MISSISSIPPI STATE UNIVERSITY™

RASPET FLIGHT RESEARCH LABORATORY

RASPET FLIGHT RESEARCH LABORATORY

Nationally recognized leader in aeronautical RDT&E – conducting applied research for over 75 years.

EXPANDING THE ENVELOPE, EXPLORING THE POSSIBLE, AND ENABLING THE NEXT ERA OF AVIATION.

Designations:

- ***FAA's ASSURE UAS Center of Excellence*** ..... 2015 – present
- ***Department of Homeland Security's UAS Test Site*** ..... 2017 – present
- ***FAA's UAS Safety Research Facility*** ..... 2020 – present

Facility & Capability Highlights:

- **50,000 ft²** of climate-controlled laboratory, test, & hangar facilities
- **On-site** at KSTF airfield
- Operate the **largest UAS in all of academia**
- **75,000+ mi²** of FAA COA accessible airspace (multi-state coverage)

MISSISSIPPI STATE UNIVERSITY™
RASPET FLIGHT RESEARCH LABORATORY

OUR LEGACY – *DR. AUGUST "GUS" RASPET*

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Raspet Flight Research Laboratory

1948
- Dr. August "Gus" Raspet

1949
- Department of Aerophysics

1950
- National Soaring Champion Aircraft

1955
- MARVEL

1957
- Marvelette

1960
- Honoring our namesake, Naming of the Laboratory

1965
- MARVEL's Maiden Flight

1981
- Desert Utility Observation with Brico Limited

1985
- Honda Research and Development Corporation

1991
- X-30 National Aerospace Plane

1993
- MH-02's Maiden Flight

2003
- National Landmark of Soaring

2003
- Aurora Flight Sciences

2007
- Stark Aerospace

2015
- ASSURE

2017
- DHS S&T UAS Demo Range

2020
- FAA's UAS Safety Research Facility

2021
- First Large UAS Flight in Class C Airspace

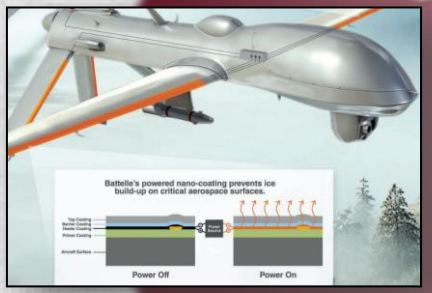
2022
- Largest UAS in Academic Research, NASC Teros

OUR VISION, OUR MISSION, OUR LEGACY

Aurora Flight Sciences

Honda Jet

Airbus Helicopters



Battelle Memorial Institute

MISSISSIPPI STATE UNIVERSITY™

RASPET FLIGHT RESEARCH LABORATORY

Navmar Applied Sciences Corp.

Insitu

General Electric

Stark Aerospace

Local, *National*, & *Global* Hub for Aeronautical RDT&E for Product, Application, & Economic Development

WHAT WE FLY

LARGE UAS ASSETS

NASC Teros

Largest in Academic Research

- **Max Gross Takeoff Weight** ..... 1,800 lbs
- **Max Payload** ..... 400 lbs
- **Range*** ..... 70+ mi
- **Endurance** ..... 15+ hrs

* *Range can be expanded with specialized communication systems*

x2

NASC TigerShark-XP

Primary Large UAS Asset

- **Max Gross Takeoff Weight** ..... 515 lbs
- **Max Payload** ..... 95 lbs
- **Range*** ..... 70+ mi
- **Endurance** ..... 8+ hrs

* *Range can be expanded with specialized communication systems*

x4

Custom Team Edge 60% Cub

Fly Anywhere

- **Max Gross Takeoff Weight** ..... XXX lbs
- **Max Payload** ..... XXX lbs
- **Range** ..... XXX mi
- **Endurance** ..... X hrs

x5

SMALL UAS ASSETS

Applied Aeronautics Albatross

DJI Matrice 600 Pro

Legacy Aviation Turbo Bushmaster

Skydio X2

DJI Mavic 2 Enterprise

Autel EVO II

MOBILE UAS GROUND CONTROL STATIONS

- **Three Mobile GCSs**
  - 28’, 40’, and 48’
- **Multiple simultaneous Large UAS operations**
- **Self-sustaining**
  - Onboard generator
  - Climate controlled
  - Segregated cockpit and workstation environments
- **On-site. Real-time.**
  - Flight testing
  - Engineering data collection and analysis
  - Situational awareness

CREWED ASSETS

Cessna L319

Primary Large UAS Chase Aircraft

- Max Gross Takeoff Weight ..... 1,614 lbs
- Max Airspeed ..... 113 kts
- Cruise Airspeed ..... 100 kts
- Max Altitude ..... 20,300 ft

Grumman American AA5B Tiger

Primary Trainer

- Max Gross Takeoff Weight ..... 2,200 lbs
- Max Airspeed ..... 143 kts
- Cruise Airspeed ..... 139 kts
- Max Altitude ..... 13,800 ft

Boeing PT-17 Stearman

Show & Workhorse

- Max Gross Takeoff Weight ..... 2,635 lbs
- Max Airspeed ..... 135 kts
- Cruise Airspeed ..... 100 kts
- Max Altitude ..... 15,000 ft

