Mobile Uncrewed Systems for Atmospheric Science (MUSAS):

Advancing Scientific Access to small UAS for Atmospheric Research

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SCOAR 2025 Meeting, 27-28 February 2025

Previous Field Work

NSF Community Infrastructure and Facilities

NSF 24-535: Atmospheric & Geospace Sciences Community Instruments and Facilities

Program Solicitation

Document information

Document history

- **Posted:** January 31, 2024
- **Replaces:** NSF 20-596

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National Science Foundation
Directorate for Geosciences
Division of Atmospheric and Geospace Sciences

Letter of Intent Due Date(s) ***(required)*** (due by 5 p.m. submitter's local time):

March 15, 2024

Full Proposal Deadline(s) (due by 5 p.m. submitter's local time):

May 01, 2024

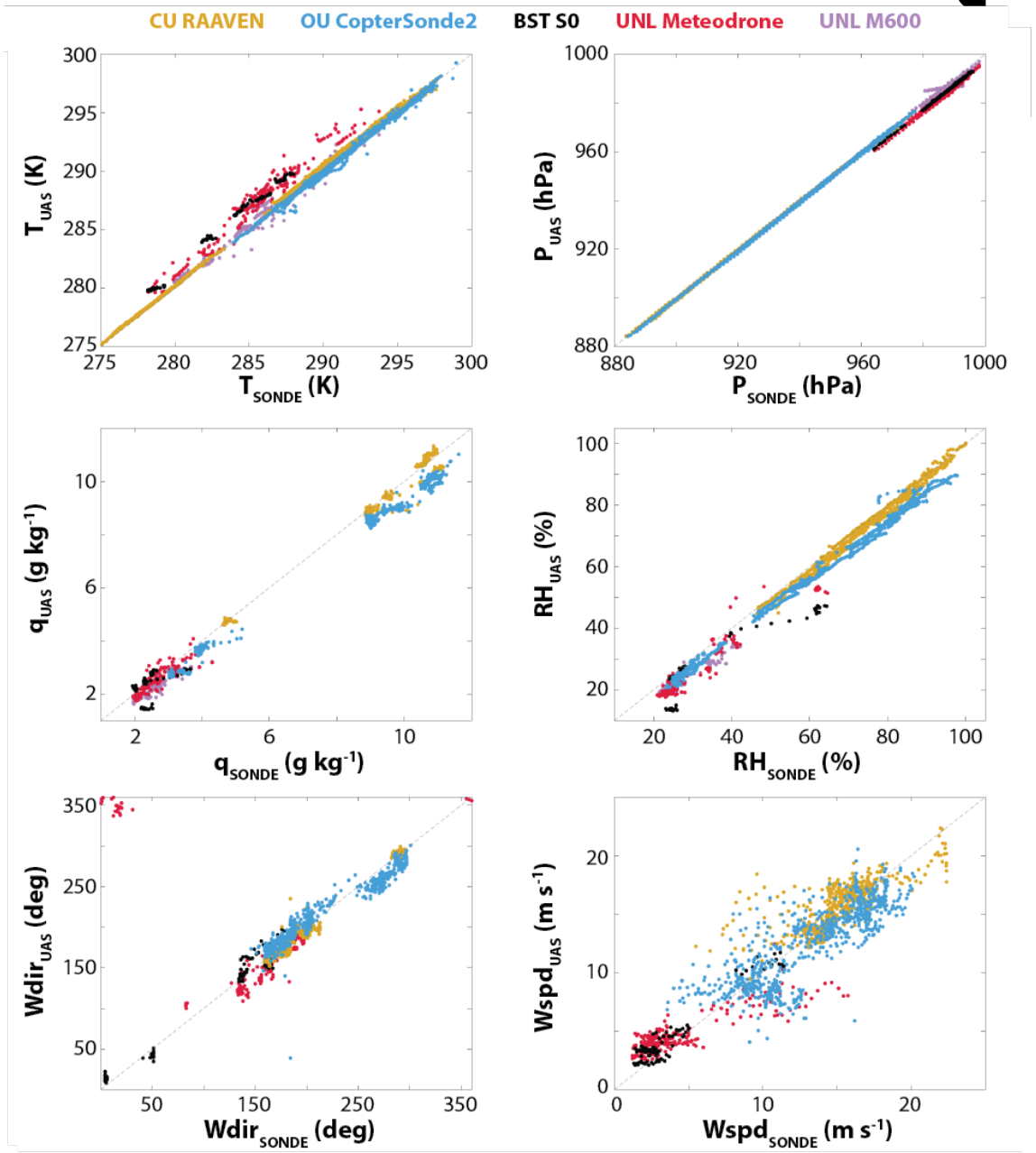
MUSAS Systems

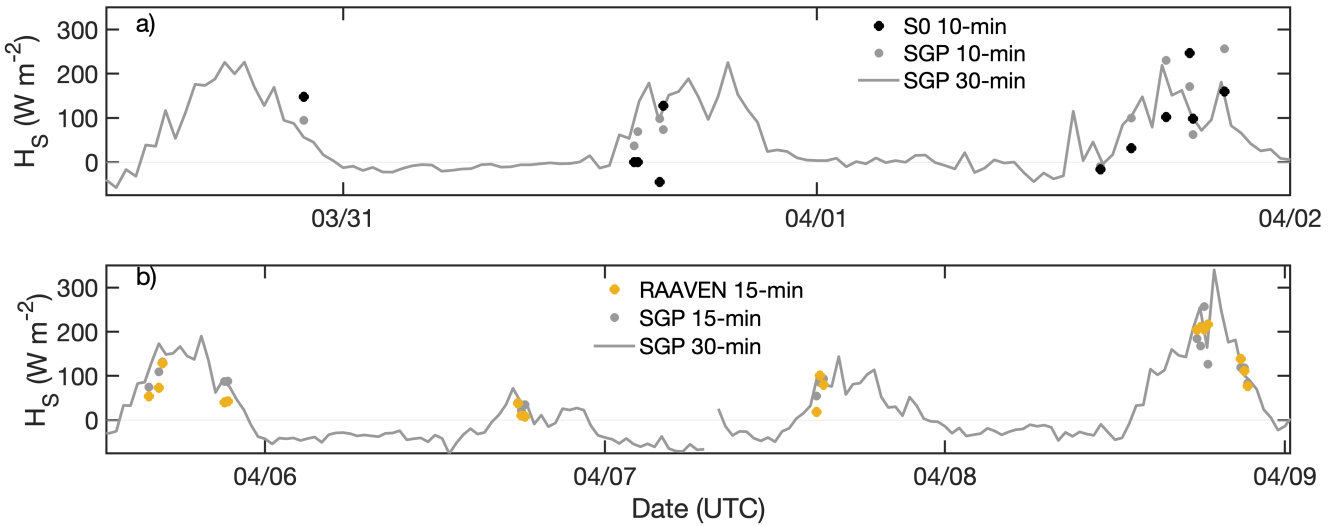
University of Colorado Boulder

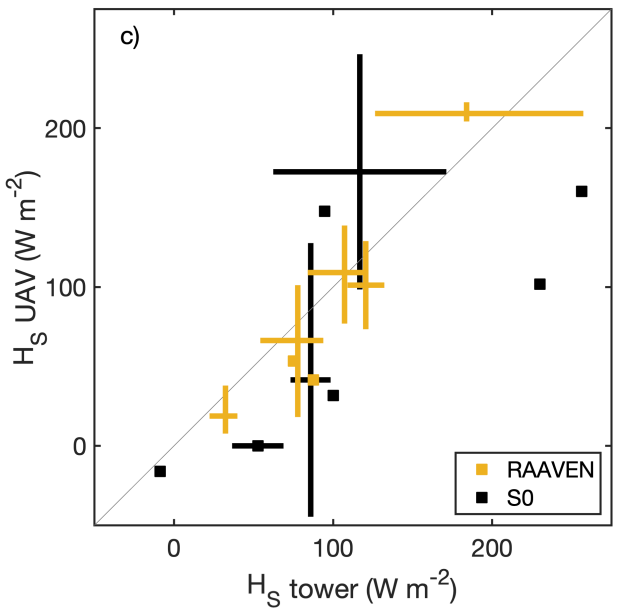
CIRES

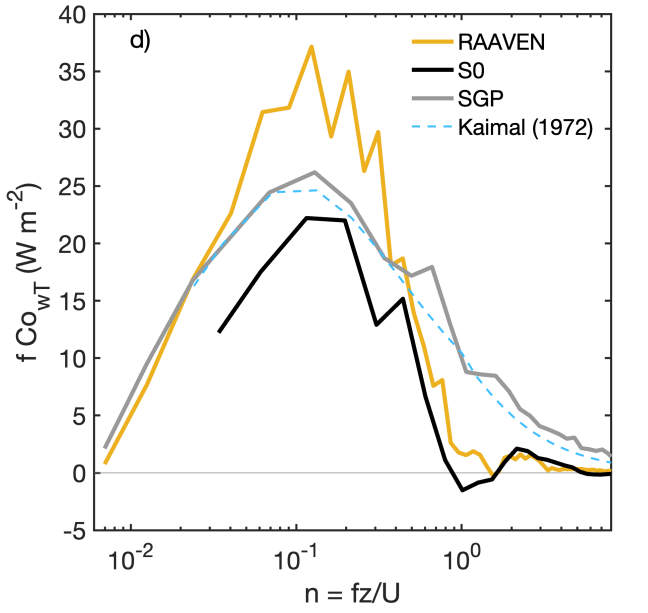
IRISS
INTEGRATED REMOTE & IN SITU SENSING

Data Quality Control









