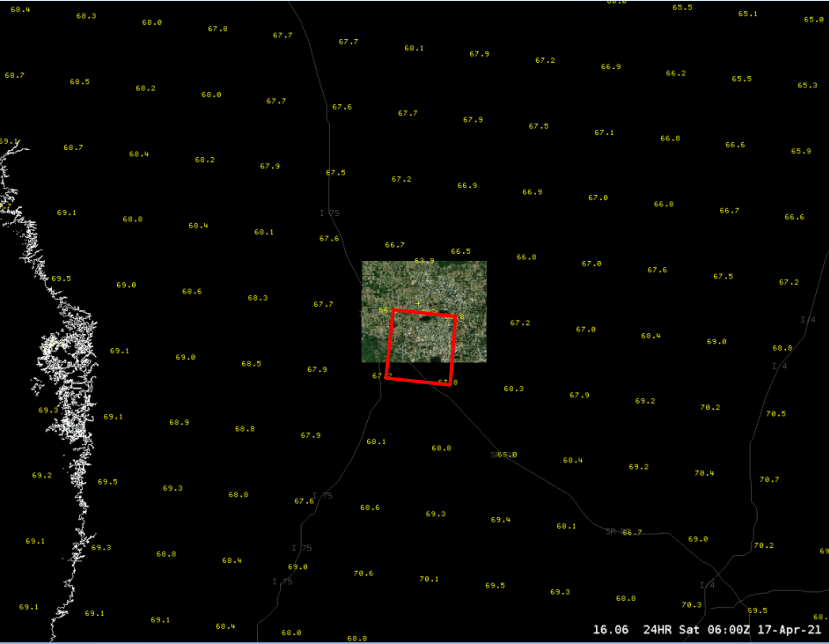


CURRENT MODEL EXAMPLES

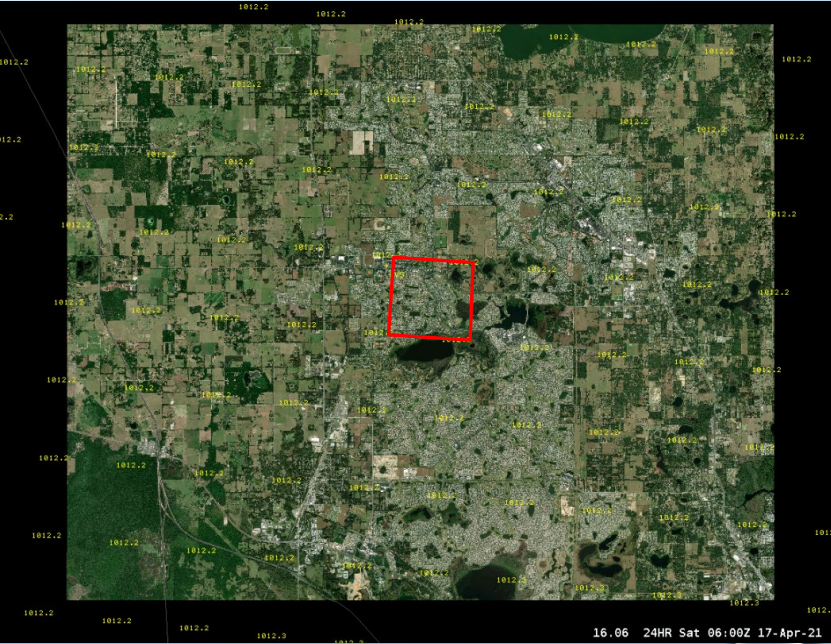
GFS GLOBAL 55KM



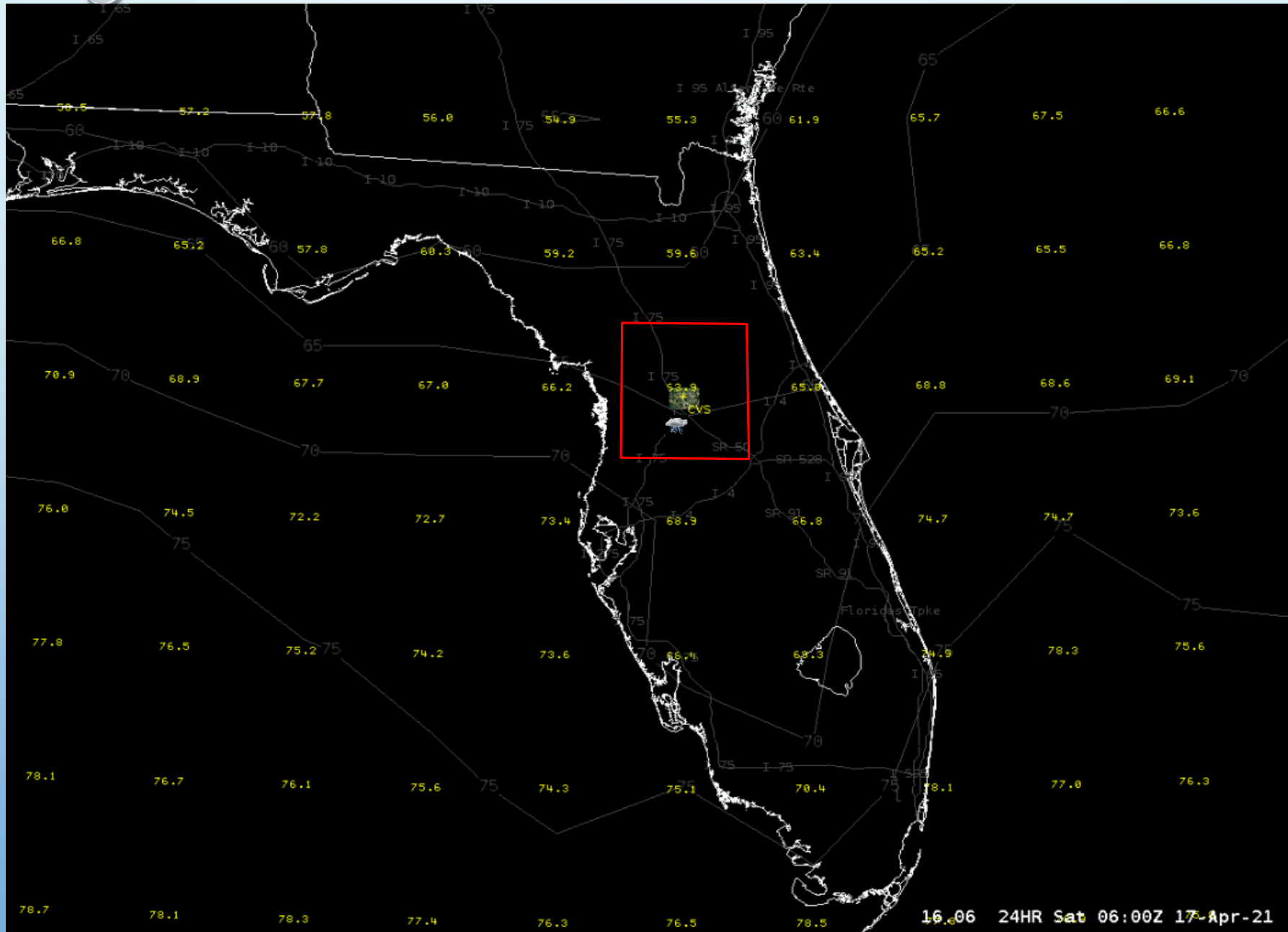
NAM1 2KM