JMAA works with MSU to fly unmanned planes at Jackson airport

WHERE WE FLY

LARGE UAS AIRSPACE ACCESS

FAA Certificate of Authorization (COA) Airspace

75,000+ mi² – *continually expanding with research needs*

Controlled & Uncontrolled National Airspace Access

- Surface – 15,000 ft MSL
- ***Class C***, D, & E Controlled Airspace Operations

Special Use Airspace (SUA) Access

Restricted Airspace (300 mi²)

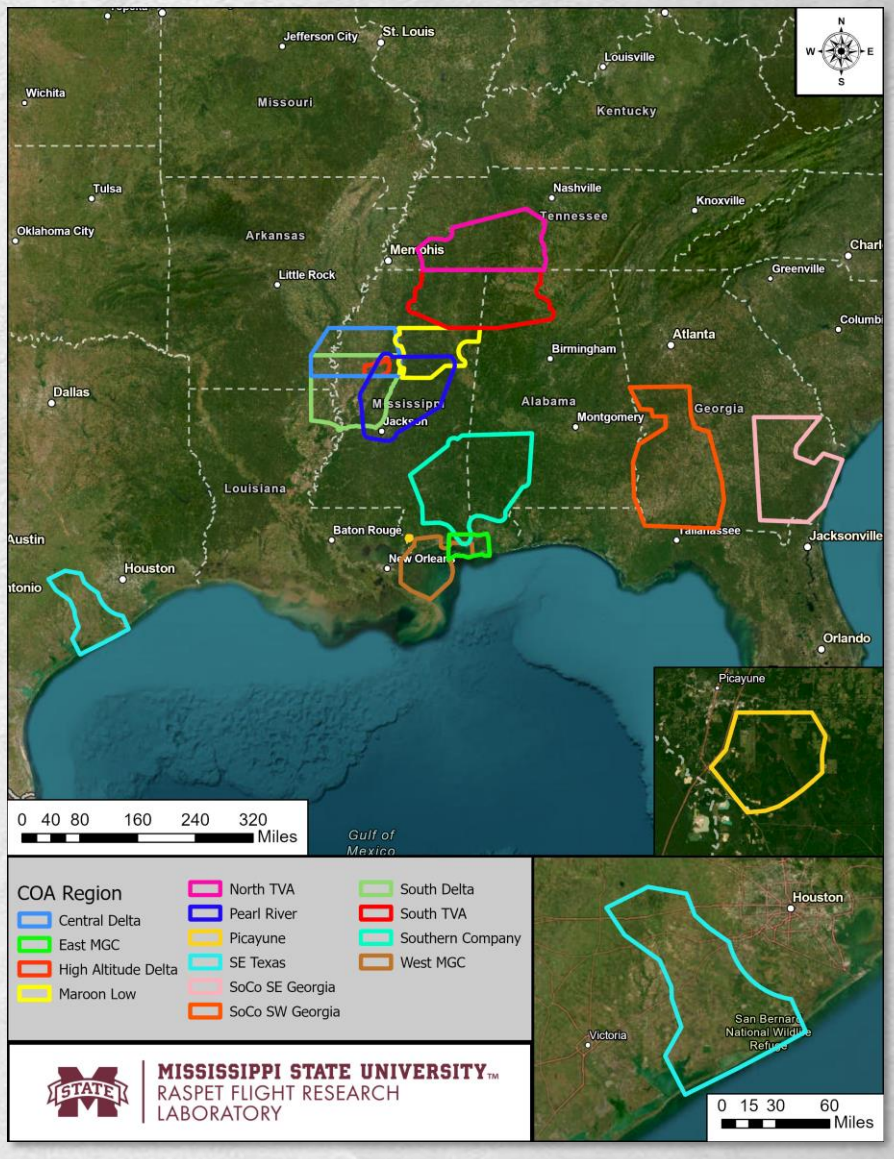
- Surface – 29,000 ft MSL

Warning Area Airspace (1,600 mi²)