de Boer et al., 2024

Access To Airspace

FAA FORM 7711-1 UAS COA Attachment
2021-CSA-8340-COA (Revision 1)

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Attachment 1
(Page 2 of 3)

Area A - Operating Area (GREEN polygon):

Within polygon defined by the following coordinates and as depicted below:

42°30'42.55" N 87°49'51.72" W 42°29'53.47" N 87°48'57.91" W
42°29'53.33" N 87°50'02.92" W 42°30'42.49" N 87°50'04.04" W

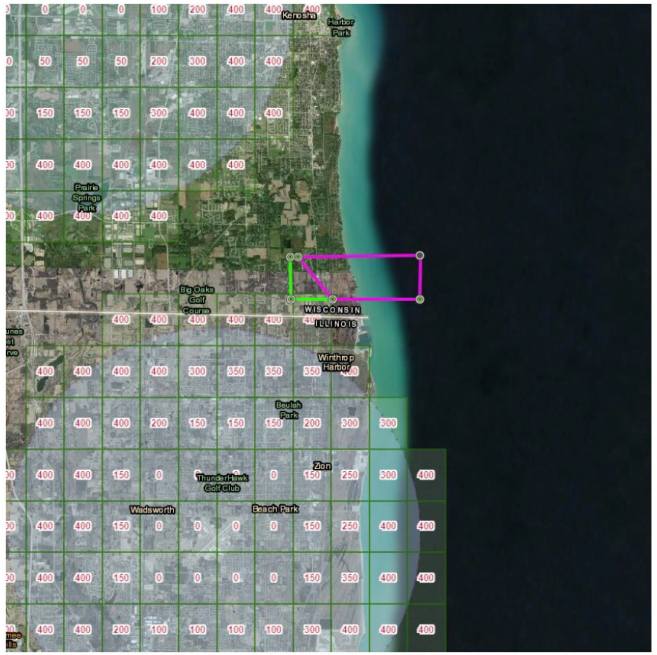
Altitude: At or Below 1400 feet Above Ground Level

Area B - Operating Area (MAGENTA polygon):