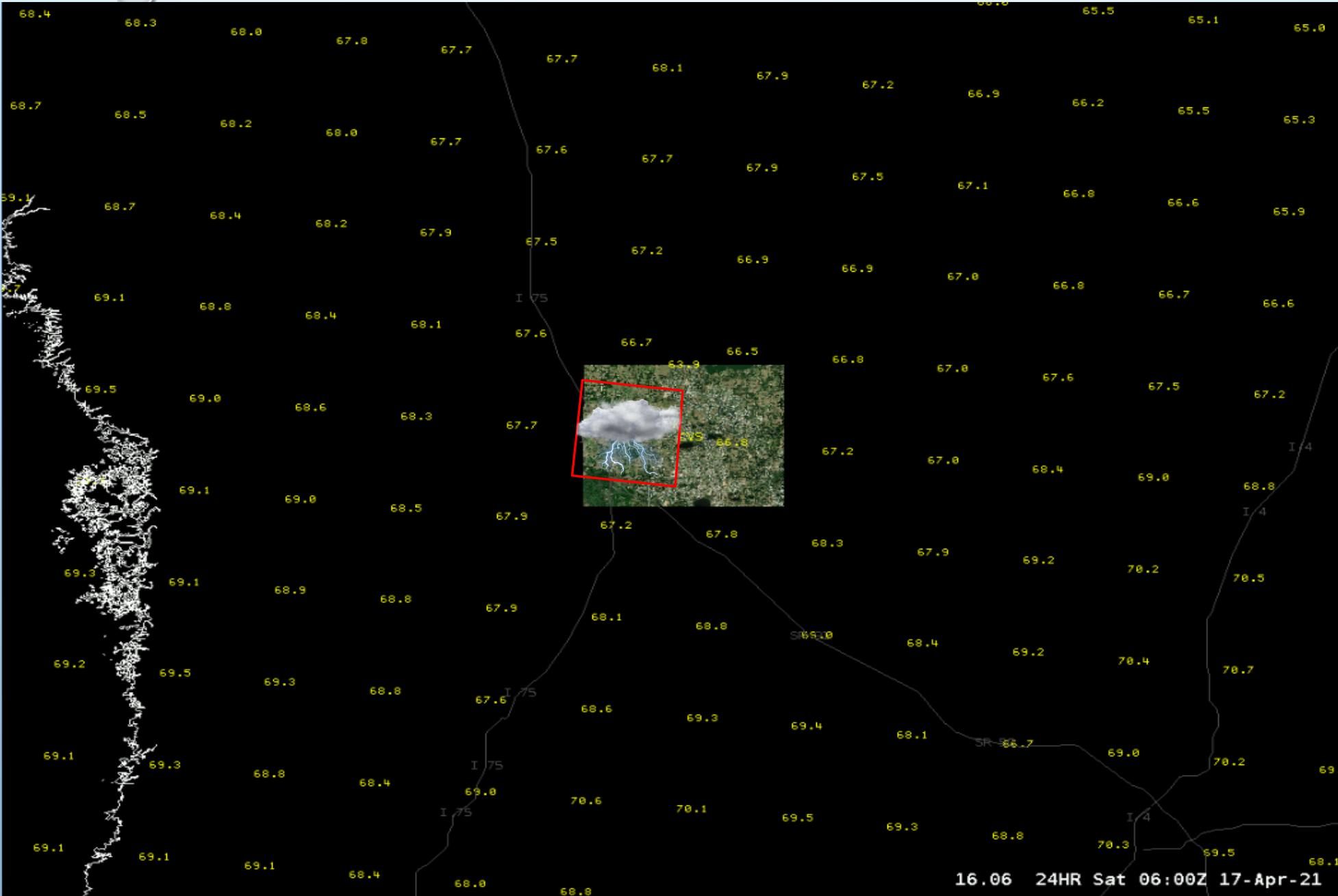
HRRR 3KM



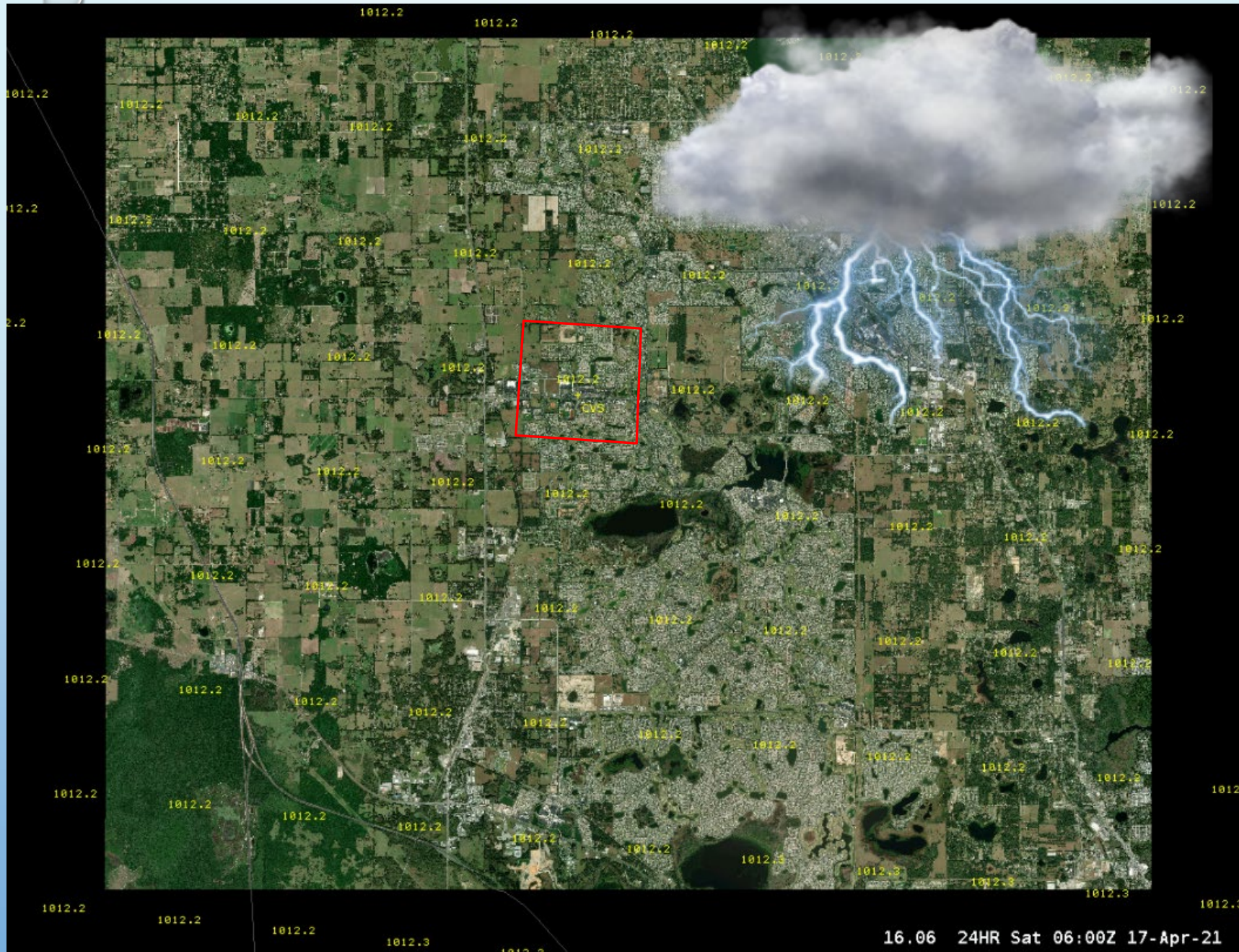
GFS GLOBAL 55KM



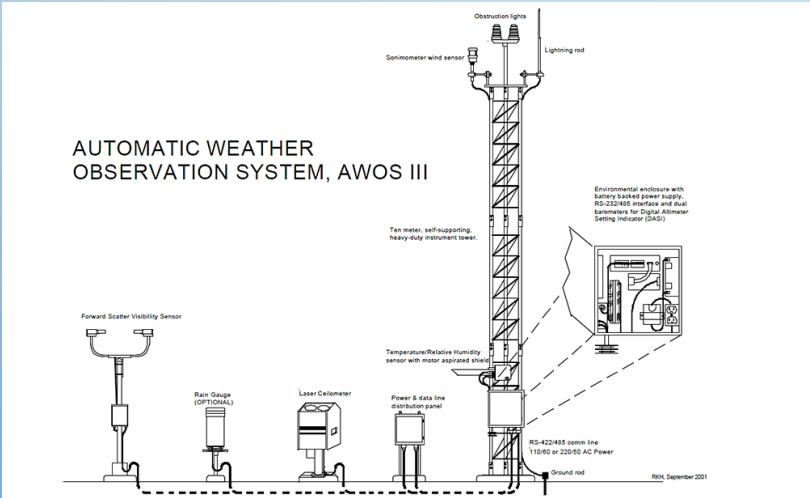
NAM12KM



HRRR 3KM



CERTIFIED OBSERVATIONS (METAR)



