



# *Pushing the Limits of Predictability to Fuel the Airborne Autonomous Revolution*

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The advance of autonomous low-altitude flight requires an interdisciplinary approach, bridging aerospace engineering, human-machine interactions, socio-economics, policy, and environmental considerations. As we move into the next quarter of the 21<sup>st</sup> century, autonomous airborne transportation promises to enhance societal mobility, efficiency, and sustainability. Low-altitude autonomous transit systems are being developed across the U.S. to enable using Uncrewed Aircraft Systems (UAS) for package and medical supply delivery services, infrastructure and environmental monitoring and to integrate autonomous aircraft into wildland fire and other environmental disaster support services. However, significant challenges remain for successful and widespread adoption, particularly the impact of weather on autonomous operations. As has been evident in the news recently, weather-related hazards pose risks to both piloted and uncrewed systems making it all the more critical to improve aviation hazard guidance products and to optimize their use in operations.

This presentation explores a dual perspective of developing high-resolution weather guidance to improve the safety and efficiency of autonomous aircraft operations and utilizing weather-sensing UAS (WxUAS) to increase predictive skill. The increasing demand for fine-scale analyses and predictions of winds and turbulence to support aviation safety and efficiency (among many other applications) necessitates coupling of mesoscale prediction systems with microscale models. These coupled systems are being used to assess the likelihood of localized wind, turbulence and other aviation weather hazards. Advances in mesoscale-to-microscale coupling (e.g., WRF-LES and FastEddy) has allowed for the exploration of the predictability of very fine scale flow features and the derivation of guidance products needed to elevate the safety and efficiency of UAS Traffic Management (UTM) systems...[Link to Full Abstract Here](#).

**Thursday, 27 February 2025, 2:00PM**

**Refreshments 1:45PM**

**Please also join colleagues for refreshments and informal discussion after the seminar until 3:30pm**

NCAR-Foothills Laboratory, 3450 Mitchell Lane

FL2-1022, Large Seminar

**Seminar will also be live webcast**

<https://sundog.ucar.edu/public/page/MMM>

Participants may ask questions during the seminar via Slido.