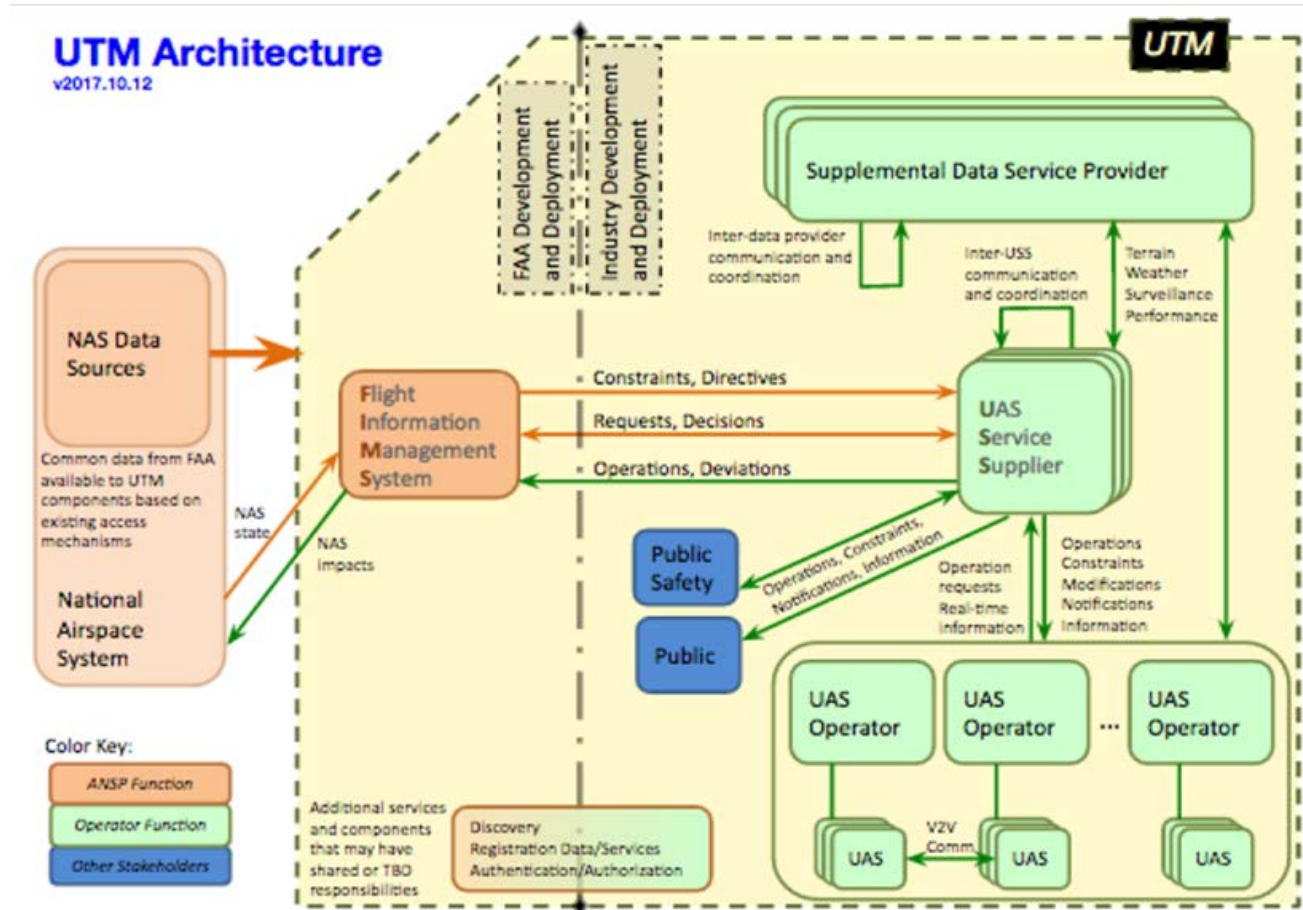


# Weather and Automation - Changing Landscapes for Weather Requirements with Evolving Automation Technology

Friends and Partners of Aviation Weather  
October 24, 2019  
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# NASA/FAA UAS TRAFFIC MANAGEMENT ARCHITECTURE