- Surface – 60,000 ft MSL

40+ Cooperative Airports Across 8 States

MS, AL, AR, GA, LA, OK, TN, & TX

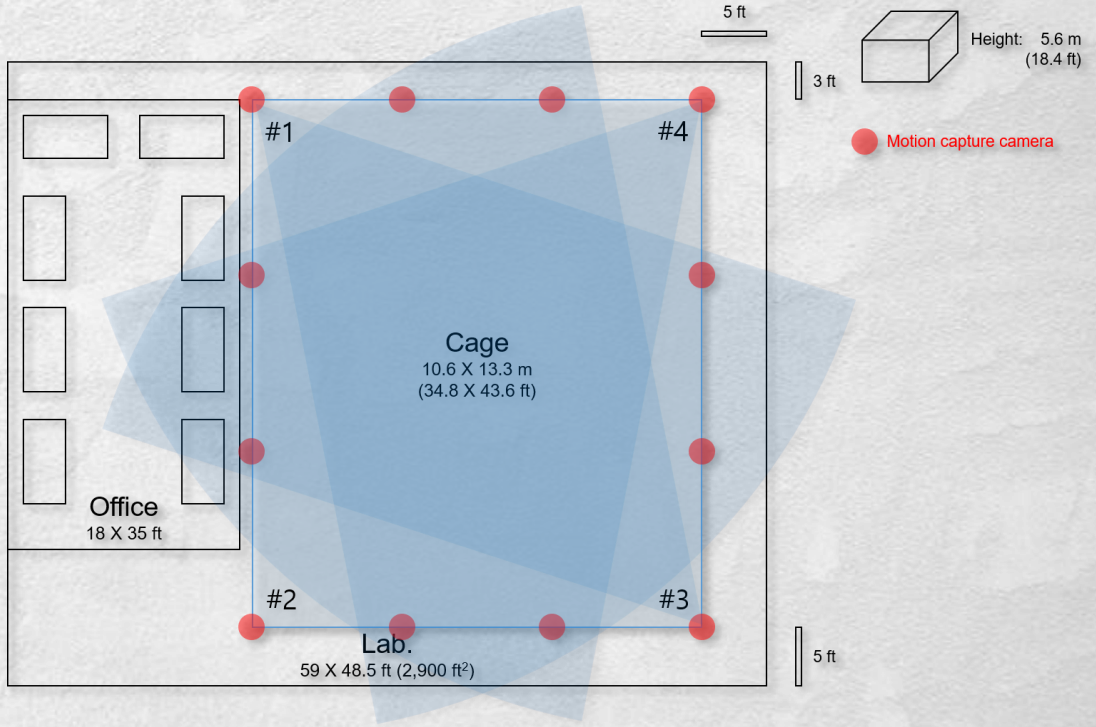


Camp Shelby Joint Forces Training Center

- **134,000-acre** training, exercise and operational evaluation center
- **Only** UAS Regional Flight Center in the nation
- **100 mi²** of Restricted Airspace
  - Surface – 29,000’ MSL
- Full-scale exercise planning/execution
  - Explosive, HAZMAT, live-fire operational capable
- ANG-operated UAS on-site
  - RQ-7 Shadow
  - RQ-11 Raven
  - RQ-20 Puma

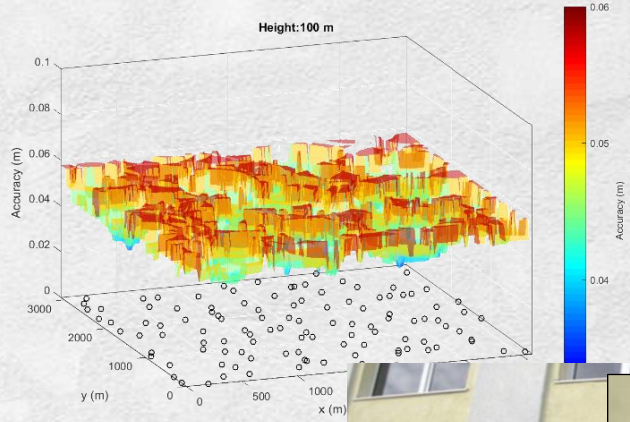
Autonomous Systems Research Lab

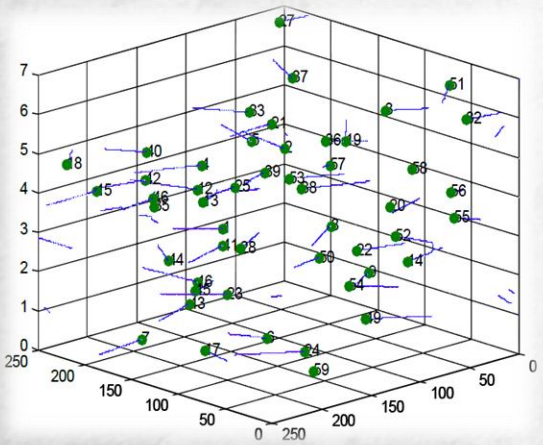
- **Lab-Within-A-Lab**
- Netted Laboratory Space (1,500 sq. ft)
- **12** Motion Capture Cameras
  - **Less than 1 millimeter** position error

