Mar 3rd, 10:45 AM - 12:00 PM

The Path Forward for States to Integrate UAM

Darshan Divakaran M.S.
Executive Aviation Consultant, Aerospace Arizona Association, ddivakaran@gmail.com

AEROSPACE ARIZONA

THE PATH FORWARD FOR STATES TO INTEGRATE UAM

Darshan Divakaran

WHY URBAN AIR MOBILITY

Human continues its worldwide migration from rural areas to cities, cities to cities, countries to cities, etc.

Rapid Urbanization is driving road congestion and crowding, making transport by ground bound vehicles increasingly difficult in urban environments.

Enabling efficient and effective mobility in urban areas is a key challenge.

Several initiatives have introduced serious efforts to introduce a third (vertical) dimension to moving people and goods in urban environments.

Unmanned vehicles are a major part of Smart City initiatives which aim to utilize digital assets to create sustainable urban environments centered around maximum efficiency and zero waste.

WHICH COUNTRIES ARE WORKING TOWARDS UAM

UAM is an innovative transportation option to avoid congestion plaguing many cities and suburbs around the world. The number of initiatives underway around the world is accelerating rapidly –

- Belgium
- Bulgaria
- France
- Germany
- Poland
- United Kingdom
- Switzerland
- Netherlands
- China
- Japan

WHAT ARE STATES IN USA DOING IN UAS/UAM

States are working on various pilot projects and initiatives –

California

Kansas

North Carolina

Utah

Ohio

Nevada

Tennessee

Oklahoma

Virginia

North Dakota

Alaska

UAM CHALLENGES

National Airspace System will be impacted by the entrance of Urban Air Mobility operations. Many of these challenges are being addressed to some extent with the emergence of UAS operations:

Infrastructure – Sufficient ground infrastructure, such as vertiports and charging/refueling stations

Certification & Standards – Pilots, vehicles, operations, etc.

Communication – C2 links, detect and avoid, connectivity and air navigation services

Regulations – New or modified rules, procedures, and airspace definitions will be required.

Other Challenges – Battery, Noise, Weather, Security, etc.

UAS LEVELS AUTONOMY

Autonomous flight is a major target goal of all technologists

Level 0: There is no autonomy.

Level 1: There are autonomous systems, like altitude control, but the pilot is in control.

Level 2: There are multiple autonomous systems running simultaneously, but the pilot is in control.

Level 3: The craft operates autonomously under certain conditions, but a pilot must monitor its progress.

Level 4: The craft is autonomous in most situations; the pilot can take over but generally doesn't have to.

Level 5: The drone is fully autonomous.

UAM MATURITY LEVELS

UML-1 Early Operational Exploration and Demonstrations in Limited Environments

UML-2 Low Density and Complexity Commercial Operations with Assistive Automation

UML-3 Low Density, Medium Complexity Operations with Comprehensive Safety Assurance Automation

UML-4 Medium Density and Complexity Operations with Collaborative and Responsible Automated Systems

UML-5 High Density and Complexity Operations with Highly-Integrated Automated Networks

UML-6 Ubiquitous UAM Operations with System-Wide Automated Optimization

UAM AS WE SEE IT

Key Players - Manufacturers, regulators, technology innovators, municipal leaders and the infrastructure & investment community will come together to discuss on-demand aviation for smart cities and to create a new future for air transportation.

Concept of UAM – Passenger services as well as aircraft operations for other activities, such as public safety, medical and rescue services, news gathering, ground traffic assessment, weather monitoring, and package delivery.

Innovation & Technology - Advances in autonomy, artificial intelligence, data analytics, hybrid and fully electric propulsion have unlocked new possibilities that are guiding us to reimagine travel and transportation.

UAM SAFETY

UAM concepts, technologies, and procedures be designed with safety in mind from the start.

UAM needs to be able to guarantee the safety of both its passengers and anyone along the path of travel.

UAM will be subject to the same safety standards as traditional commercial aviation.

UAM manufacturers will also be expected to demonstrate compliance with safety regulations specific to them.

UAM manufacturers will need to implement the necessary safety precautions and redundancies to ensure that UAM vehicles, can operate safely even under highly unusual circumstances.

UAM INFRASTRUCTURE

Vertiport design will include state, local, and federal inputs like fire codes, local zoning restrictions, etc.

Operational considerations such as approaches and departures, landings and takeoffs, passenger loading and unloading, security, and charging/refueling need to be accounted for.

To achieve the maximum societal benefit, operators should place vertiports in those spots that help reduce congestion

Unforeseen technical issues are inevitable, so predefined and dedicated backup sites for unplanned landings.

Regard noise in vertiport design and construction.

UNMANNED TRAFFIC MANGEMENT

States efforts to define and launch a statewide UTM will result in key benefits :

- Facilitating collaboration, communication and data exchange
- Fostering public awareness about drone regulations and airspace requirements
- Demonstrating sophisticated solutions that safeguard public safety and personal privacy, including technology for geofencing and remote identification
- Enabling high-scale and complex operations beyond visual line of sight

With the growing interest in the possibilities for UAM, key players in the industry, including NASA and the FAA in the US, are working on a UTM system for low altitude UAS operations that will integrate into the national airspace.

UAM AIR TRAFFIC MANAGEMENT

The components and considerations for UAM airspace integration are -

Congestion Management

Scheduling

Separation

Interoperability

Disruption Management

Contingency Response Management

Complex UAM Operations

WHAT STATES NEED TO DO

States will need to identify Stakeholders to Collaborate on –

- Public Private Partnerships
- Regulatory requirements for BVLOS, Ops over people, etc.
- Modernizing Infrastructure
- Regulatory Framework for UAM
- Statewide Unmanned Traffic Management
- Solving Connectivity Issues and Spectrum Allocation
- Remote ID integration with Public Safety
- Counter UAS
- Standardized Training
- Community Outreach

COMMUNITY AIR MOBILITY INITIATIVE

CAMI is a nonprofit organization dedicated to supporting the responsible integration of the third dimension of urban transportation at the state and local level.

Mission

To educate and equip state and local decision makers, the public, and the media with the information they need to set policies and design infrastructure and systems that address transportation needs for their communities.

To help the urban air mobility (UAM) industry better meet the needs of local stakeholders and maximize the value they bring to communities.

Team

CAMI's team is comprised of passionate experts in the urban air mobility, electric aircraft, sustainability, nonprofits, infrastructure and innovative personal aviation industries. We're excited to be part of the next transportation revolution.

AEROSPACE ARIZONA

Aerospace Arizona Association promotes and advances the unmanned industry throughout the State of Arizona through actions focused on advocacy, education, networking and partnerships.

Contact us:

www.aerospacearizona.org
info@aerospacearizona.org

AIRAVAT AVIATION SOLUTIONS

Airavat provides Unmanned systems program management and training support to commercial companies and government agencies in the United States and abroad

Contact us:

www.airavatsolutions.com
uas@airavatsolutions.com

DARSHAN DIVAKARAN

EXECUTIVE AVIATION CONSULTANT

EMAIL: DARSHAN@AIRAVATSOLUTIONS.COM
PHONE: 919-9874333

Linkedin - https://www.linkedin.com/in/darshandivakaran