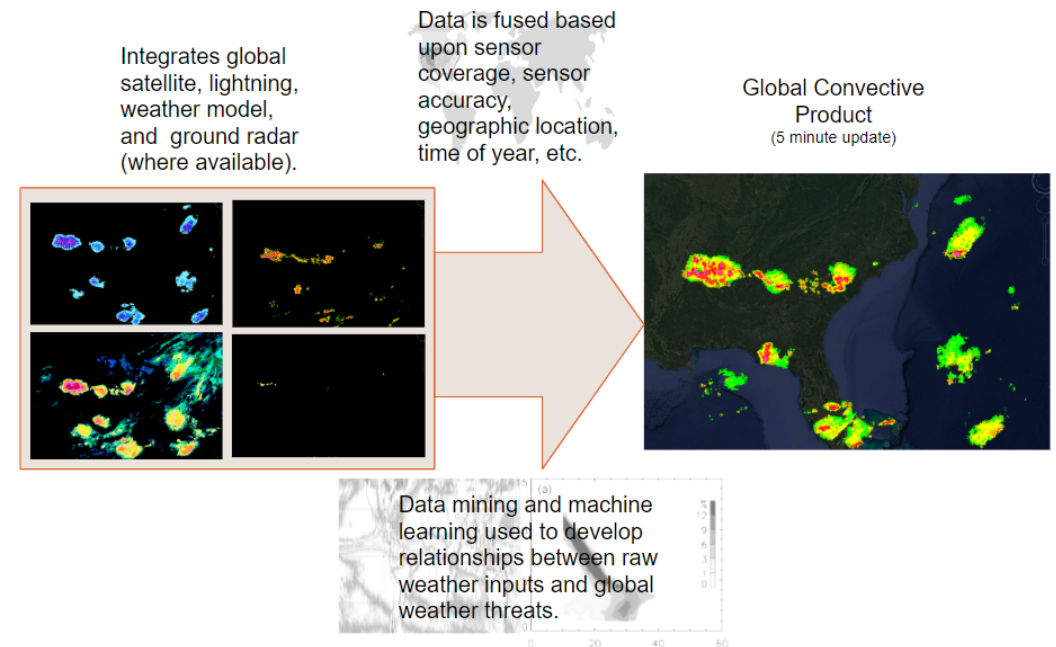
Increasing demand for UAS for commerce.

Common Weather Picture shared among stakeholders

- Weather Data Fusion

# Common Weather Picture

- Disparate weather sources can be integrated
  - Private and Public sector weather products and sensor networks.
  - Ensemble integration of weather data.
- Reliable Quality Metric
  - Automation Requirement
  - Passengers vs. cargo affects tolerance to weather (e.g. turbulence, etc.)
  - Compared to manned aircraft, there are no humans to assess quality of weather.
  - Meaningful Confidence value



## Collins Global Convective Product

# Improved Weather Sensor Network Density

- Weather forecasting systems can be improved through higher density observations.
  - Augment or replace weather balloons.
- Additional Weather sensor networks needed deployment in areas where operations are desired.
  - Use currently deployed weather sensors and solutions.
    - Crowd-sourcing weather information and techniques to produce useful weather observations.
  - UAS equipped with weather sensors and communications.
    - Real-time distribution of weather sensor data into weather models.
  - Low-cost



Examples: UAS as Weather Measurement Sensors  
Source: Anemoment LLC & Internet Systems

# Additional Considerations

- Understanding Impact of weather on UAS
  - To date, nearly all aviation weather impacts has been directed towards manned aircraft.
  - Larger size distribution of UAS as compared to manned aircraft.
  - Smaller UAS will be adversely affected by weather more significantly than manned aircraft.
  - Human acceptance of turbulence.
- Certification
  - Weather provider processes, sensors, and pedigree of weather data.
- Security
  - Malicious injection of erroneous weather information to cause disruption and failures.