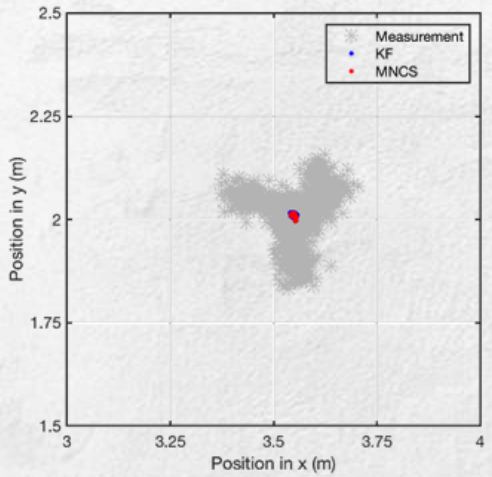


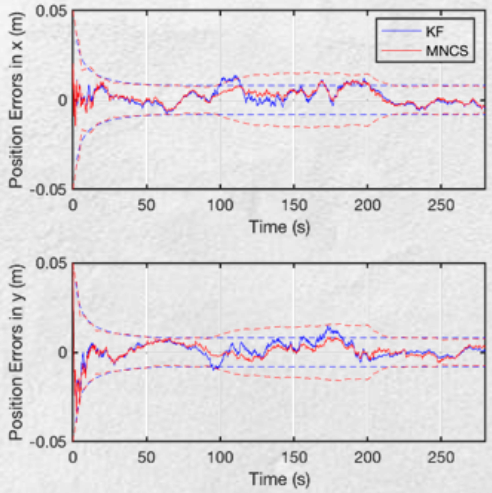
Autonomous Systems Research Lab

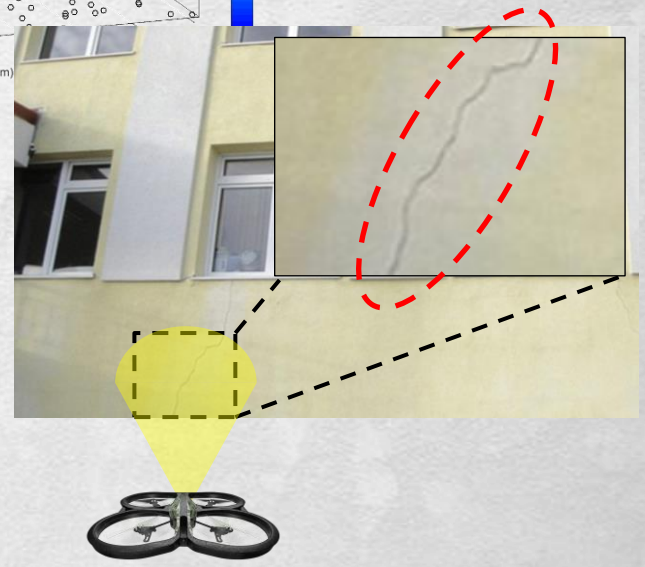
- **Multi-UAS** control strategy/control laws evaluations
  - **Swarm Collision Avoidance**
  - Optimized spatial positioning – **machine learning**
- Disposable Sensor Network Simulation and Increased Performance via Kalman Filtering Research
- Structural Health Monitoring (**Crack Detection**)



