Integration of Weather Information for Improved UAS/UAM Operation Planning

Rafal Kicinger, Ph.D.
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Motivation

Weather impacts both safety and efficiency of air traffic operations
- Leading cause of delays for commercial air traffic in the US
- Leading cause of fatal accidents

UAM/UAS missions are more susceptible to weather hazards than traditional commercial air traffic
- Sensitivities to weather hazards
  - Precipitation
  - Wind
  - Turbulence
  - Icing
- Large variability of UAM/UAS performance characteristics

Weather data products available today are insufficient for strategic and tactical UAM/UAS mission planning
- Spatial and temporal resolution
- Refresh rate
- Inadequate (often unknown) accuracy - in particular, for low-altitude airspace (ground to 5,000 ft)
Test Site Opportunities for Improved Weather Integration for UAM

Development and validation of enhanced weather forecast products
• Confined airspace region allowing for more accurate modeling
• Ability to install enhanced instrumentation and sensors providing critical observation data
  – Assimilation into numerical weather prediction models
  – Forecast validation

Testing and validation of UAS/UAM sensitivities to weather hazards
• Performance degradation testing in controlled experimental conditions
• Modeling and validation of weather impact models specific to classes of UAS/UAM
• Development and validation of decision support tools

Image source: Airbus A3
Metron Aviation Activities in UAM

Weather Translation Models
• Studying shortcomings of current aviation weather forecasts
• Reorienting Weather Translation models to address lower altitude airspace

Strategic Planning Tools
• Investigating resource allocation issues for the UAM environment
• Prototyping a strategic UAS/UAM airspace planning tool, which can be used in the UAM or UAM test range environments
  -- Includes weather risk