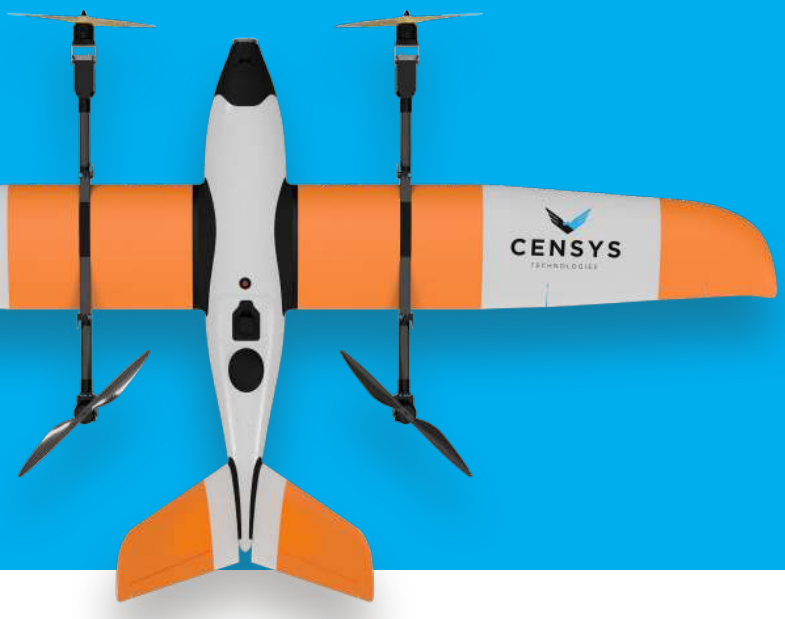
CENSYS
TECHNOLOGIES

Gazing From the Heavens: How Drones Can Revolutionize Your Business



"Mankind must rise above the Earth – to the top of the atmosphere and beyond. For only thus will he fully understand the world in which he lives."

- Socrates, fifth century BC

A New Era of Aviation Technology

Traditionally, manned aircraft have been the go-to solution for mapping, surveying, and safety reconnaissance. However, with advances in unmanned aircraft systems (UAS) and drone technology, control of the skies is beginning to shift.

Unmanned aircraft are becoming more affordable, more versatile, and more reliable, launching a plethora of new applications and opportunities in the private and public sectors. Agriculture, mapping and surveying, public safety, and utilities are some of the industries and services that are benefiting from this new technology.

Efficiently Gather Reliable Data

With our increasing reliance on data, an eye in the sky can give us invaluable information and perspective. UAS fly lower than most manned aircraft, utilizing robotic precision -- resulting in better surface models, more accurate quantities, and precise feature extraction.

Drones like the Censys Sentaero VLOS and Sentaero BVLOS are specifically designed to gather and deliver crucial data and information. The VLOS features a variety of hot-swappable payload options that are tailored for mapping, agriculture data collection, ISR, and public safety. No matter the job, Censys' Sentaero drones can meet your missions' demands.

Manned vs Unmanned Aircraft

Until recently, one of the biggest advantages of manned aircraft was the lower cost, when compared to UAS. However, that dynamic is shifting. According to auvsi.org, a land management case study showed that unmanned aircraft were significantly less expensive than their manned counterparts.

Case Study

The Sandhill Crane Population Survey

"The Sandhill Crane Population Survey was a joint project with the United States Geological Survey. Previous surveys were ocular counts conducted in a Cessna 172 or 206 under daylight conditions above the U.S. Fish and Wildlife Refuge. A manned Cessna ocular survey costs the BLM about $4,300. And while the counts could be conducted in just a few flights, the main expense was getting the Cessna to the refuge."

Sandhill Crane Population Survey Costs	
Government Manned Aircraft*	**$4,300**
Contractor Manned Aircraft	**$35,000**
Unmanned Aircraft	**$2,600**

Case Study

The Mesa County Landfill Project

"The Mesa County Landfill Project is a collaboration between the BLM, USGS, and the Colorado Mesa County Sheriffs' Department. The Department has a county-wide Certificate of Authorization (COA) for emergencies. The County has to write an EPA report on a quarterly basis on the amount of material in their landfill (volumetric compliance inspection).