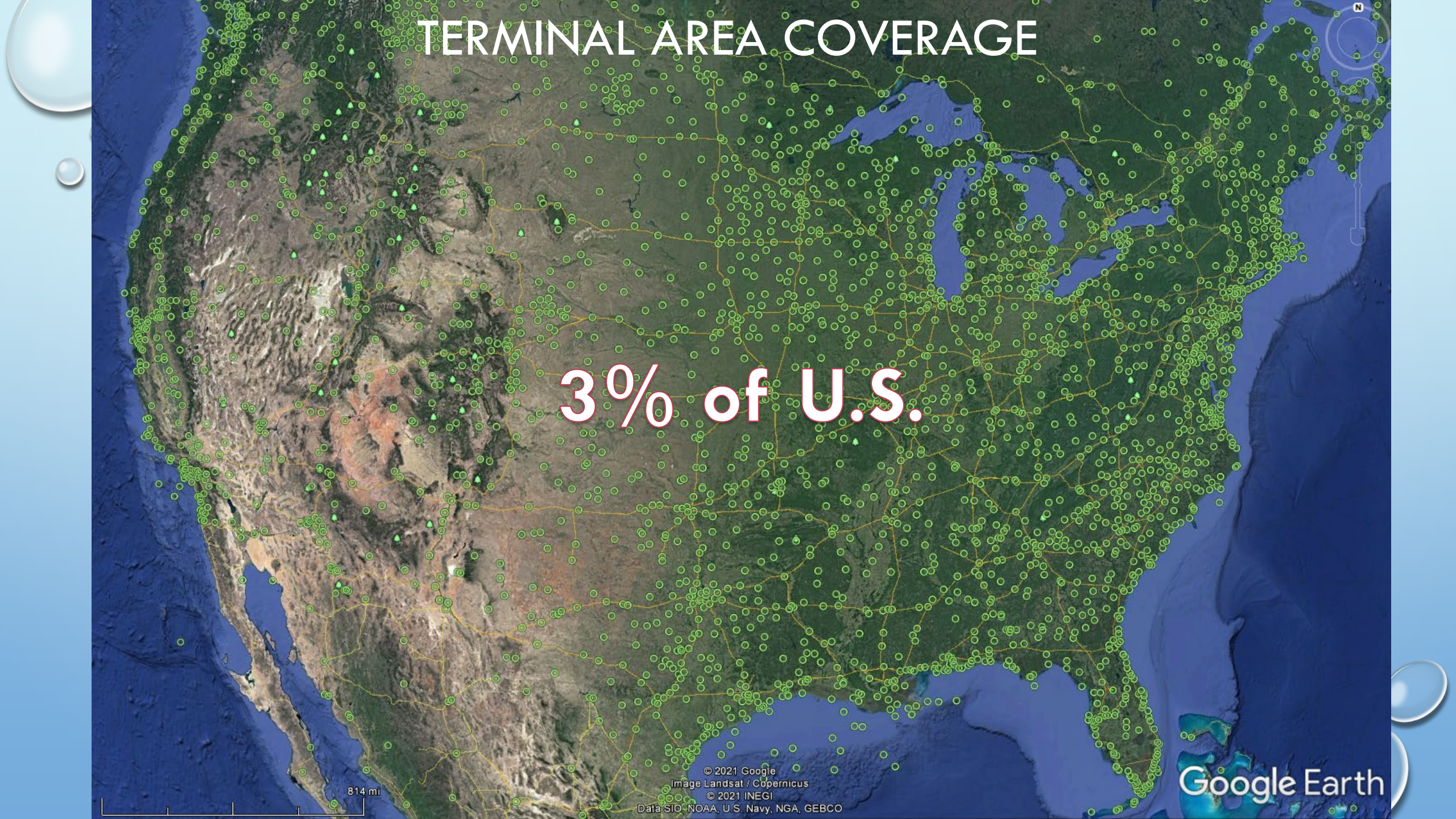
TERMINAL AREA COVERAGE

3% of U.S.

814 mi

© 2021 Google
Image Landsat / Copernicus
© 2021 INEGI
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Google Earth



