PRECISIONHAWK

CASE STUDY

UAS Technology Revolutionizes Ecosystem Observation and Change Predictions

QUANTUM SPATIAL, INC. (QSI) , THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) & PRECISIONHAWK

When Quantum Spatial, Inc. (QSI) sought a partner to collect and analyze data for The National Oceanic and Atmospheric Administration (NOAA) Office for Coastal Management (OCM), they were looking for superior data, greater efficiency, and cost savings. PrecisionHawk, Inc. delivered with cutting-edge drone and sensor technology.

NOAA's mission is to better understand and predict changes in climate and to conserve and manage coastal and marine ecosystems. To achieve these objectives, the agency relies on precise data and comprehensive analysis to identify invasive species, pollution sources, and other environmental risk factors. They gather that data from a variety of environments, such as: oceans, wildlands, volcanic islands, the poles, and wildfire-impacted areas.

NOAA engaged QSI, the largest independent geospatial data firm in the United States, to help assess three National Estuarine Research Reserves (NERRs); each of the three NERRs presented unique survey challenges.

Limitations of Traditional Mapping

NOAA's mapping to date had relied on the deployment of manned aircraft or ground survey. Manned aircraft was well-suited for large-scale NERR imagery, achieving in one day what required weeks of tedious ground survey. The cost of a single day of manned aircraft, however, was prohibitive. Additionally, changing sensors on a manned aircraft was time-consuming and costly, yet paramount to gathering quality data..

The limitations of manned aircraft motivated QSI to seek a partner who could integrate unmanned aerial system (UAS) technology to revolutionize NOAA's observation strategies. QSI recognized PrecisionHawk as a leader in the commercial drone industry and a good match for NOAA's mission.

> ***Blaine Horner, an expert in PrecisionHawk's government enterprise technical sales***, explains:
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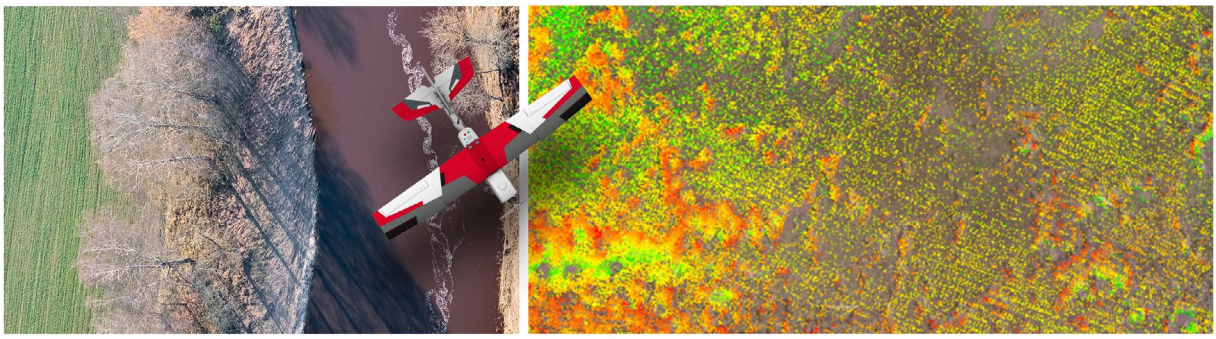
> *"NOAA has 29 NERR sites, and each one covers miles of varying terrain. PrecisionHawk had what NOAA needed in terms of quality of imagery, the redundancy of equipment, and sufficient team members to ensure uninterrupted workflow."*

Application of UAS Technology to Ecological Observation

Between Fall of 2016 and Spring 2017, PrecisionHawk worked with QSI to investigate the range of ecosystems located within the three NERRS. PrecisionHawk deployed numerous flight teams to NERR locations, and each flight team had a number of pilots.

Each PrecisionHawk drone was equipped with GPS and an inertial measurement unit (IMU) to record the latitude and longitude of each mapped point, as well as factors such as angular velocity and acceleration. The combination aided the analysis of images captured by light detection and ranging (LiDAR) and near infrared sensors. LiDAR images were used to create elevation maps to provide NOAA with the data necessary to identify bare earth, as well as the height and biomass of trees and other vegetation. Near infrared sensors added data that could be used to assess plant health and moisture levels.



Benefits of UAS Technology

> *Drone use during NOAA's large-scale imagery project revealed the benefits of UAS technology in comparison to manned aircraft: greater precision of data, efficiency, cost-effectiveness, and adaptability.*

PrecisionHawk's ability to hone in on a targeted area created a denser data set, and therefore more precise data. For example, traditional field surveys provided a single elevation point once every fifty feet; drone sensors did the same once per inch.

The resolution of PrecisionHawk's drone sensor technology provided an additional benefit. Drone sensors captured approximately three-quarters of an inch per pixel compared to six inches per pixel for standard manned aircraft resolution. Also, because drone sensors can be changed out in a matter of minutes, the collection of robust imagery was much more efficient and cost-effective than that of manned aircraft

> *The superior imagery and data improved forecasting, which enables NOAA to saves lives, property, and resources.*

Additionally, UAS's use of remote pilots created opportunity for better mobility and adaptability, including the ability to launch and recover drones in dangerous and remote areas. For the NOAA project, PrecisionHawk's pilots maneuvered through sand dunes, thick vegetation, and marshes. On occasion, this required boat launches and temporary runways. This level of adaptability was an important factor for NOAA, since their research relies on information gathered from oceans, wildlands, volcanic islands, the poles, and wildfire-impacted areas.

PrecisionHawk's involvement in the NERR project was NOAA's first use of drones for large-scale imagery and data analysis. The same benefits of UAS safety, mobility, and scalability offers nearly limitless opportunities for companies that need to gather and analyze data from sites otherwise complicated by location and a variety of environmental factors.

Thanks to The National Oceanic and Atmospheric Administration (NOAA)
for sharing their experience with us!

*Speak with us about adding aerial intelligence to your organization —**email info@precisionhawk.com**. Learn more about drones and aerial data in government at **PrecisionHawk.com/government***

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