This is an expensive project as it costs the County about $10,000 for a contractor to fly the project. Flying their Falcon and Dragonflyer under their COA, the BLM flew the project for about $300."

Mesa Country Landfill Inspection Costs	
Manned Aircraft	**$10,000**
Unmanned Aircraft	**$300**

Case Study

The Mesa County Gravel Pit Project

"Similar to the landfill operation, Mesa County also has to perform compliance inspections for volumetrics on their gravel pit. The county has the same contractor cost here as for the landfill project, about $10,000. Again flying under the County's COA, the BLM was able to provide photogrammetric expertise to the County for about $120."

This case study and accompanying surveys help to illustrate how the market and industry needs are shifting with new technology like drones. The US Federal Aviation Administration (FAA) projects that in 2021 there will be 3.5 million UAS in use, with 1.6 million used in a commercial capacity.

Mesa Country Gravel Pit Inpsection Costs	
Manned Aircraft	**$10,000**
Unmanned Aircraft	**$120**

Use Case Improved Public Safety

Safe and Effective Reconnaissance for Public Safety Services

Unmanned aircraft systems give police, fire, rescue, and other first responders a crucial advantage in emergency situations. Drones, outfitted with cutting-edge surveillance technology, can quickly and accurately communicate essential intel to response teams, while maintaining a safe distance.

Supporting First Responders

According to The Association for Unmanned Vehicle Systems International, fewer than 3% of law enforcement units have aviation assets to support their daily operations because of the high operating costs of manned aircraft. UAS would change this, allowing these agencies to better protect themselves as they work to protect us, at a fraction of the cost. UAS have a direct operational cost totaling $3.36 per hour, compared to $250 to $600 per hour for a manned aircraft.

A UAS gives public safety teams the ability to identify, track, and monitor everything from criminal pursuits to environmental disasters.

Disaster Support and Management

Drones can be used to proactively supply critical intelligence and information during a natural disaster. In the case of flooding, a UAS can help to determine the direction of the flood or wildfire and identify people and property that may be at risk. Response teams can better prioritize who to evacuate first and establish pragmatic timetables.

While it might be too dangerous for an emergency response team to scout out flood paths or fire-spreading vectors, drones can quickly and safely monitor those areas. They can pinpoint critical response zones and identify people in danger.

UAS can also assist reactively in the aftermath of a natural disaster. In the event of an earthquake or hurricane, drones can look for survivors, deliver supplies, and help to prioritize relief efforts.

Use Case Improved Public Safety

Practical Situations

The University of Alaska demonstrated the use of a three-pound unmanned aircraft that could gather 3D aerial data to aid oil spill cleanup efforts and ensure minimal environmental impact.

UAS were dispatched after Hurricane Katrina. They were able to search for people stranded by floodwaters much more quickly than emergency responders who ventured out in rowboats.