OFFICIAL METAR

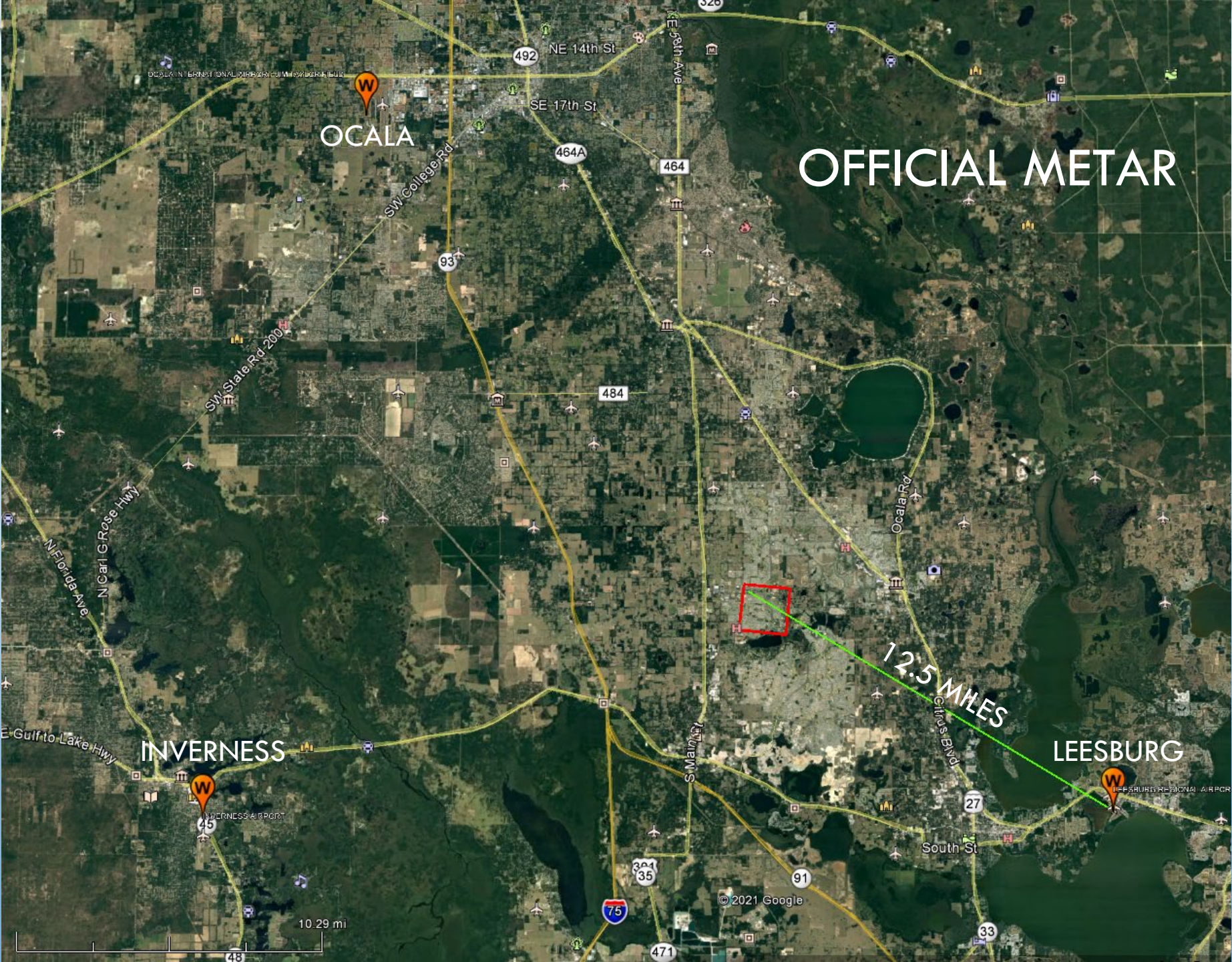
OCALA

INVERNESS

LEESBURG



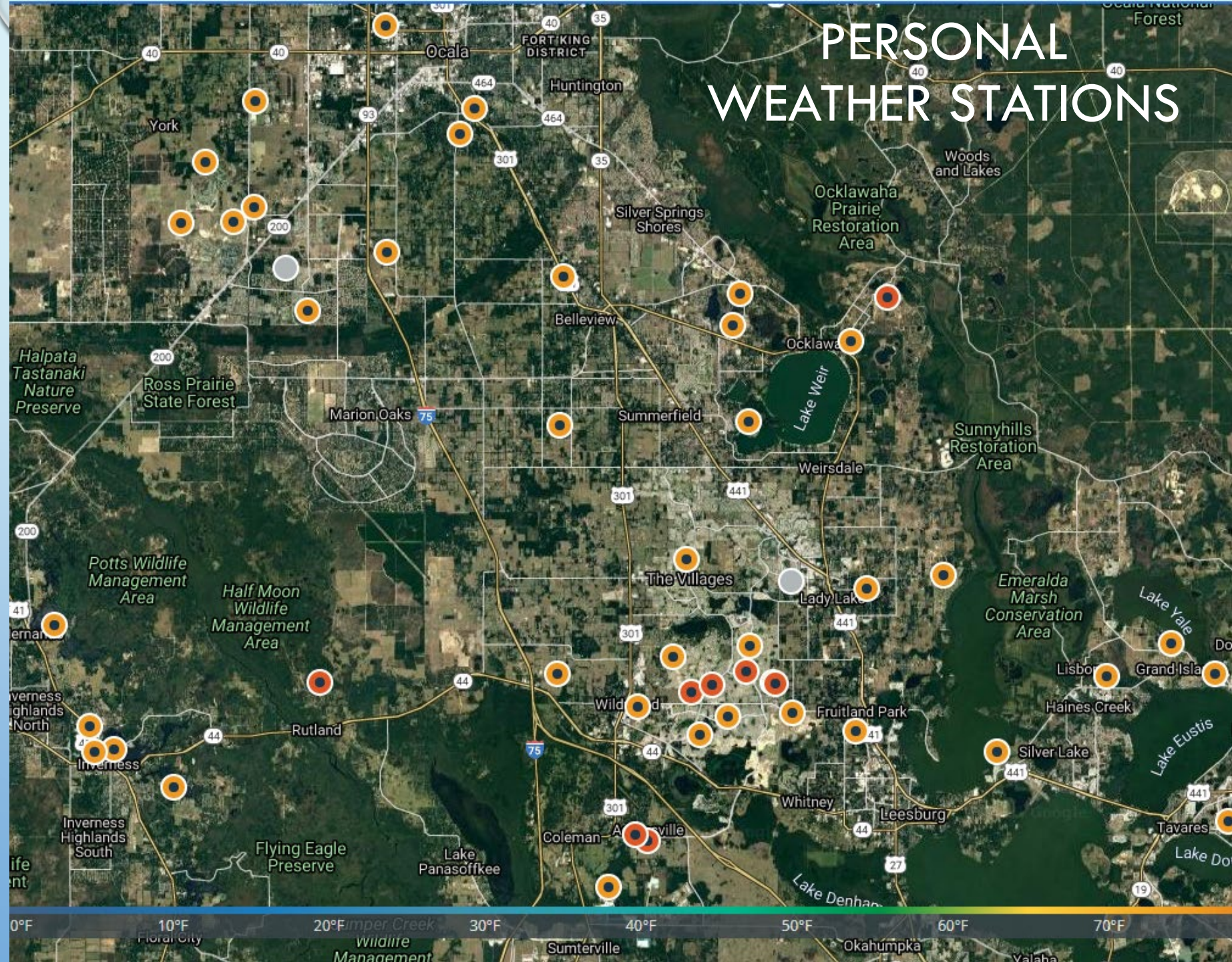
12.5 MILES



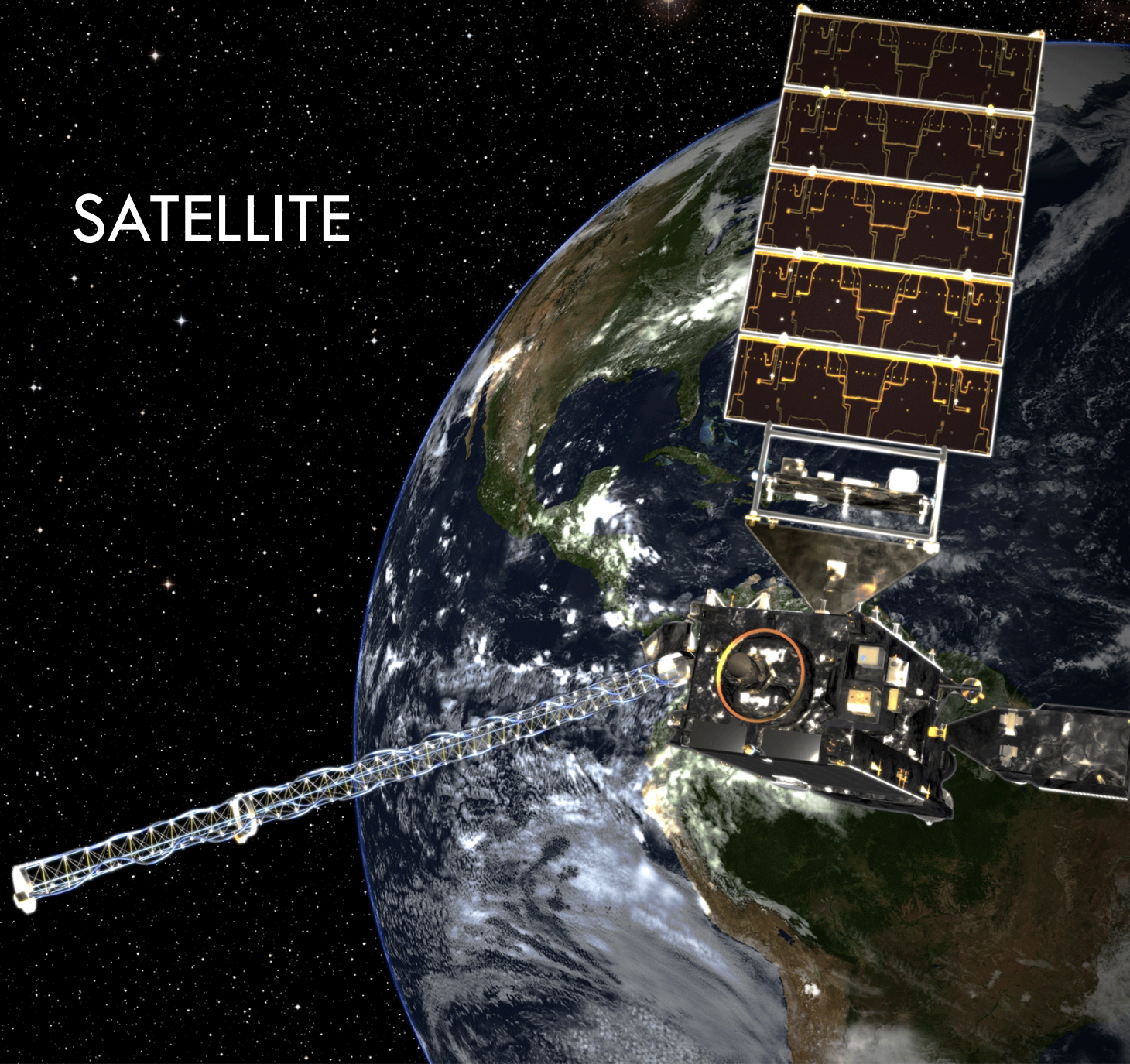
10.29 mi

© 2021 Google

PERSONAL WEATHER STATIONS



SATELLITE

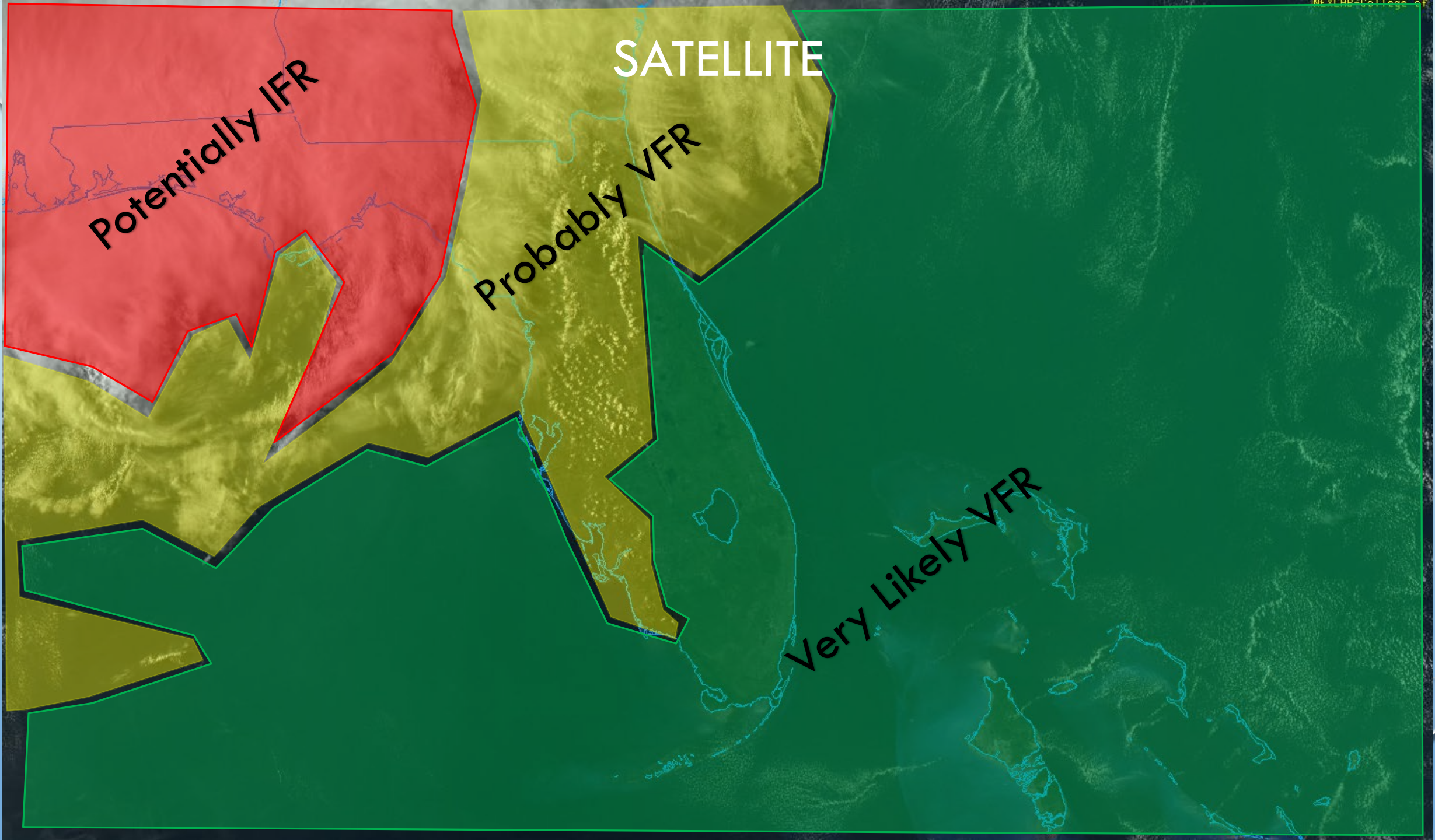


SATELLITE

Potentially IFR

Probably VFR