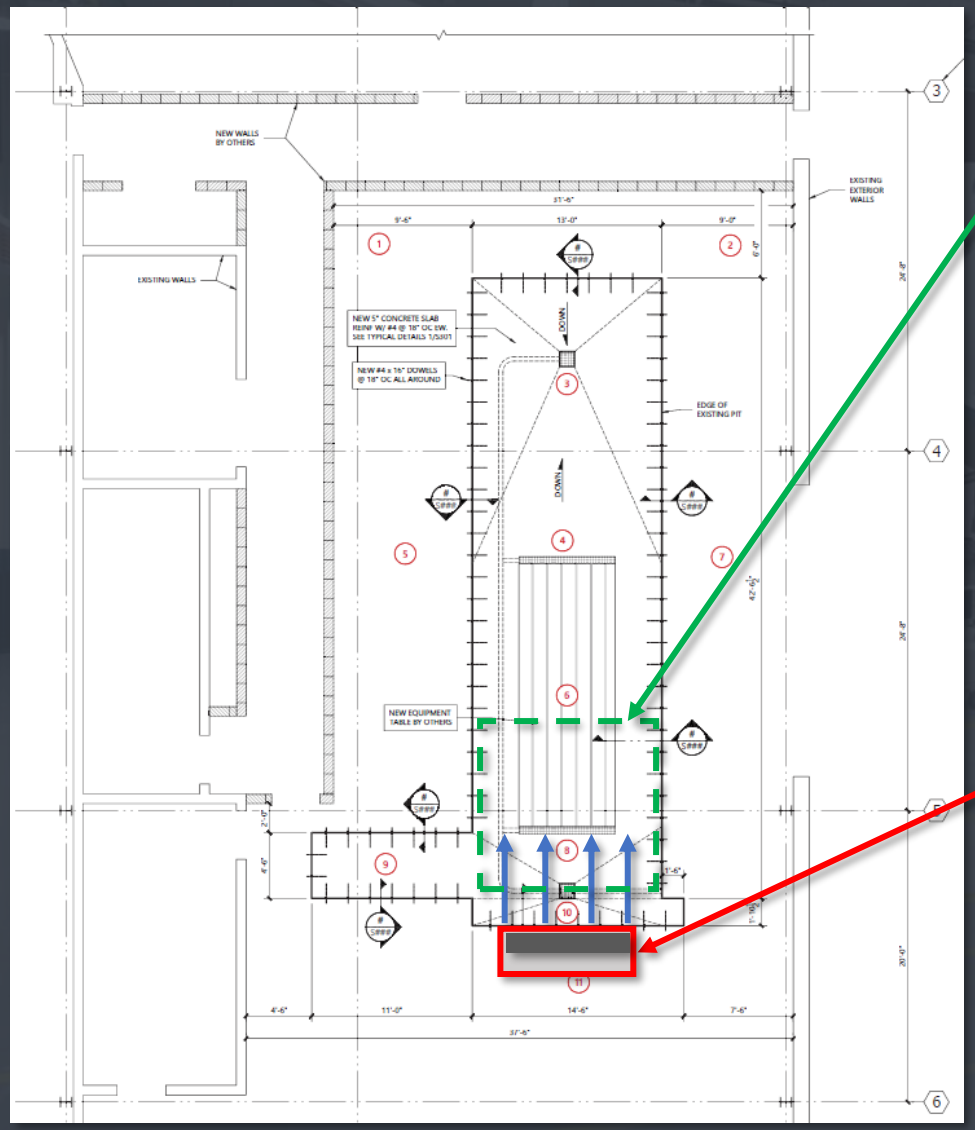








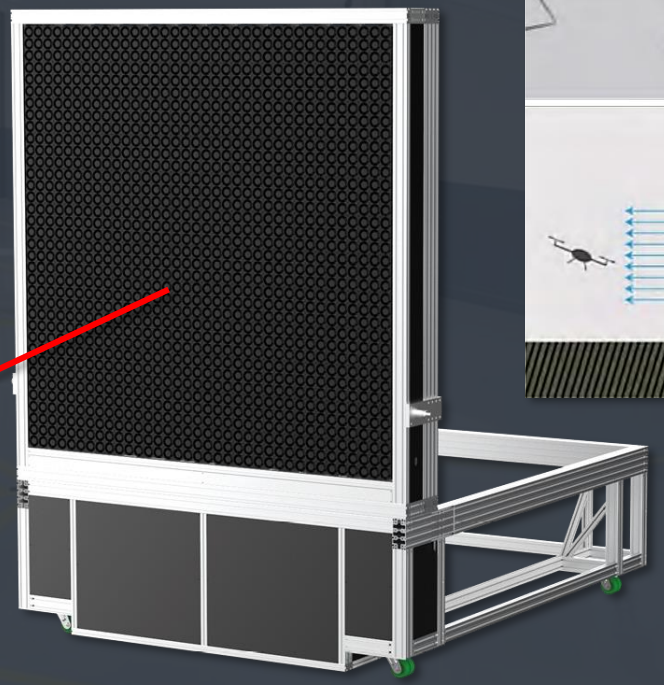
Inclement Weather Research Laboratory

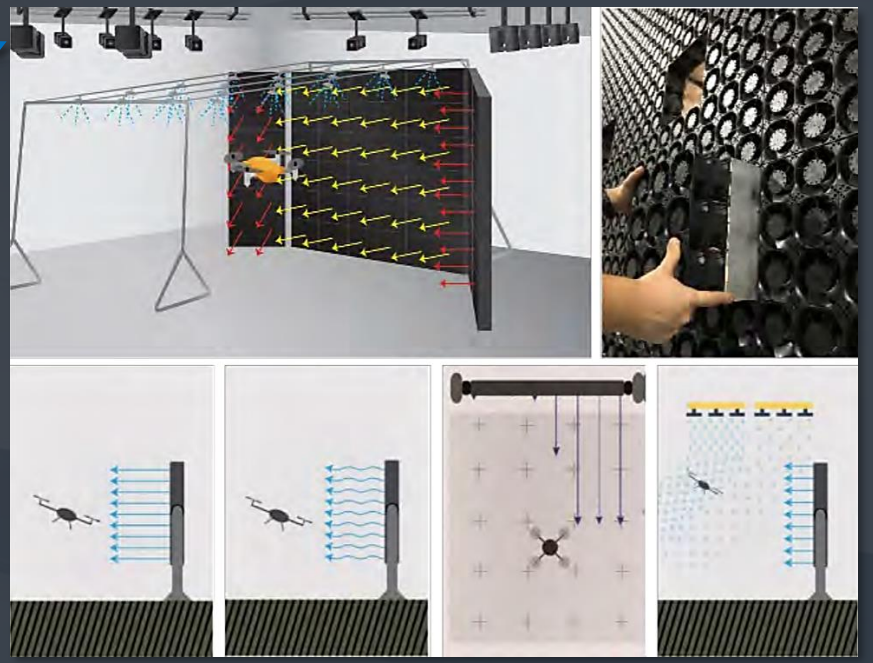


12'x12' Overhead Precipitation System

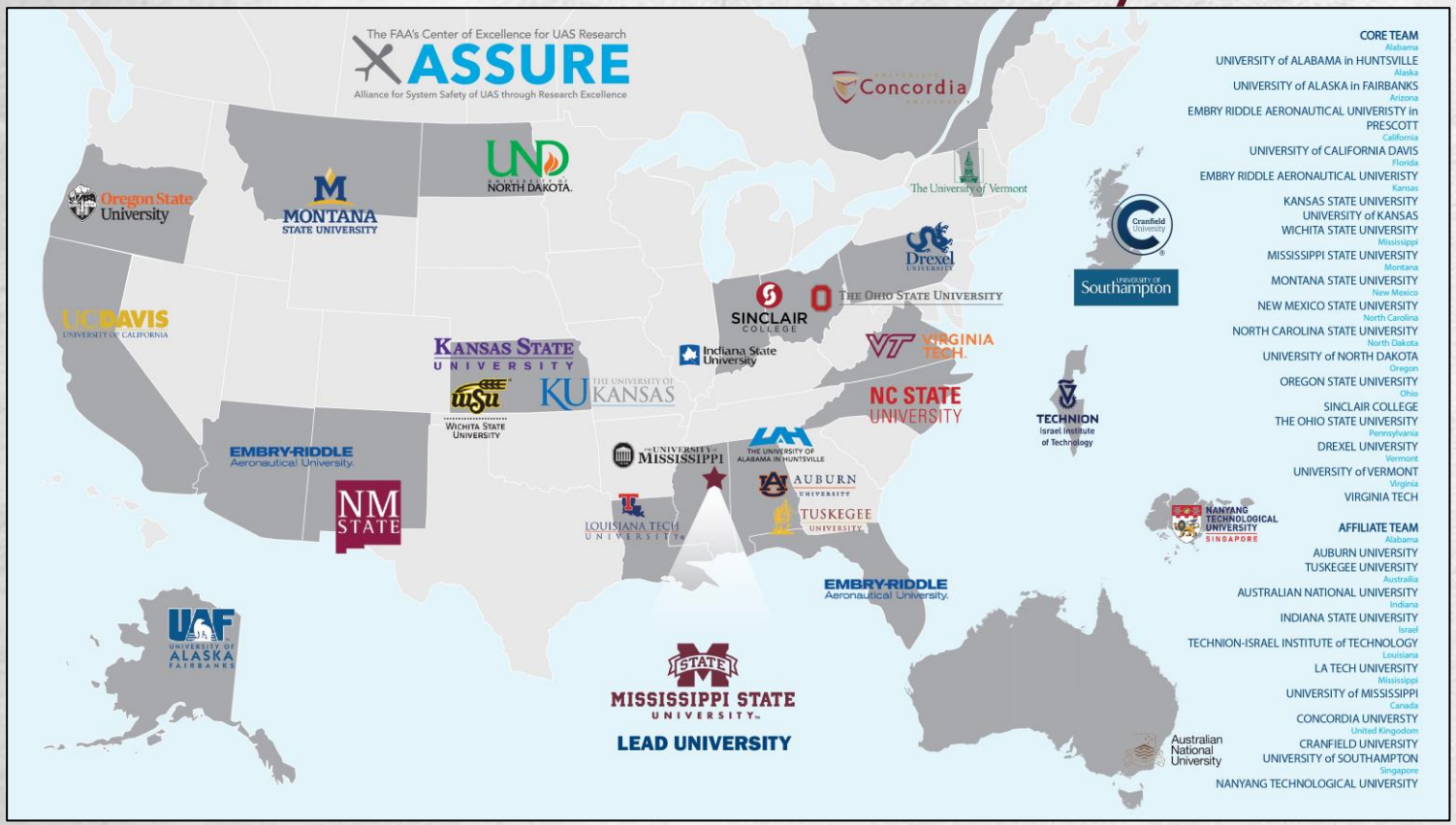
New Mocap System

12'x12' Windshaper



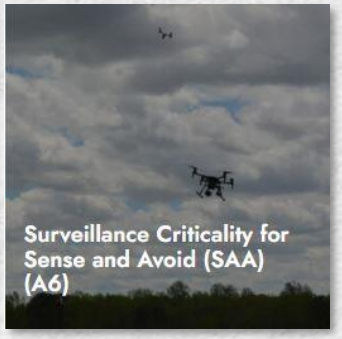