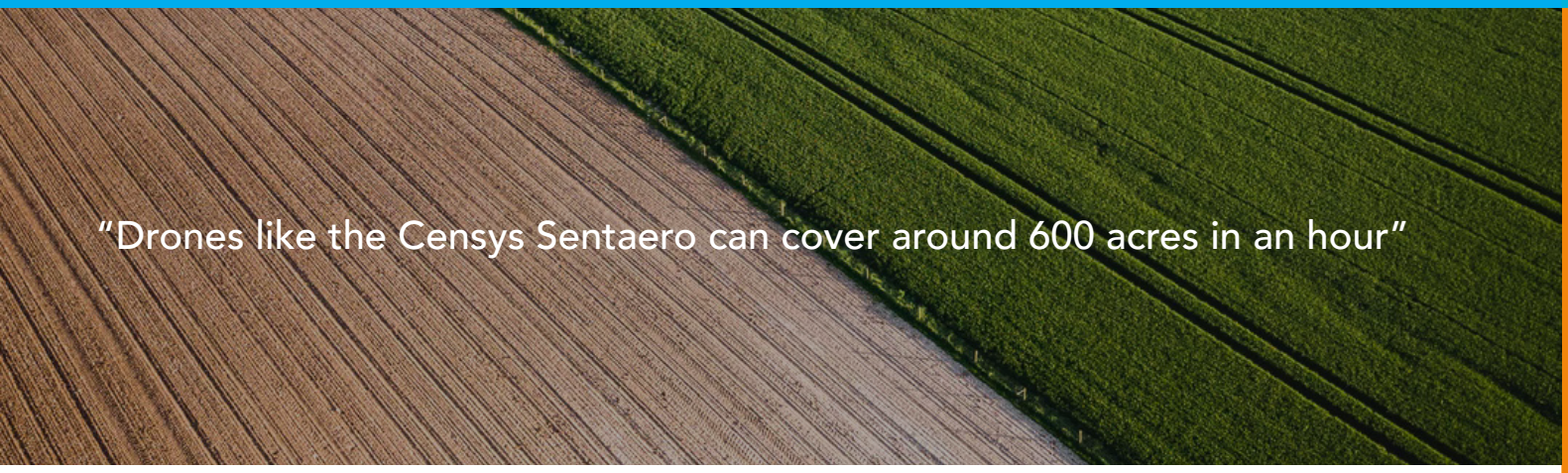
In 2010, researchers at the University of North Dakota used UAS to capture real-time images of the flooded Red River in the upper Midwest and provided data that was essential for flood research, rescue, and planning.

With proper preparation, deployment, and use of UAS for emergency situations, lives can be saved and disasters averted or mitigated.

Public Safety Mission Profiles

- Search and Rescue
- Event Monitoring
- Mapping and Planning
- First Responder
- Surveillance
- Scene Documentation
- Criminal Pursuit
- Disaster Management

Use Case Efficient Agriculture



"Drones like the Censys Sentaero can cover around 600 acres in an hour"

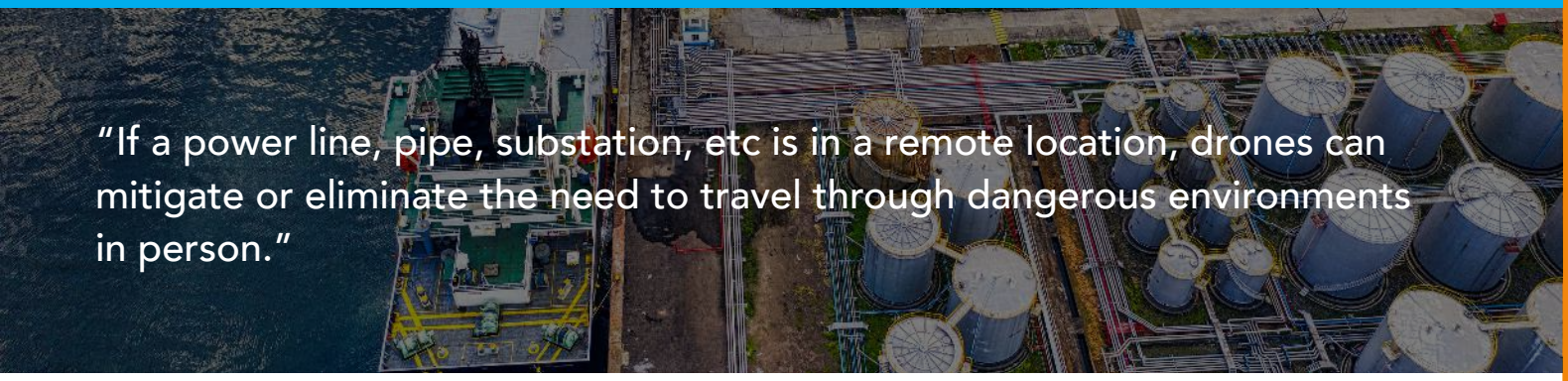
Agriculture is one of the sectors that is benefitting the most from the inception of UAS. The usage of drones is a growing trend on farms because it allows for precise crop management and increased production. Drones are already saving farmers millions of dollars in time and resources by streamlining a variety of agricultural processes.