Very Likely VFR



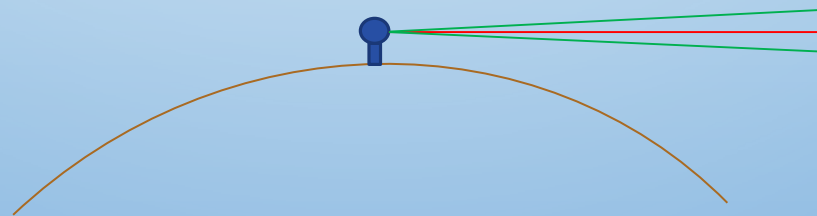
WHY DON'T WE USE RADAR?



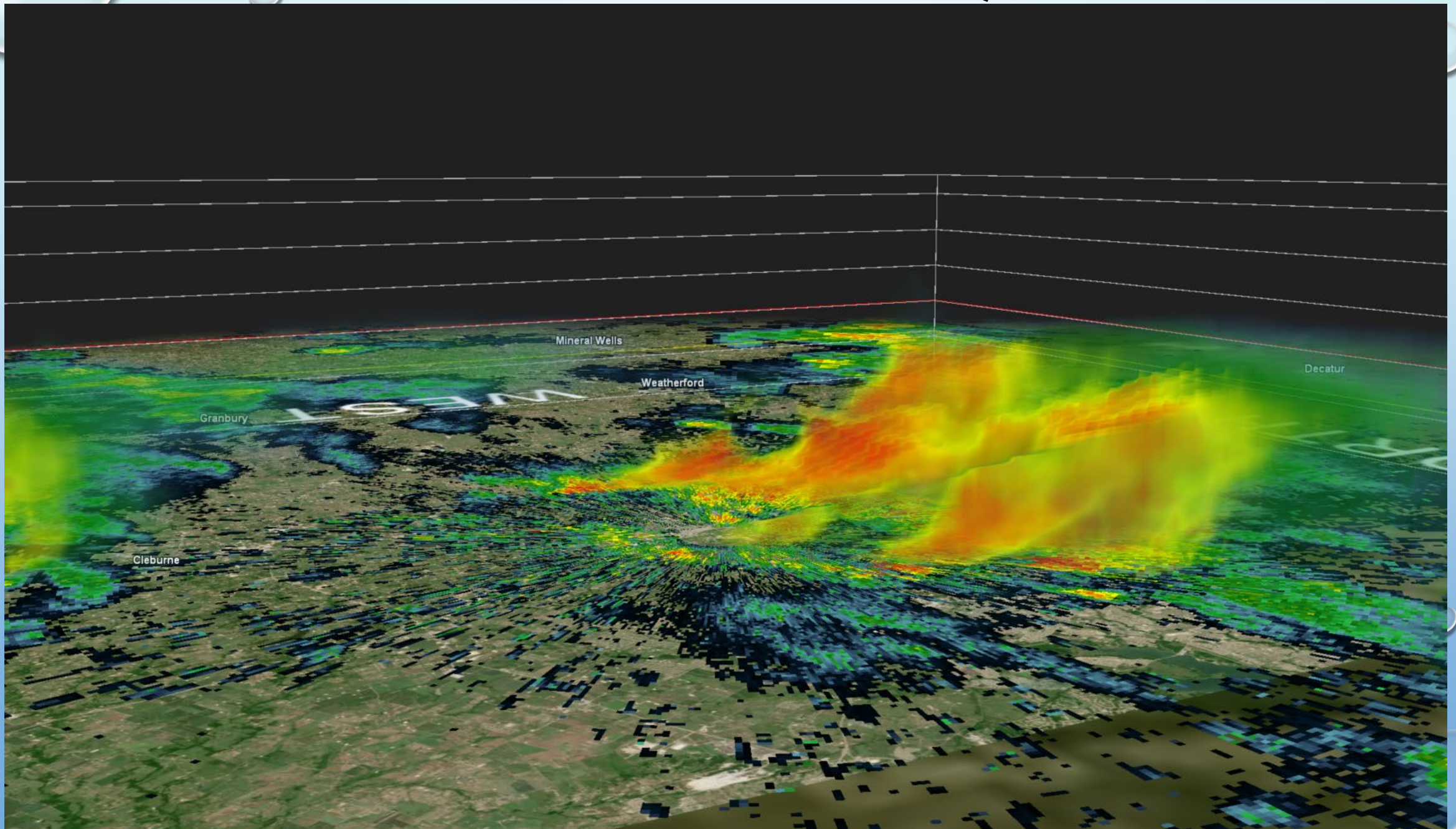
POLL: RADAR BEAM HEIGHT

- ASSUMING DRONE OPERATIONS ARE AT 400FT AGL OR BELOW, WHAT DISTANCE MUST YOU BE FROM A WEATHER RADAR TO PICK UP RAIN AT/BELOW THAT HEIGHT?
 - ~5 MILES
 - ~9 MILES
 - ~16 MILES
 - ~50 MILES

