



Aeronautics

Unmanned Aerial Systems (UAS) Traffic Management

Safe and efficient UAS operations

NASA has developed a traffic management system for Unmanned Aerial Systems (UASs) to maintain safe and efficient UAS operations. This novel technology enables the growth in civilian applications of UAS operations at lower altitudes by developing a UAS Traffic Management (UTM) system. There are a number of applications of UAS which includes goods and services delivery in urban, difficult terrain and rural areas, imaging and surveillance for agricultural, and utility management. To enable significant commercial use of UASs within lower altitude airspace and airspace that does not interfere with regular National Airspace System (NAS) operations, a UTM system is required. UTM is essential to enable accelerated applications of UASs. UTM will accommodate and support all types of UAS operations ranging from disposable with minimalistic avionics capabilities to highly capable UASs.

BENEFITS

- ➔ UTM support geographically geo-fenced area on a continuous basis
- ➔ Economical means of delivery rather than road transport due to smaller size, quantity, and volume than trucks
- ➔ Very useful where road conditions are unsuitable for road transport
- ➔ UTM can be portable as-needed system or real-time continuous operation
- ➔ Support micro, small, and medium size UAS
- ➔ Reliably provide communication, navigation, and surveillance below 10,000 ft.
- ➔ Safe airspace operations by procedures and airspace design that keep UAS separated from other UAS and general aviation
- ➔ Provide congestion management, route planning and rerouting, conflict avoidance, collision avoidance, terrain avoidance, obstacle avoidance, severe weather and wind avoidance services as needed based on needs of UASs operation and capability
- ➔ Support departure from and arrival into any location that is deemed safe
- ➔ Support operations at remote regions, and urban areas

technology solution

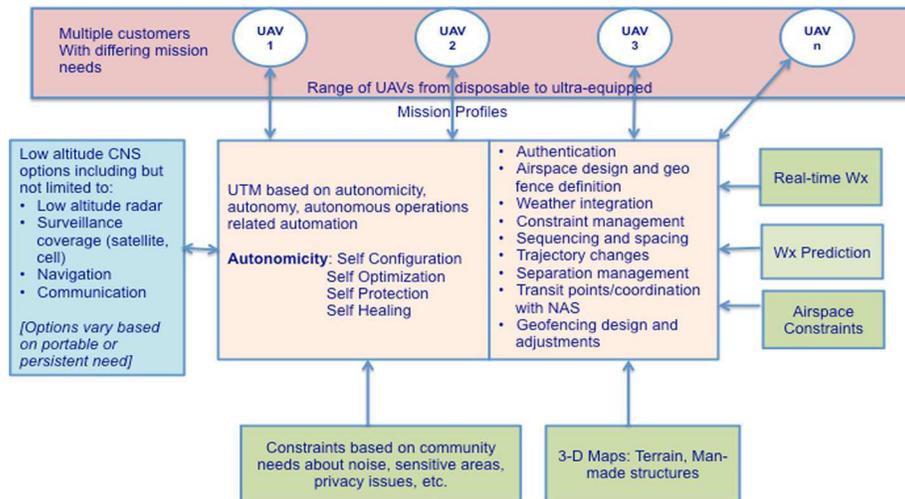


NASA Technology Transfer Program

Bringing NASA Technology Down to Earth

THE TECHNOLOGY

The UTM functions will include support for the strategic as well as tactical operations. These functions include: airspace design where altitudes are assigned based on direction of flight, and geo fencing design and updates based on the need to avoid sensitive areas (e.g., noise sensitive areas or high value assets). It will provide surveillance of vehicles; weather and wind prediction, and integration with route and flow management; congestion management, and constraint and obstacle management (e.g., terrain, tall natural and man-made structures). Other functions include demand and capacity imbalance management for crossing points, arrival and departure phases; separation assurance, collision avoidance and recovery, and emergency landing site selection and landing, if needed. It provides minimum requirements on UASs to operate at the lower altitudes as relates to communication, sensors, navigation, collision avoidance, and classification of UAS based on their performance characteristics in terms of weight, wake, ability to operate with certain types of wind and weather.



UTM Vision

APPLICATIONS

The technology has several potential applications:

- ➔ Wildfire mapping
- ➔ Agriculture monitoring
- ➔ Disaster management
- ➔ Law enforcement
- ➔ Telecommunication
- ➔ Weather monitoring
- ➔ Aerial imaging and mapping
- ➔ Freight transport
- ➔ Delivery of goods and services, like medical service delivery
- ➔ Television news coverage, sporting events, movie making
- ➔ Oil and gas exploration

PUBLICATIONS

Patent Pending

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