Manually inspecting fields is tedious, time-consuming, and relatively ineffective. Drones like the Censys Sentaero can cover around 600 acres in an hour. By creating a flight path, fields and areas can be systematically scouted and cataloged, improving consistency and reliability. By using variable sensor payloads, a UAS can handle everything from water management to weed detection.

Agriculture Mission Profiles

- Phenotyping
- Crop Health Mapping
- Water Management
- Fertilizer Management
- Disease Identification
- Species Identification
- Differentiation
- Weed Detection
- Advanced Crop Scouting
- Terrain Modeling
- Leak Scouting

Use Case Safer Utilities: Oil, Gas, and Electric



"If a power line, pipe, substation, etc is in a remote location, drones can mitigate or eliminate the need to travel through dangerous environments in person."

Traditionally, remote facilities and infrastructure can make it difficult to manage energy operations. The ability to effectively and regularly inspect, monitor, and maintain energy utility assets is crucial when providing vital services. Irregular energy supply can lead to disruption, injury, and even death. With the help of UAS, the energy industry can mitigate and eliminate many of the obstacles preventing consistent, safe power.

One of the biggest benefits of using drones in the utility industry is the ability to monitor transmission lines and distribution circuits in remote areas. Using sophisticated cameras and scanning technology, like the payloads on the Censys Sentaero drones, coupled with advanced drone software and artificial intelligence, UAS can be programmed to search for broken or damaged poles, natural hazards, and other issues that could cause a power interruption.

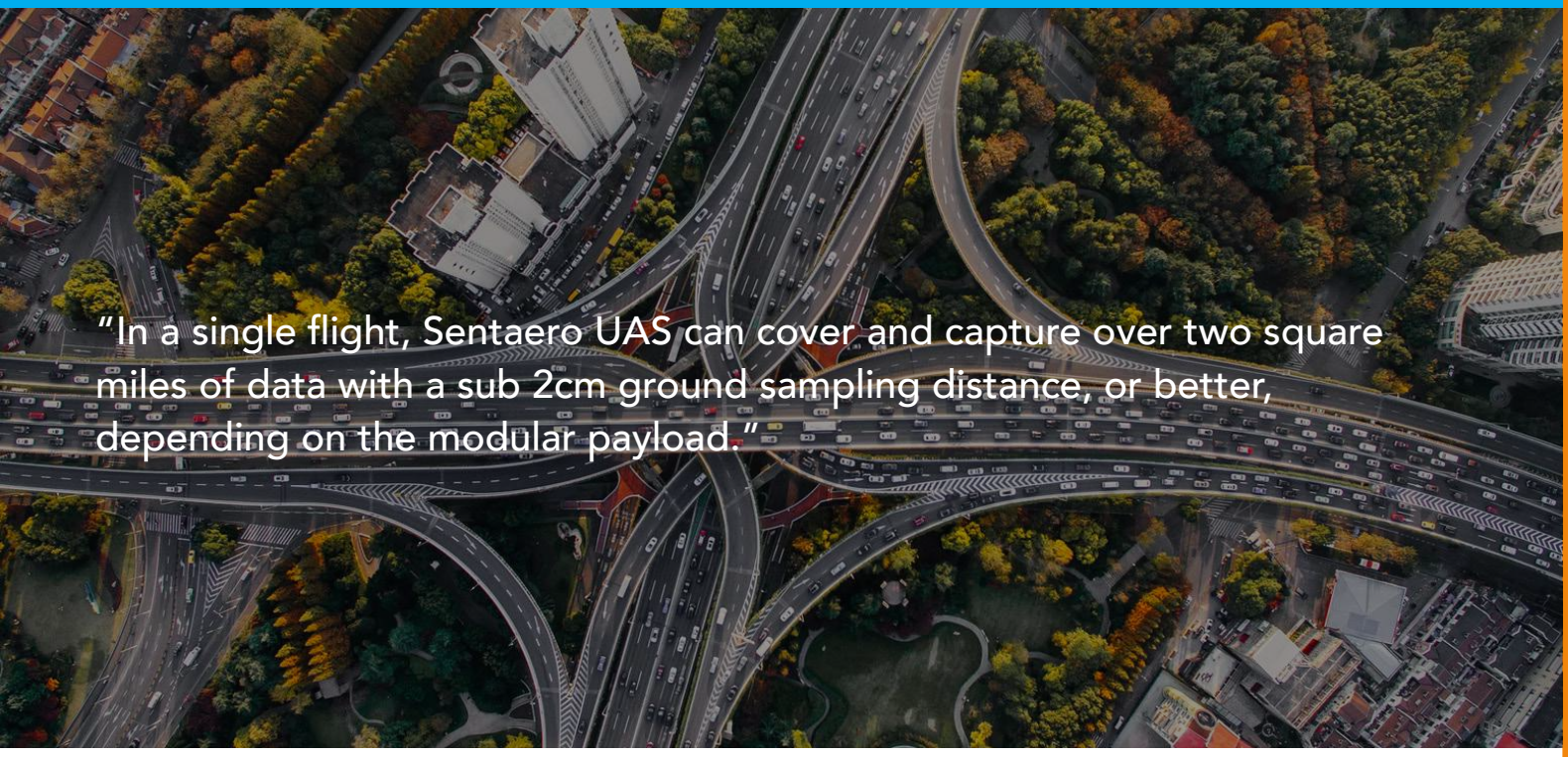
Drones can keep utility workers safe by helping them avoid dangerous areas and situations. If a power line, pipe, substation, etc is in a remote location, drones can mitigate or eliminate the need to travel through dangerous environments in person. In the event of a disaster situation, UAS can go into areas that would otherwise be too dangerous to navigate in person.

