

News Column

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Applications of Small Unmanned Aerial Systems (sUAS)

Small unmanned aerial systems (SUAS), also known as drones, are fixed- or rotary-winged vehicles that do not carry humans. The lighter-than-air units were developed for the military, but advances in computer technology and enthusiastic aerial radio-controlled vehicle hobbyists provided the incentive for the syndicated technologies and UAS systems that have made their way into commercial industry and the federal airspace.

The smallest unmanned aerial systems weight less than a pound and fit into the palm of a hand. They are typically powered by electricity and fly for about 10 minutes. The largest vehicles in this category weight up to 55 pounds, are gasoline-powered, and fly for almost 24 hours. An unmanned aircraft system is comprised of one or more ground control stations, a data link, a payload (e.g., camera, sensor), a human operator, and the unmanned aircraft.



Small unmanned aerial systems offer a broad range of capabilities. A few practical applications include:

- Food production: Sensor technology allows farmers and ranchers to monitor plant health at critical growth stages and detect problems with livestock (e.g., thermal sensing, left) and rangelands long before they become visible to the unaided eye. Other uses include

monitoring crop status, growing stage, yield estimates; collecting precision agriculture prescription data; and tracking livestock migration.

- Crop protection and plant biosecurity: Remote-sensing technologies enable early detection of pests and invasive species and implementation of sophisticated pest management strategies. For example, with UAS-generated vegetation maps, researchers can chart distinct field patterns that allow them to quickly identify and manage damaging infestations of crop pests such as Russian wheat aphid.
- Infrastructure inspection: Small unmanned aerial systems can capture and relay information about the condition of structures such as wind turbines, power lines and smokestacks in real time and at relatively low cost compared to manual inspections. Using unmanned vehicles to inspect hard-to-reach structures reduces risks to inspectors and increases the economic efficiency of the power system.
- Transportation: The ability to capture images tagged with technical details such as time and location increases the utility of small UAS for road and bridge inspection, pothole detection, accident reporting, environmental assessment, and post-disaster surveys.
- Public safety: In firefighting search and rescue efforts in wilderness or large urban areas, the aerial view enables responders to cover large areas and to locate victims quickly. Detailed site data helps responders make better decisions, which saves lives and protects property.
- Water quality: Small UAS offer rapid response to changing environmental conditions. They can be used to monitor swimming beaches or shorelines for toxic algal scum that threatens humans, or to detect algal blooms that can be deadly to livestock.

Information provided by Brian McCornack, field crop entomologist, and Kurt Carraway, UAS program manager, K-State Polytechnic Campus, Salina.

Source: *SUAS What You Should Know About Small Unmanned Aerial Systems*, MF3245:

<http://www.bookstore.ksre.ksu.edu/pubs/MF3245.pdf>