



# Unmanned Aircraft Systems

A picture is worth a thousand words, but it helps to have the right picture for your application. That is why SIG offers a full range of remote sensing and geospatial analysis services that includes the deployment of unmanned aircraft systems (UAS). UAS provide an ideal solution for mapping and measuring smaller areas (50-2500 acres) – providing on-demand, extremely high-resolution imagery (~3.5cm) for a relatively low cost when compared to traditional remote sensing platforms. We fly a variety of cutting-edge, lightweight (<3 lbs), mapping-grade UAS equipped with digital sensors, GPS and other on-board flight control sensors. Our flight operations team consists of two to four personnel, capturing up to 250 acres of imagery per flight. Depending on the complexity of analysis, product turnaround is usually within 24 hours. UAS is the perfect solution for on-demand collection of spatially accurate imagery and topographic data that can be used for a board range of analysis and monitoring applications.



## Real-World Applications

- GIS – feature location and extraction (roads, trees, buildings, powerlines, streams, etc.)
- Natural resources and agriculture field mapping and monitoring
- Mapping tree mortality in conifer forests
- Humanitarian - flood hazard and impact assessment, on-demand natural disaster characterization
- Cost-effective performance monitoring of forest and wetland restoration projects
- Invasive species monitoring
- Construction site compliance monitoring for Best Management Practice (BMP) for runoff, vegetation retention, and management of fill storage
- Volumetric calculations of construction fill and excavation

## Post-flight Products

- Orthorectified images
- Photogrammetric point clouds in LAS format
- 2d and 3d digital products
- Contour maps
- Vector and raster maps representing features of interests, along with associated summary statistics and analysis

## Timing

- Flight planning is efficient, can be readily updated in the field as needed based on local conditions.
- Flight time – up to forty minutes per flight
- Orthorectified images and most products are turned around within 24 hours

## Team Experience

- Over 400 missions flown to date
- FAA certified equipment and FAA Section 333 exemption authorized. Flight safety certified
- Conducted flights covering deciduous and conifer forest, agricultural landscapes with variation in topographic relief and vegetation cover, and over-water flights

## Equipment

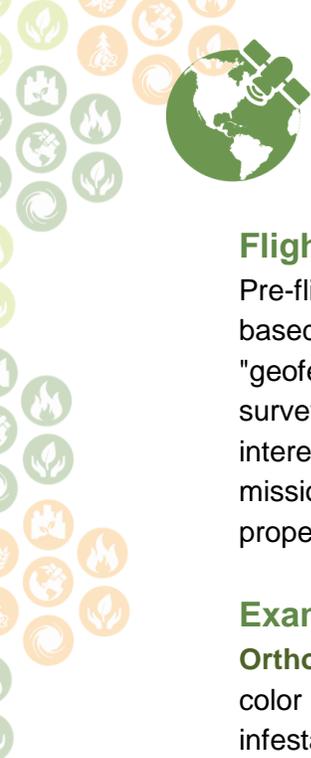
- Aircraft – light-weight, battery powered, fixed-wing and multi-rotor systems
- Digital sensors
- Flight planning and control software
- Post-flight imagery processing software
- 3d terrain modeling software



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## Flight Planning

Pre-flight planning is efficient and can be readily adjusted in the field, based on local conditions. Shown here are planned flight lines and a "geofence", which prevents the UAS from exceeding the delineated survey boundary. The UAS can be programmed to target areas of interest and to avoid restricted areas as appropriate for each unique mission and landscape setting (e.g., airports, military facilities, private property, power lines, etc.).



## Example Products

**Orthorectified Imagery** – accurate, high-resolution, GIS-ready true color or color infrared image mosaics. This image shows an infestation of Eurasian watermilfoil (*Myriophyllum spicatum*), an aquatic invasive species. UAS can be used to characterize the extent of infestations and to monitor invasive species control efforts.



## 3D Point Clouds

Photogrammetrically generated, these 3D products can provide information similar to LiDAR and can be used to measure slope, distance, compute volume, and used to visualize existing conditions or to model future desired conditions for a site of interest.



## Contour Maps

Contour mapping provides insight into drainage patterns and boundaries, topographic relief, and erosion hazard. This contour map shows the topography associated with a reservoir dam that was produced within 24 hours of flight data collection - allowing for a rapid assessment of the dam's external integrity.



## Digital Elevation Model

Our proprietary workflows enable us to turn UAS imagery into detailed elevation models that give you an unparalleled view of the landscape. UAS offer substantial cost and time savings compared to traditional field-based survey methods.