Drones not only make the energy industry more efficient, they can also help to keep workers safe.

Utilities Mission Profiles

- Routine Inspections
- Surveying
- Event Monitoring
- Remote Infrastructure Monitoring
- Proactive Issue Monitoring
- Circumvent Dangerous Ecosystems
- Investigate Suspicious Activity
- Avoid Hazardous Material Exposure
- Track Natural Disasters

Use Case Mapping and Surveying

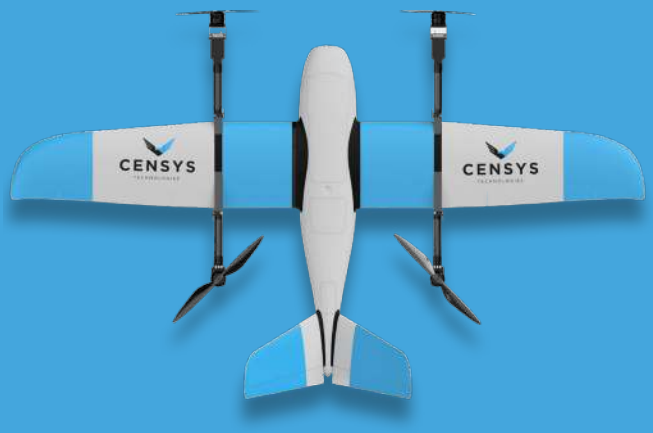


The usage of drones in mapping and surveying is not a new idea. UAS have helped to revolutionize the industry by automating much of the work and providing exceedingly accurate and efficient data and images.