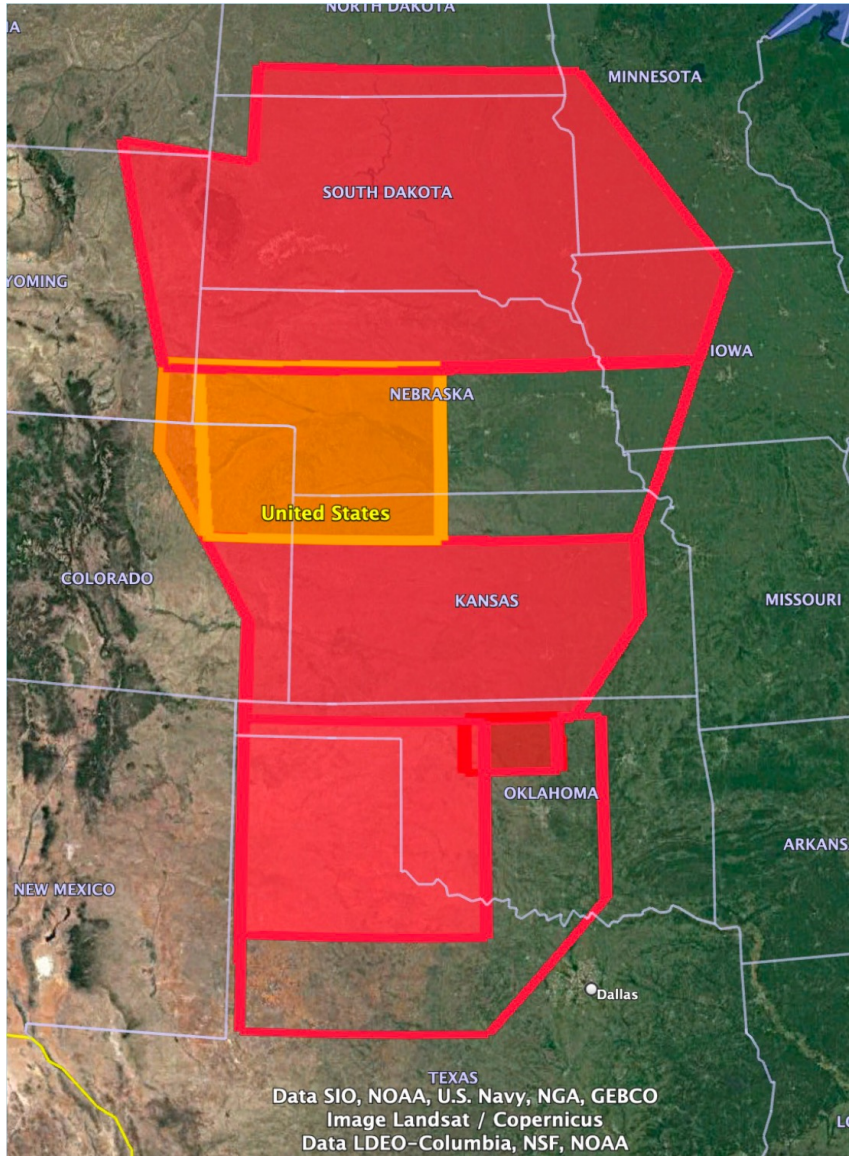
Within polygon defined by the following coordinates and as depicted below:

42°30'42.55" N 87°49'51.72" W 42°29'53.47" N 87°48'57.91" W
42°29'53.74" N 87°46'40.56" W 42°30'44.61" N 87°46'39.82" W

Altitude: At or Below 1700 feet Above Ground Level



UA operation Areas: Area A - GREEN Area B – MAGENTA



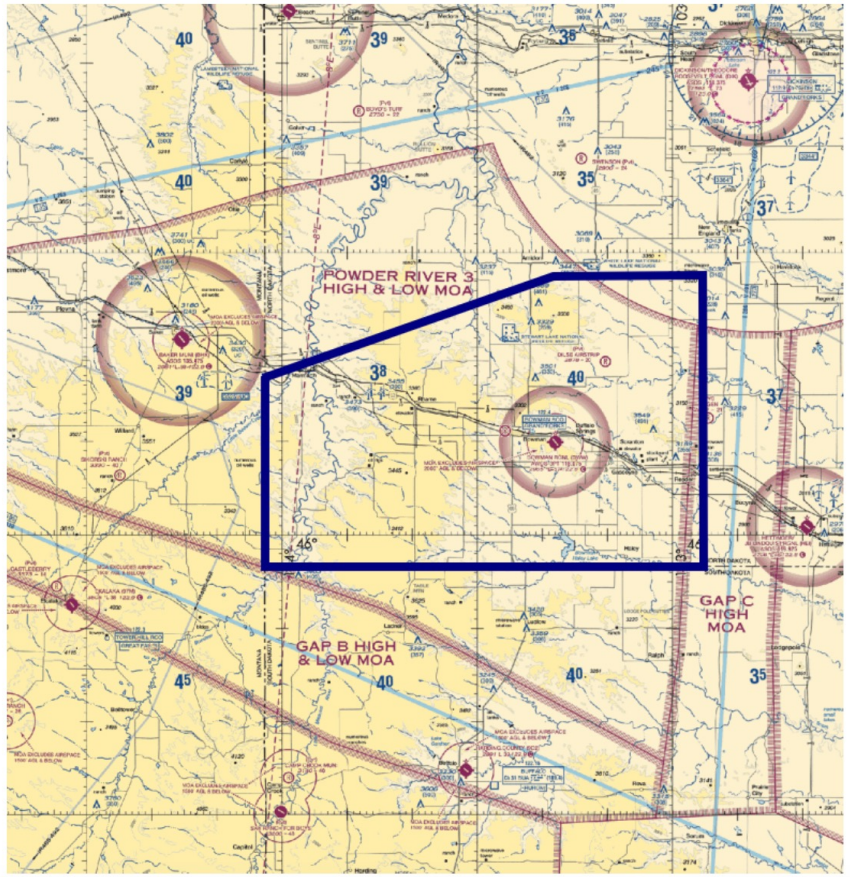
FAA FORM 7711-1 UAS COA Attachment
2023-CSA-12788 COA