RADAR BEAM HEIGHT



REAL LIFE VISUAL – APRIL 23 2021, FORT WORTH



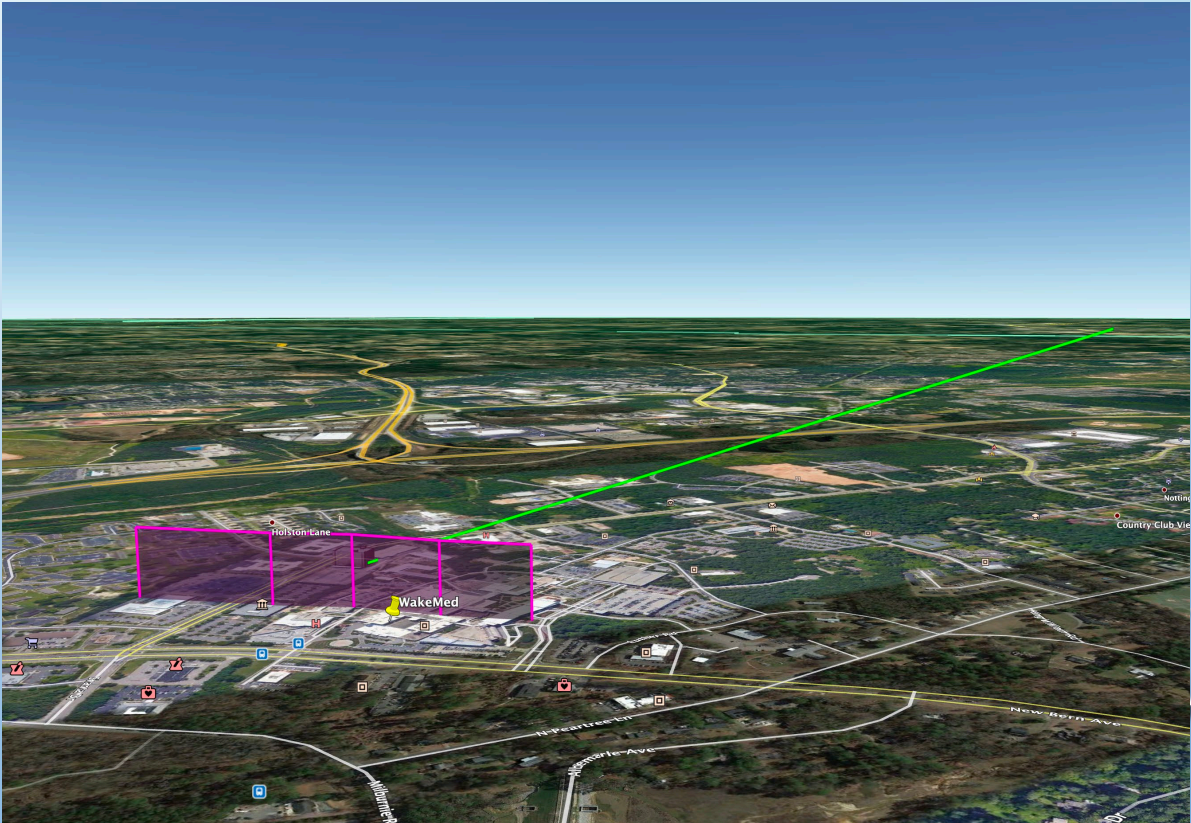
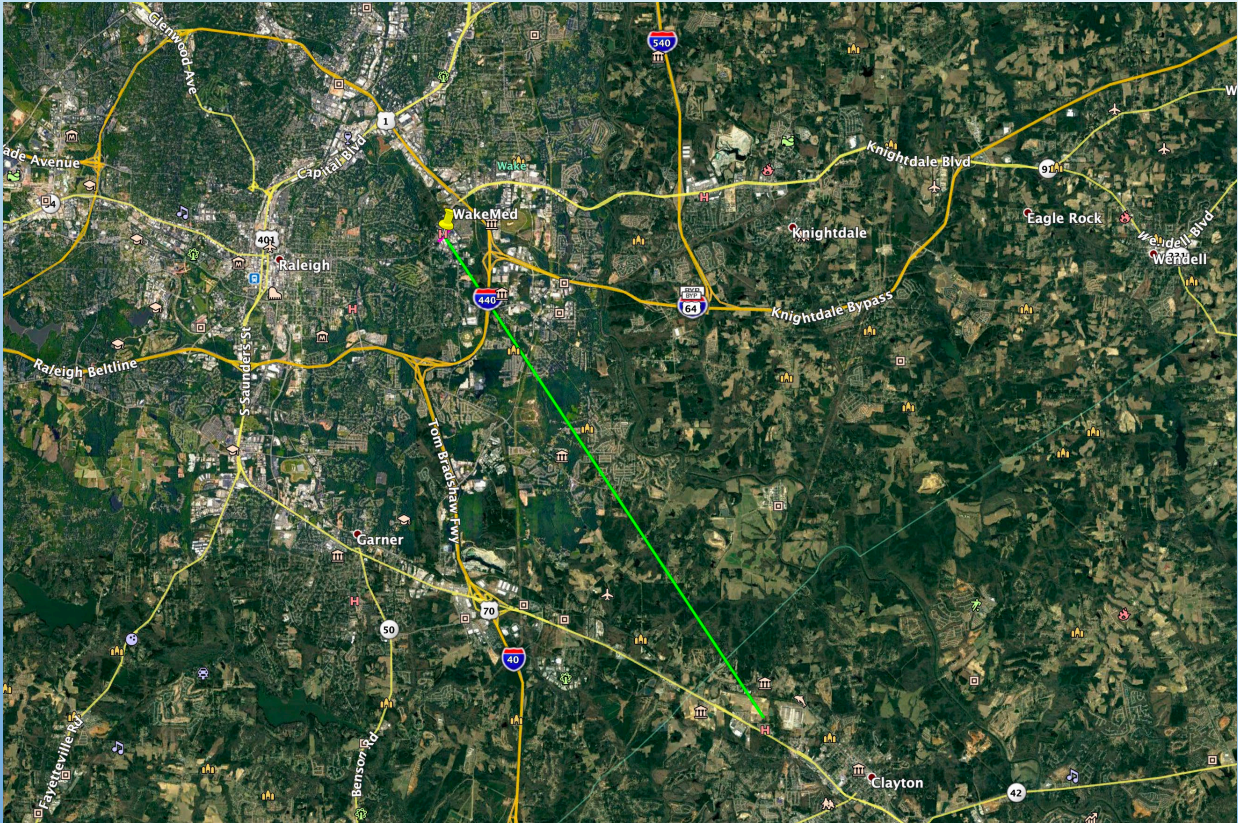
POLL: RADAR BEAM HEIGHT

- ASSUMING DRONE OPERATIONS ARE AT 400FT AGL OR BELOW, WHAT DISTANCE MUST YOU BE FROM A WEATHER RADAR TO PICK UP RAIN AT/BELOW THAT HEIGHT?
 - ~5 MILES
 - ~9 MILES
 - ~16 MILES
 - ~50 MILES

