UAS Weather Forum

Moderated by Matthias Steiner

https://ral.ucar.edu/events/uaswf

Co-located Partner Event at AUVSI’s XPONENTIAL
Monday, 25 April 2022

Contact: Matthias Steiner, msteiner@ucar.edu
The UAS Weather Forum provides a platform for UAS operators; federal & state agencies; weather researchers & providers; trade groups; safety & insurance groups; UAS manufacturers; & others to:

- Share experiences with expected & unexpected weather impacts
- Engage in a dialogue about weather needs for UAS operations
- Collect requirements for developing better weather guidance
- Cultivate strategies on how to make progress with needed weather support
- Assist regulators with safe integration of UAS into the national airspace system considering weather impacts
- Explore opportunities for using UAS-sensed environmental information for enhanced situational awareness & better weather prediction
- Facilitate weather education & outreach
Today’s Theme is “Weather & Autonomy”

Matthias Steiner, NCAR
Weather and Autonomy – Setting the Stage

George Gorospe, NASA
Seeing Through the Fog: Perception Testing for Autonomous Flight

Jack Elston, Black Swift Technologies
UAS Operations in Extreme Weather Environments, Case Studies and Technological Solutions

Jamey Jacob, Oklahoma State University
Weather Intelligent Navigation Data and Modeling for Aviation Planning

Andy Thurling, NUAIR
Whose Reality? – Trusting Autonomy in UTM/AAM Weather
Weather & Autonomy

Increasing use of sensors & algorithms

Weather can impact safety, efficiency & reliability of flight operations
Taking pilot out of cockpit
• Losing human pilot as onboard detector of environmental clues for risk assessment
• Remote pilot needs help to effectively oversee a flight
  - increasing use of sensors & algorithms

Human – automation interface
• Remote oversight of flights requires effective communication
  - builds on connectivity & understanding

Virtual handshake

Evolving Role of Pilot
Monitoring flight status & hazards
- Use of visible, infrared, sonic & microwave sensors for detection & avoidance of hazards
  - hazard sensing should include weather
- Monitoring of critical flight parameters
  - position, altitude, speed, roll, pitch, yaw, etc.

Interpretation & decision making
- Data & data quality control are critical
  - misleading/bad data will impact algorithms
- Digestion of information for flight decisions
  - fusion & interpretation of information for decision making
  - emulating what human brain can do well
- Autonomy requires onboard processing

Variety of sensors
Off-Nominal Situations

Concerns for automated & autonomous flights

• Timely human intervention in off-nominal situations
  - remote pilot may not immediately understand what aircraft is experiencing
  - winds may push aircraft off intended flight path or altitude
  - wind & turbulence may drain battery charge more quickly
• Loss of connectivity & human oversight
  - what if link is lost – it will happen
• Weather can affect flight-critical & payload sensors
  - moisture affects sensor readings
    (fog, rain, snow, condensation, icing)
Today’s Theme is “Weather & Autonomy”

Matthias Steiner, NCAR
*Weather and Autonomy – Setting the Stage*

George Gorospe, NASA
*Seeing Through the Fog: Perception Testing for Autonomous Flight*

Jack Elston, Black Swift Technologies
*UAS Operations in Extreme Weather Environments, Case Studies and Technological Solutions*

Break

Jamey Jacob, Oklahoma State University
*Weather Intelligent Navigation Data and Modeling for Aviation Planning*

Andy Thurling, NUAIR
*Whose Reality? – Trusting Autonomy in UTM/AAM Weather*