Attachmen

Authorized Operating Area: Class E and G airspace in the vicinity of Bowman, North Dakota as defined and depicted below:

46°16'50"N 104°2'31"W 46°27'31"N 103°18'4"W 46°27'32"N 102°55'28"W
45°56'37"N 102°55'27"W 45°56'41"N 104°2'42"W

Operating Altitude: At or below 3,000 feet AGL



Education and Engagement

- **Educational deployments to advance learning:** sUAS are a fantastic learning and engagement tool. MUSAS can be requested under a “Track 1” proposal through NSF’s FIRP (Facility and Instrumentation Request Process), for education and outreach.
- **Middle and High School education:** MUSAS team members from the CIRES Center for Education, Engagement, and Evaluation (CEEE) are designing sUAS-focused curriculum elements to be broadly shared with middle- and high-school educators.
- **Undergraduate Research Experiences for Community College Students:** MUSAS connects with the existing CIRES RECCS program to offer opportunities for community college students to engage with sUAS field deployments and data analysis.
- **Seminars:** MUSAS team members are available for virtual or in-person seminars to interested groups.
- **Development of a training course with microcredential:** CEEE team members are supporting the development of a training course focused specifically on the use of sUAS in atmospheric science to help raise awareness.
- **Faculty mentorship program:** To grow the “sUAS in atmospheric science” community, MUSAS will offer various forms of mentorship and support to interested groups.

Request Process

Active funding opportunity
This document is the current version.

NSF 23-602: Facility and Instrumentation Request Process (FIRP)

Program Solicitation

Document Information

Document History

- **Posted:** July 3, 2023
- **Replaces:** NSF 21-611

Download the solicitation (PDF, 0.8mb) | View the program page

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Full Proposal Deadline(s) (due by 5 p.m. submitter's local time):

Proposals Accepted Anytime

Summary and Acknowledgments

- **Small UAS are a powerful tool to improve our understanding of critical atmospheric processes**, offering an ability to collect regular measurements in environments that are too dull, dangerous, or dirty for other systems. They help to close a gap between observations available from surface observing systems and those from satellite and ground-based remote sensors.
- Development and operation of these systems requires experience and expertise that may be challenging for individual investigators to obtain and invest in. To help provide access, **the University of Colorado Boulder was recently supported under the NSF "Community Infrastructure and Facilities" (CIF) program** to maintain an sUAS facility for atmospheric science, known as **MUSAS** (**M**obile **U**ncrewed **S**ystems for **A**tmospheric **S**cience).
- These sUAS have previously been deployed around the world and have been demonstrated to have **high data quality and system reliability**.
- The university of Colorado Boulder has significant experience working with the FAA and international airspace coordinating bodies to **gain access to airspace for sUAS supporting atmospheric research**.
- MUSAS includes experts in education, outreach, and engagement who are developing a **variety of pathways for broad dissemination of information on MUSAS platforms across a variety of different communities**.

MUSAS is supported by the US NSF under cooperative agreement AGS-2431471.
For more information on MUSAS, please visit the website linked through the QR code at right, or email Professor Brian Argrow (**brian.argrow@colorado.edu**).

SCAN ME