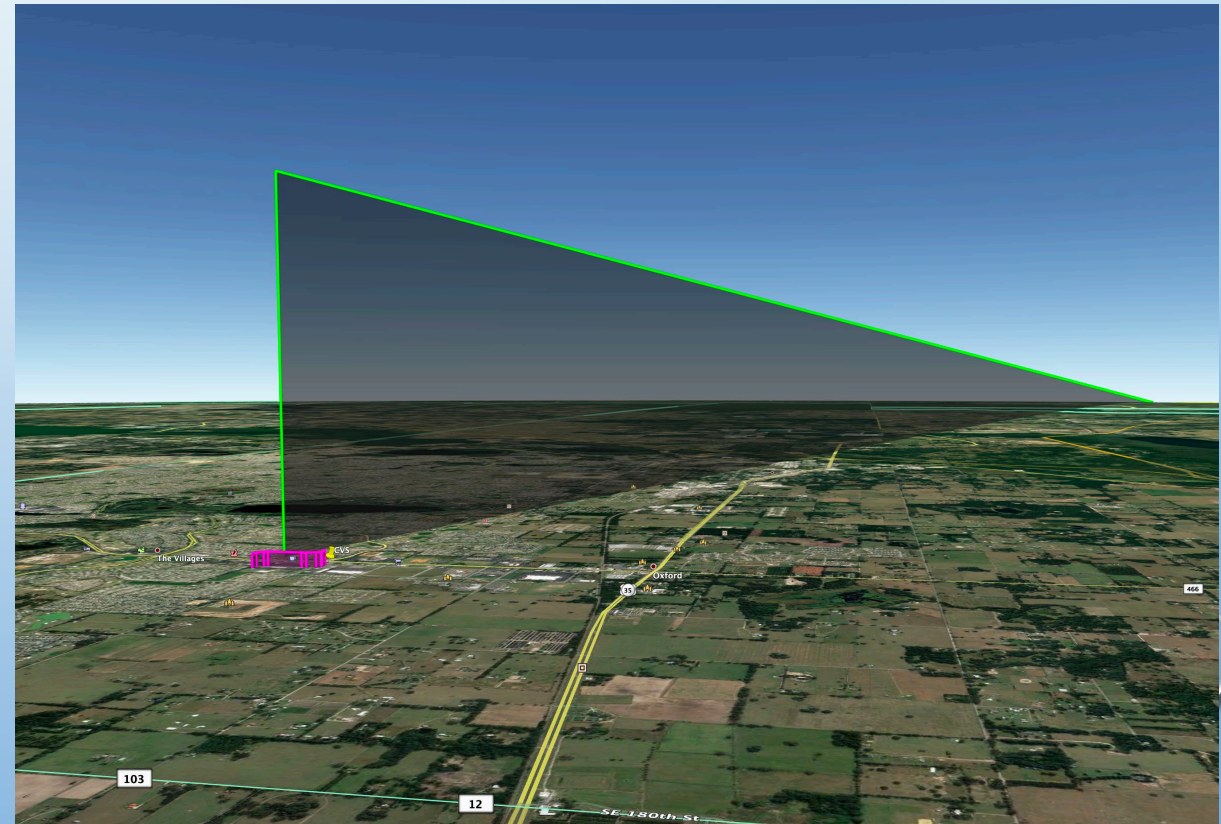
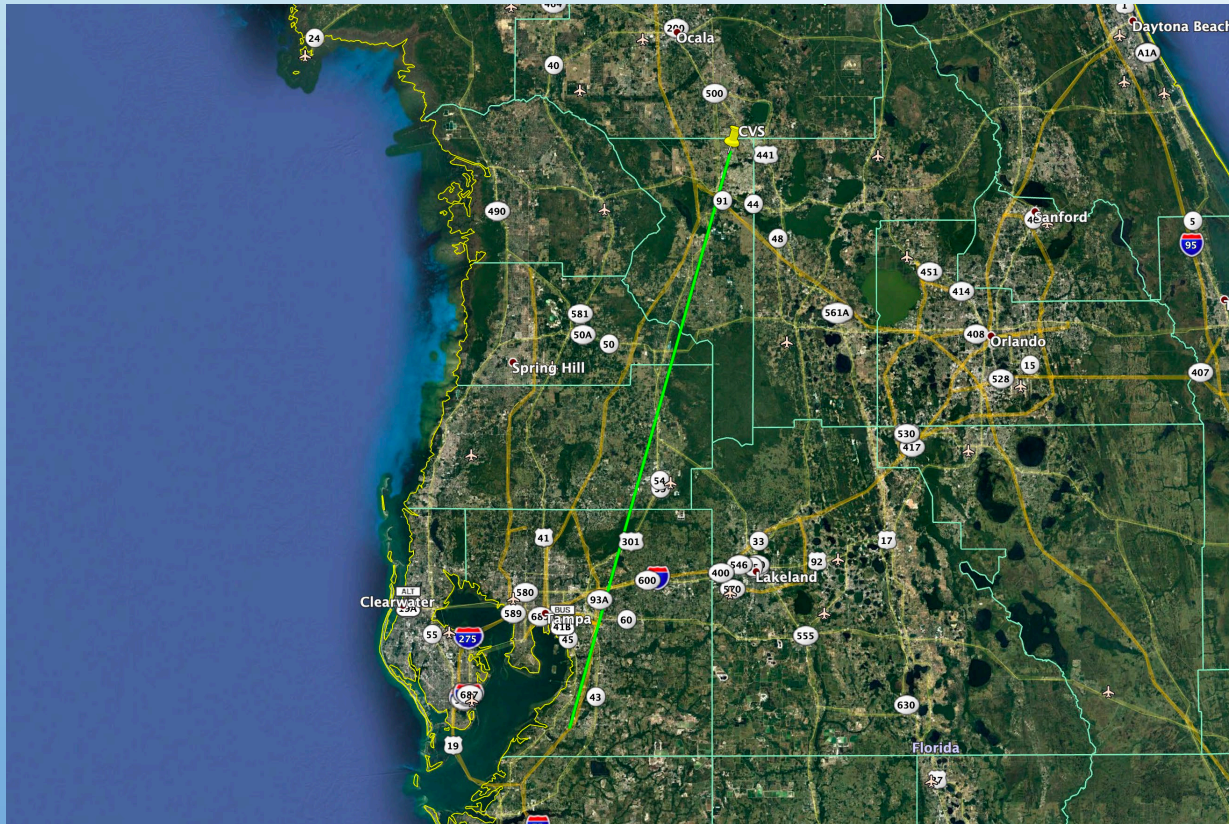
RALEIGH, NC

DISTANCE – 10 MILES

BEAM HEIGHT 200FT

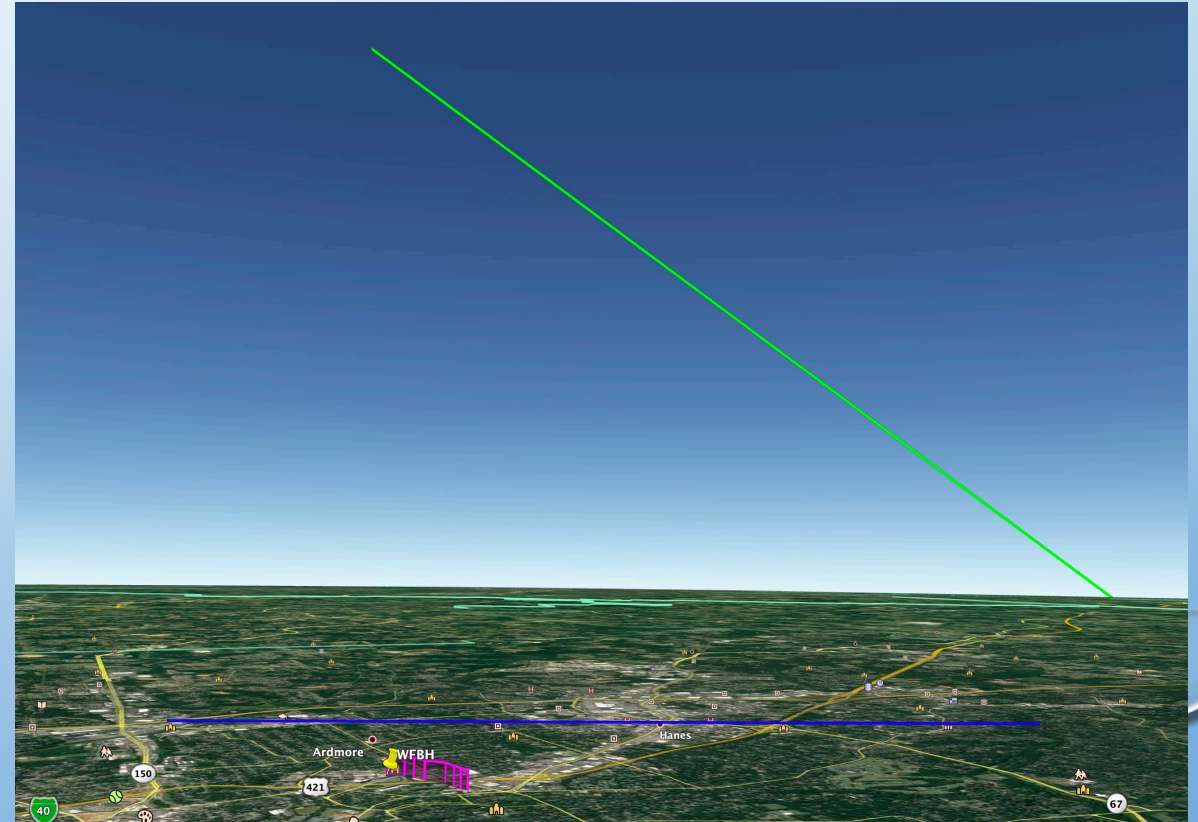
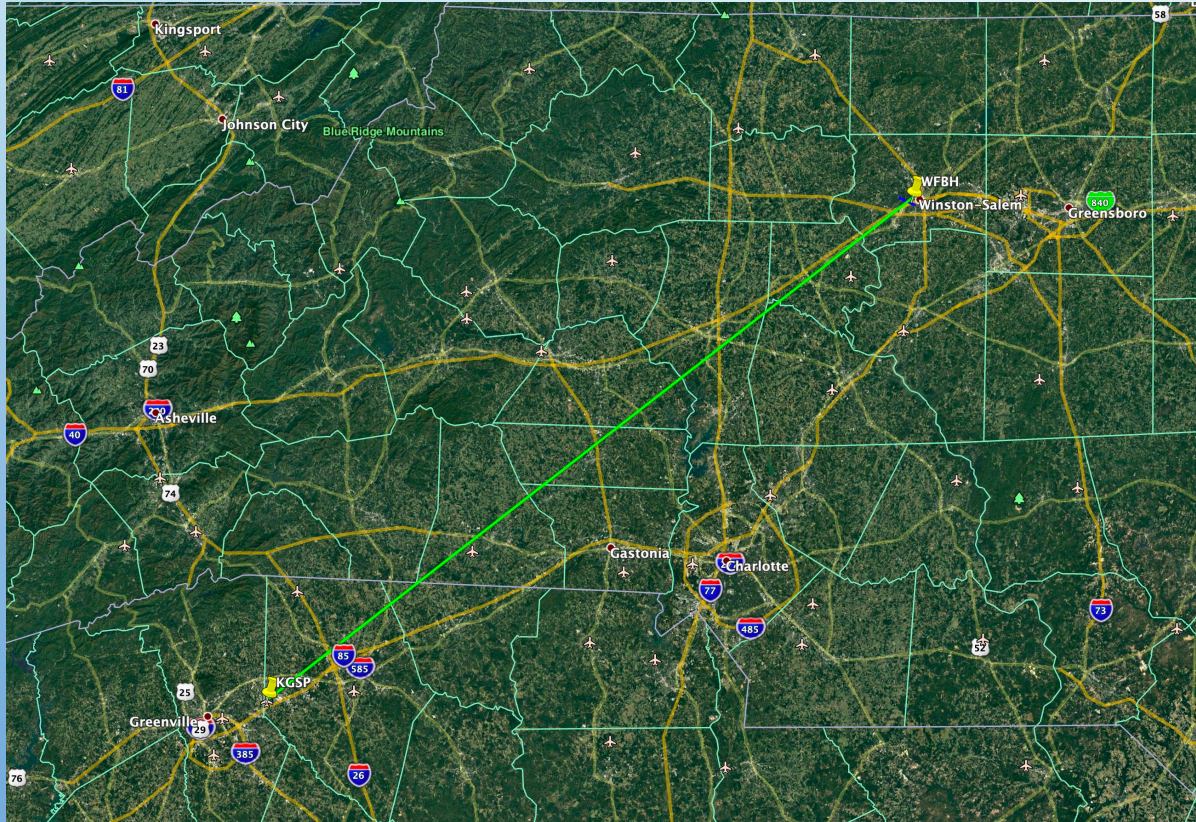