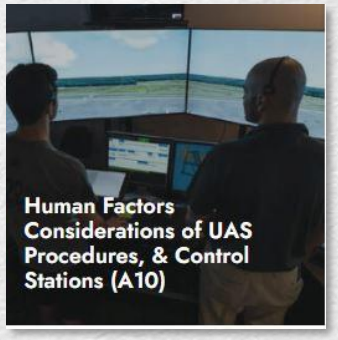
FAA Center of Excellence & FAA UAS Safety Research Facility



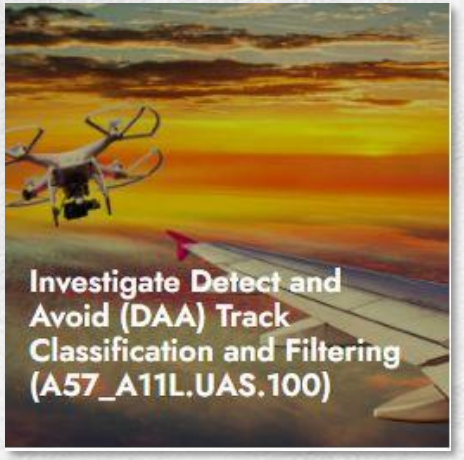
- **Independent validation** of UAS research results for FAA.
- **Safety-based recommendations** to inform UAS policy and regulatory rule makings.
- **Performance evaluation** testbed for emerging UAS technologies