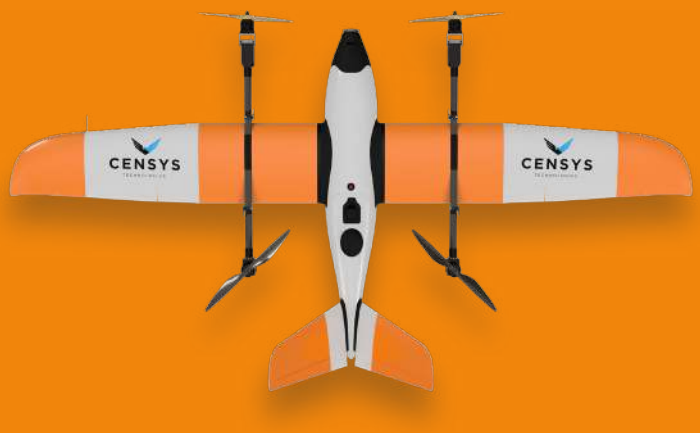
The question then becomes less about whether to use drones in mapping and surveying, and more about which drones are best suited for the task. The Censys Sentaero drones are designed with mapping and surveying in mind.

The major difference, that sets the Censys platform apart from other UAS, is its enhanced flight time. In a single flight, Sentaero UAS can cover and capture over two square miles of data with a sub 2cm ground sampling distance, or better, depending on the modular payload.

The ability to quickly and easily swap out different cameras and scanning payloads is essential for getting the most out of your UAS. Choosing a drone that is easy to program, track, and retrieve data from is also important.



The Sentaero VLOS



The Sentaero BVLOS

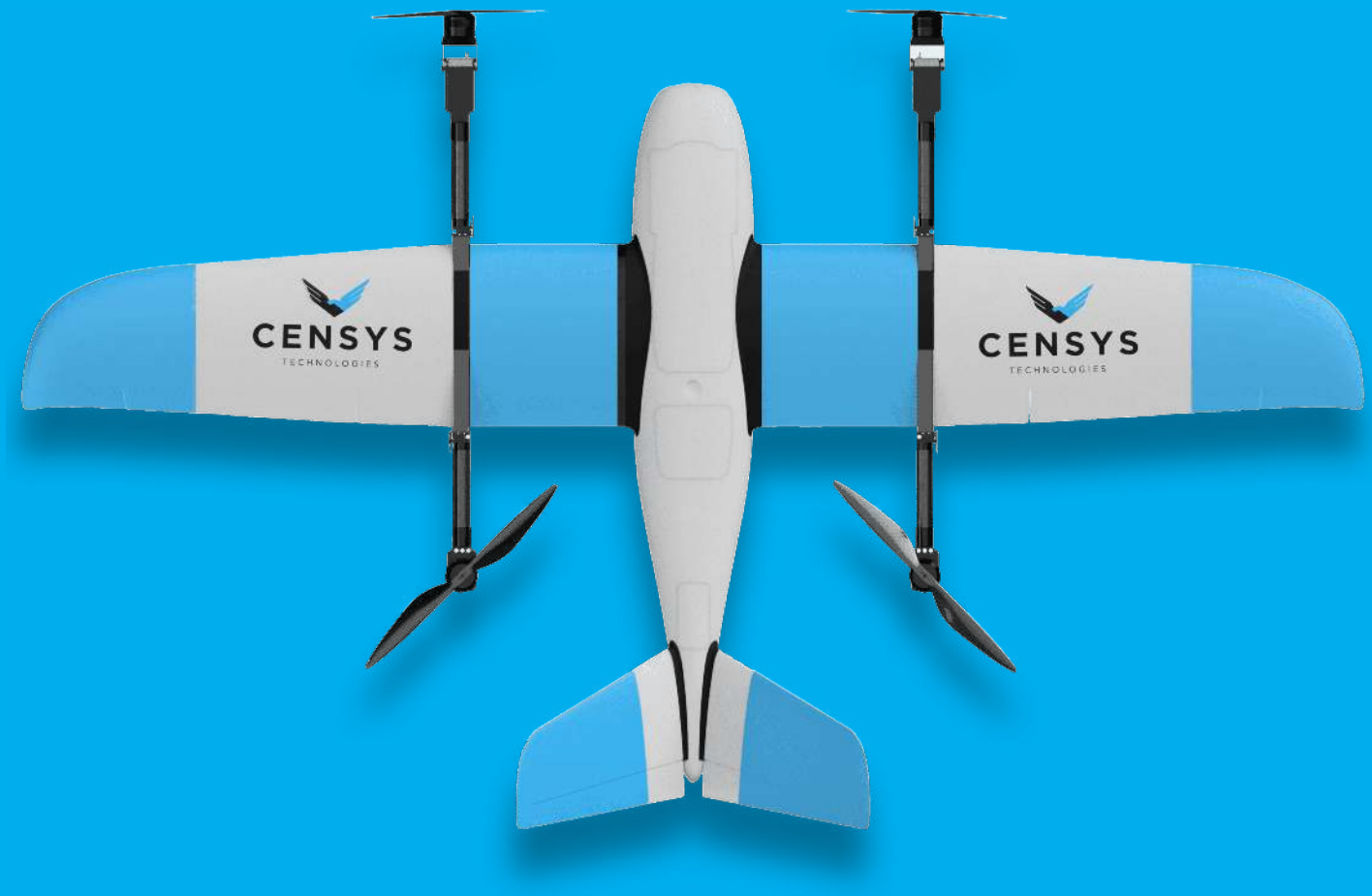
Which UAS Should You Choose?