THE VILLAGES, FL DISTANCE – 88 MILES BEAM HEIGHT 7,900FT



WINSTON SALEM, NC

DISTANCE – 138 MILES
BEAM HEIGHT 12,000FT





WEATHER MINIMUMS AND SENSORS

HOW DO WE COMPLY WITH REGULATIONS?



PART 14 CFR 107.51 WEATHER MINIMUMS

(C) THE MINIMUM FLIGHT VISIBILITY, AS OBSERVED FROM THE LOCATION OF THE CONTROL STATION MUST BE NO LESS THAN 3 STATUTE MILES...[]...

(D) THE MINIMUM DISTANCE OF THE SMALL UNMANNED AIRCRAFT FROM CLOUDS MUST BE NO LESS THAN:

- (1) 500 FEET BELOW THE CLOUD; AND
- (2) 2,000 FEET HORIZONTALLY FROM THE CLOUD.

PHYSICAL WEATHER OBSERVATION STATION



- DO WE NEED OUR OWN SENSORS, AND WHAT REQUIREMENTS WILL THE FAA MANDATE? (LOCATION, ACCURACY, APPROVED INSTRUMENTS)
- HOW DO WE TACKLE VEHICLE MOUNTED SENSORS?
- TERMINAL AREA OBSERVATIONS ONLY GOOD FOR 5MI RADIUS FROM AIRPORT
- COST IS NOT CONDUCIVE TO OPERATIONS



WEATHER STATION BREAKDOWN

- BASIC SENSORS ARE COST EFFECTIVE
 - TEMPERATURE, DEWPOINT, WIND DIRECTION, WIND SPEED, RAIN AMOUNT, RAIN RATE, HUMIDITY, ETC
 - BASIC STATIONS \$500-\$13,000
- ASIDE FROM BASIC SENSORS, FAA IS MOST CONCERNED WITH CEILING AND VISIBILITY
 - THE CEILOMETER SENSOR BY ITSELF IS \$18,000
 - TOTAL COST BECOMES OVER \$35,000

MUST BE APPROVED BY FAA FOR OFFICIAL USE BY PART 135 AIRLINE



UAS OBSERVATIONS?

- INSTALL SENSORS ON UAS
 - TRADEOFF – WEIGHT VS PAYLOAD
 - ACTIVE [RADAR/LIDAR] VS PASSIVE [BAROMETER]
- INSTALL SENSORS ON GROUND BASED VEHICLES
- USE EXISTING ALTERNATIVE SENSORS AND ADAPT FOR WEATHER
 - DOT WEATHER CAMS
 - CELL PHONE TOWERS
- BALLOON SOUNDING DATA FOR <400FT
 - HOW TO WE TRANSMIT AND DISPLAY

FINAL THOUGHTS

THE FAA PROCESS IS A DEMONSTRATE AND PROVE METHOD.

WE HAVE TO DEMONSTRATE NON-TRADITIONAL METHODS TO COLLECT WEATHER DATA, THEN LOG AND VALIDATE THAT DATA AGAINST EXISTING FAA APPROVED SENSORS. THIS WILL PROVE THAT ALTERNATE METHODS MAY BE USED AS PRIMARY FOR LOW ALTITUDE OPERATIONS.

AVIATION SENSORS HAVE NOT CHANGED MUCH OVER 30 YEARS, BUT TECHNOLOGY HAS ADVANCED.

NEW INNOVATIVE SOLUTIONS ARE NOT DESIGNED FOR MANNED AVIATION, BUT COULD SUPPLEMENT AREAS WHERE AWOS STATIONS ARE NOT AVAILABLE. THIS WOULD ESPECIALLY BE HELPFUL FOR MEDEVAC HELICOPTERS AND SPARSELY POPULATED AREAS.

COMPUTER MODEL OUTPUT MUST HAVE MORE INPUT TO INCREASE RESOLUTION AND SCALE TO THE MICROWEATHER ENVIRONMENT. WITHOUT MORE INPUT, CLAIMS OF 500M RESOLUTION ARE JUST PLAIN FALSE.

WHICH IS BETTER?

“CERTIFIED” OUT OF OPERATING RANGE DATA

“UNCERTIFIED” DATA WITHIN OPERATING RANGE

NO DATA

WHEN IN DOUBT...

1 800-WX-BRIEF

https://www.1800wxbrief.com/Website/#!/

ome

FlightService Home Dashboard Map Wx Charts Plan & Brief Airports Account Features Links Help

Fri Apr 23 16:19:45 EDT | 20:19:45 Z

Featured Capabilities

- New Briefing**
- Interactive Map**
- Automated Voice Service**
- SMS Text Message Service**

Latest Features & Enhancements

Resources

- Service Provider Integration
- How-To Videos
- Pilot Tip Cards
- Phone Numbers & Quick Steps

News & Announcements

February 8, 2021

FAA GA Survey Now Open


The General Aviation (GA) Survey is now open at <https://www.surveymzmo.com/s3/4309962/>. This FAA survey is being administered by CFI Group, an independent third-party research group. This brief survey asks about your satisfaction with the 1800wxbrief.com website as well as ways that we can improve our service to you. Your answers will remain anonymous and will be combined with those from other respondents for research and evaluation purposes only.

[READ MORE >](#)

December 9, 2020

To Go or Not To Go

Evaluate departure time detail is now available!



[READ MORE >](#)

September 23, 2020

Local Area Knowledge on the Interactive Map

Local Area Knowledge (LAK) is now available

Login

Username [Create Account](#)

Password [Forgot/Reset Password](#)

[Login](#)

Upcoming Events

There are no upcoming events.

The background is a light blue gradient with several realistic water droplets of various sizes scattered across the surface. The droplets have highlights and shadows, giving them a three-dimensional appearance.

LOW LEVEL WEATHER CHALLENGES

JUSTIN HILLIARD – UPS FLIGHT FORWARD