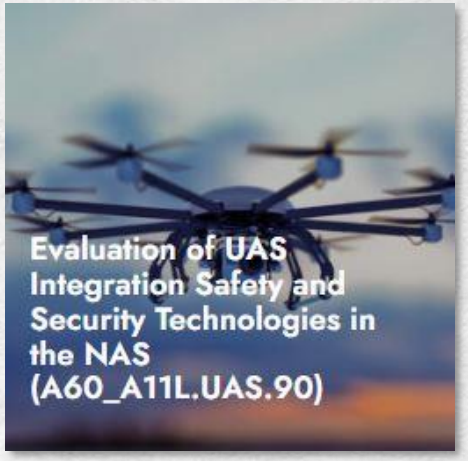
Completed FAA ASSURE Research





Ongoing FAA ASSURE Research

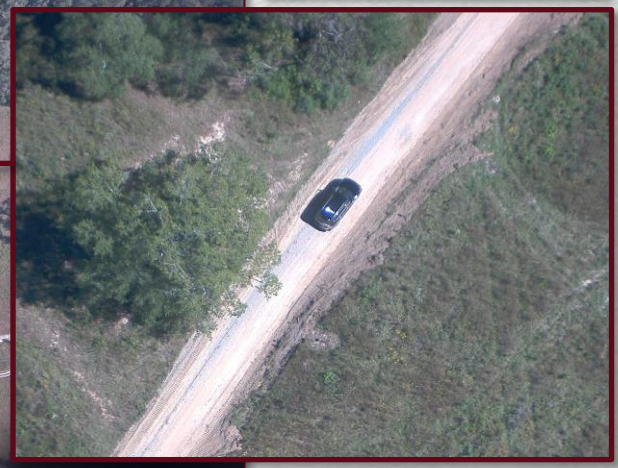




DHS Common UAS Test Site

DHS Common UAS Test Site

- **Full-scale** operational evaluations and exercises
  - In support of **DHS Science & Technology (S&T) Directorate** and the **9 component DHS agencies**.
- **Land & maritime** test environments
- Scientific analysis of UAS requirements:
  - Flight characteristics and performance
  - Specification accuracy
  - Human factors
  - Deployment speed
  - Scenario and mission set effectiveness
  - Payload/sensor performance
- Custom UAS and CUAS solutions