Now that we have established the practical uses for drones in private and public sectors, the question becomes which drones can accomplish these missions in the most efficient and effective manner.

Censys Technologies has created two drone systems and a mobile command center that can fulfill all of the mission criteria for a variety of roles.

In the US, commercial drone pilots must always maintain a visual line of sight with any drone they are operating. However, an approved waiver by the FAA can allow drone pilots to fly Beyond Visual Line of Sight (BVLOS). This maximizes the benefits and efficiency of the unit. The drone can cover larger areas without the need for the operator to keep their eyes on the unit.

Censys Technologies achieved 100% Beyond Visual Line of Sight (BVLOS) waiver approval for its UAS systems. The FAA has a 1% approval rate for this waiver, making Censys one of the very few drone producers that enjoy this advantage.



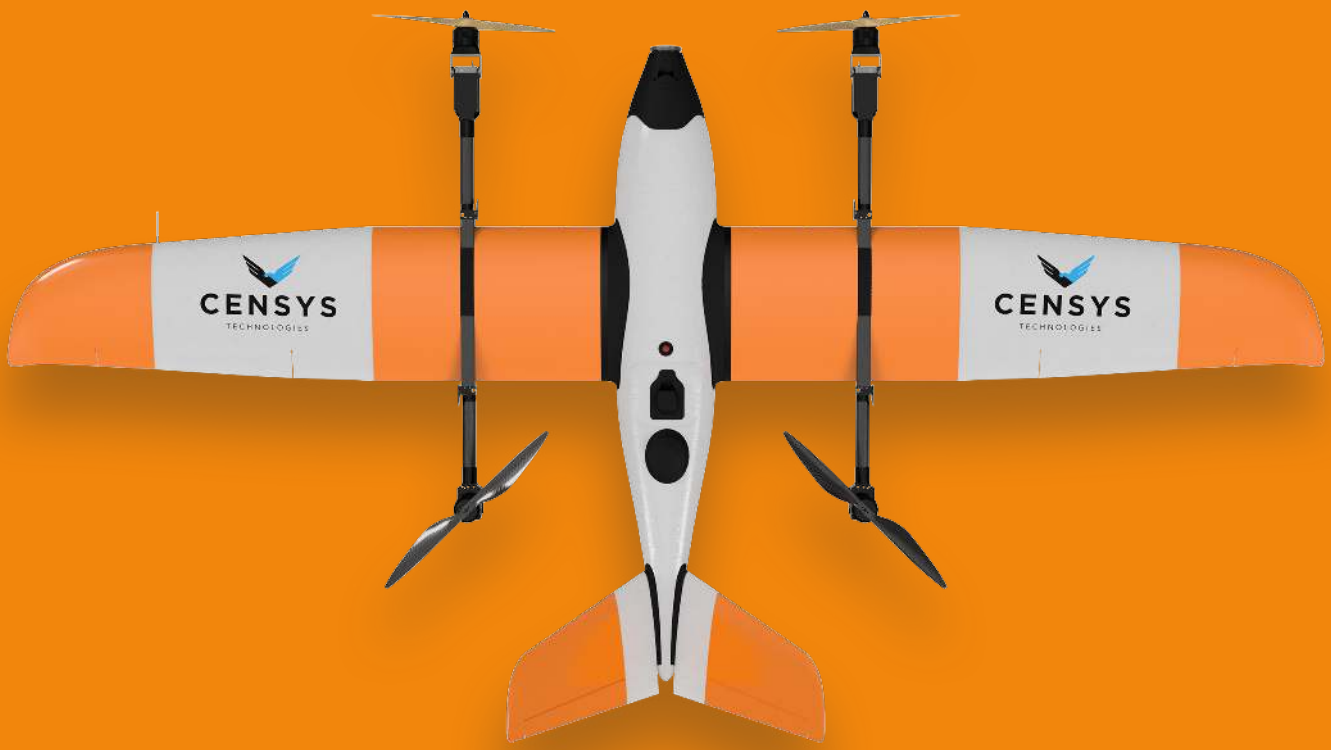
The Sentaero VLOS

Specifications

Max Range | 70 Miles
Max Flight Time | 1.75 Hours
Max Cruise Speed | 40 MPH
Payloads | Varied, Hot-swappable, Universal
Standard Weight | 16 Lbs
Wing | Fixed
Takeoff | Vertical
Line of Sight | VLOS
Data Collection | Qualitative and Quantitative

The Censys Sentaero VLOS is an industry-leading mid-to-long range UAV, optimized for tight launch and landing zones. This extremely versatile UAS can be augmented for a variety of missions and applications. The VLOS can fulfill the needs of a variety of users, from small businesses to government agencies, to enterprise-level businesses.

This aircraft features hot-swappable payloads including gimbaled EO/IR and video streaming at a scalable price point.



The Sentaero BVLOS

Specifications

Max Range | 55 Miles
Max Flight Time | 1.2 Hours
Max Cruise Speed | 45 MPH
Payloads | Varied, Hot-swappable
Standard Weight | 18 Lbs
Wing | Fixed
Takeoff | Vertical
