

# UNMANNED AERIAL SYSTEM & UNMANNED TRAFFIC MANAGEMENT



DroneWork  
Bo Bader

# Unmanned Traffic Management

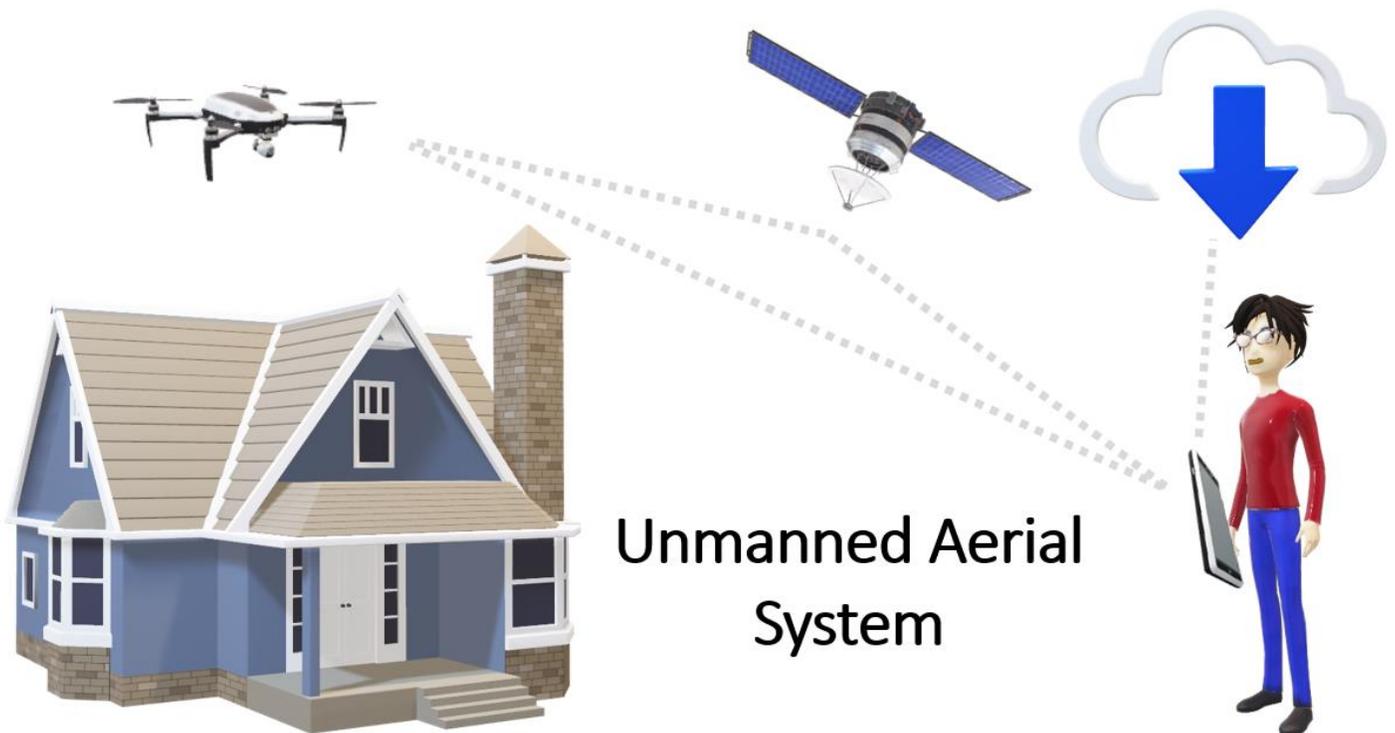
Over the past few years the drone industry has grown so rapidly that basic terminology has been altered. The media typically uses drone as its reporting basis because they know it is easiest to understand and will catch people's eyes. UAV and UAS are two technical terms that represent a drone and its flight. A UAV or unmanned aerial vehicle refers to the aircraft itself. A UAS or unmanned aerial system encompasses all that goes into a drone operation such as ground control station, communication links, aerial data processing. Please refer to the diagram below to see a visual representation of UAS.



Due to FAA rules and regulations, all flights are operated with having a physical drone operator on site, having visual line of sight. With this said, not all drone flights are operated manually and often the drone operator simply sets up his/her drone technology and presses a button in which the drone will autonomously fly its pre-programmed mission.

In this example you have a multi-rotor UAV or drone conducting a property inspection of a home. As the image depicts, there is a radio communication link between the drone and the drone pilot who is on the ground with a controller and a smartphone or tablet. This communication link goes from drone to the pilot and from the pilot to the drone. Also, there is a communication link with a satellite presenting a signal to the drone and the pilot. Having the links of communication from all three sources allows for the drone to fly in uniform flight.

Technically the UAS is composed of the drone and the communication with the drone. Another aspect to completing a drone mission is creating autonomous flight plans and uploading aerial data (pictures) as they are captured. Using drone mapping or analytics software, users can create a flight plan by selecting the area they would like to survey using coordinates such as Google Maps. After the flight is designed, the user will go to the site, setup the drone, press a button, and the drone will autonomously fly its preprogrammed mission. Additionally, drone software is used to automatically upload data in which the drone will take pictures and autonomously move those assets to a cloud-based application. In summary, a UAS or unmanned aerial system consists of 4 components being the drone or unmanned aerial vehicle, a satellite, a drone pilot, and the operating system for planning flights and uploading aerial data.



# Unmanned Traffic Management

Many commercial UAS applications have been proposed such as drone delivery, BVLOS (beyond visual line of sight), critical infrastructure surveillance, search/rescue, and agricultural monitoring. In today's aviation, there is no established infrastructure to allow consistent, scalable, and safe low-altitude UAS operation. An unmanned traffic management (UTM) system allows for UAS operation in low-altitude airspace. This concept leverages a "airspace highway" system of roads, lanes, stop signs, and rules that govern in the sky.

NASA is leveraging their work in air traffic management used for crewed aircraft to research and develop technologies for UAS traffic management that could provide low altitude flight in a safe and efficient manner. This system would encompass airspace design, corridors, geofencing, terrain avoidance, sequencing, spacing, weather avoidance, and much more. As UTM is further developed and strategically implemented, look for further UAS operations to blossom through automation which will increase data collection and drive business insights. *The image below represents the potential UTM*