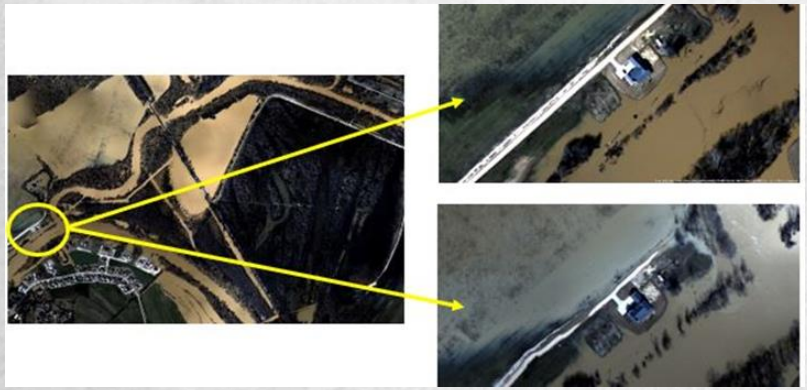


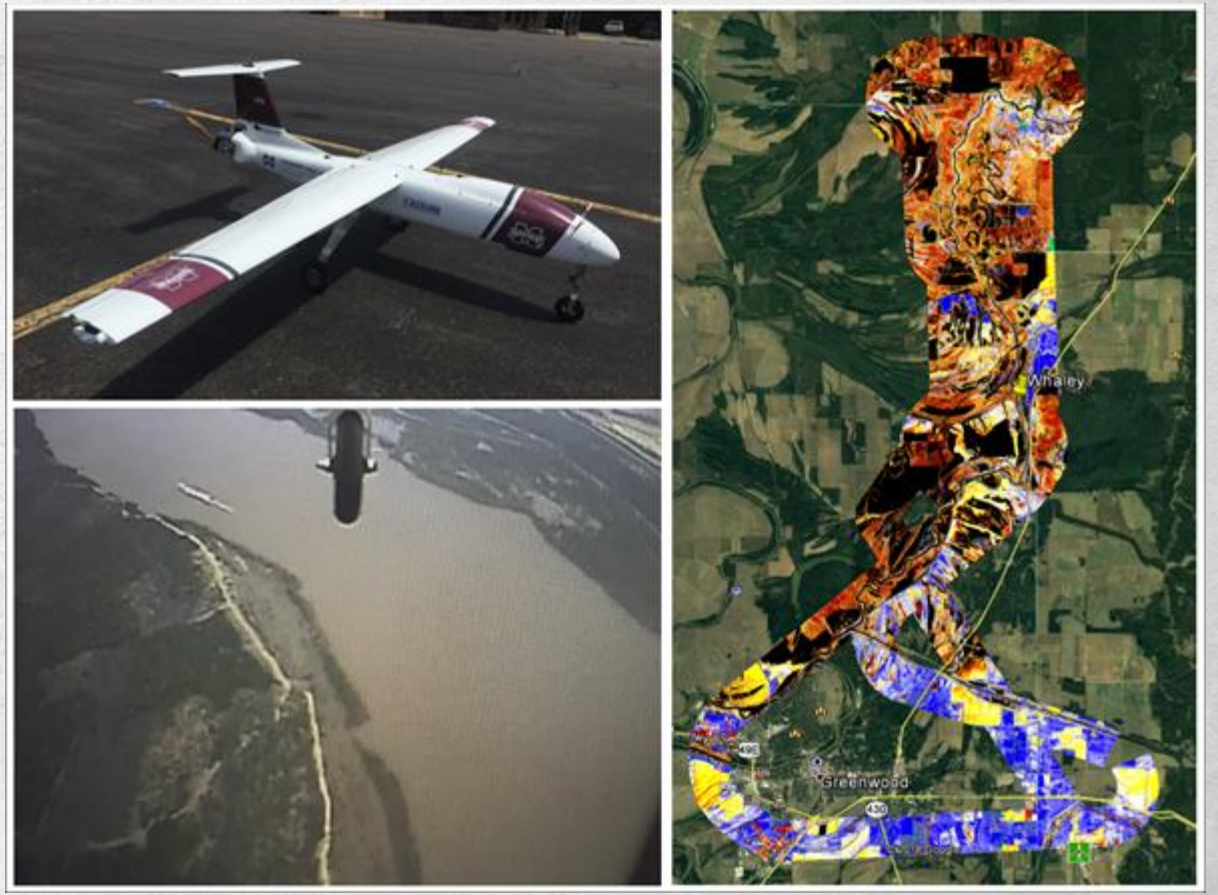
NOAA Unmanned Aircraft Systems Program

UAS Flood Monitoring & Forecasting

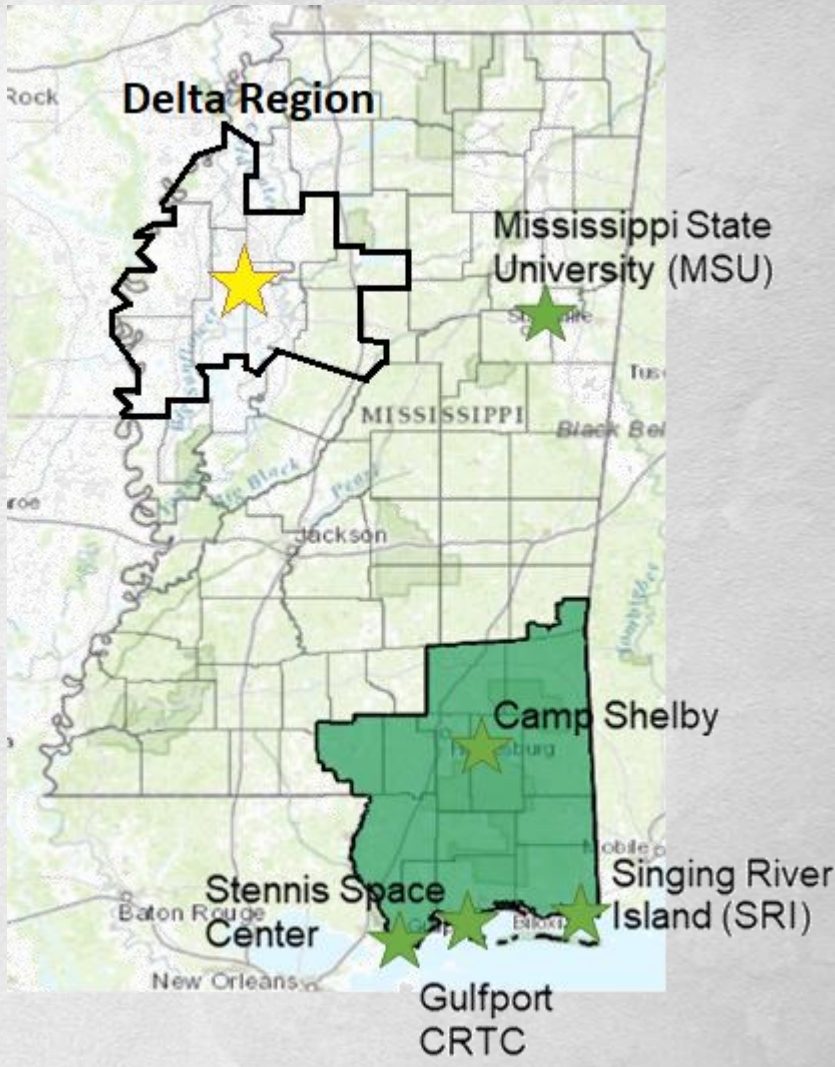
MSU's NGI + RFRL conducted aerial flood monitoring in the MS Delta

- Continuous data over multiple days tracked rising/receding flood waters
- Results helped improve NWS flood forecasting models





MISSISSIPPI UAS Partnership



Ongoing Development Efforts

Beyond Visual Line of Sight UAS Operations

All-Weather Test Facility

Autonomous Aircraft Testbed Development

Thrust Areas

- Cyber vulnerability testing
- Counter UAS
- UAS use case strategy development
- UAS training development
- Infrastructure Inspection
- Disaster response UAS handbook
- Medical transportation
- Airspace deconfliction
- Prototype development and testing
- Autonomy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