Line of Sight | 100% Beyond Line of Sight (BVLOS) + Detect and Avoid System
Data Collection | Qualitative and Quantitative

The Censys Sentaero BVLOS (Beyond Visual Line of Sight) features mid-to-long range flight capabilities. The beyond visual line of sight feature makes this unit unique and more versatile than the majority of other drones. This platform can be fitted for a variety of sensor and camera payloads, making it flexible enough to excel in most applications and missions.

The BVLOS is the best in class UAV solution for small businesses, government applications, and enterprise-level organizations.

Mobile Command Center

The Censys Technologies Mobile Command Center is an asset to applications and missions where quick data turn-around time is essential. When used to support the Sentaero family, an MCC can add up to 50 miles, per week, of working distance.

The Mobile Command Center was created out of a need for efficiency, better human factors, additional layers of risk mitigation, and the BVLOS Safety Case. Eliminating the set up and tear down before and after missions saves hours a week, resulting in greater output from your field teams. The MCC provides risk mitigation through redundancies in power supplies, Ground Control Stations, and Communications. It's also designed to be comfortable for UAS operators.

By combining Sentaero drones with a Mobile Command Center, businesses and organizations can develop the ultimate unmanned aerial strategy.

Command the Skies

As technology advances both public and private sectors must shift and adapt to take advantage of new opportunities. The advances in UAS technology have made drones one of the most exciting new technologies for a variety of businesses and applications.

If you are ready to step into the world of UAS, update your fleet of drones, or learn more about the technology, we invite you to reach out to Censys Technologies to get started.

Learn More

www.censystech.com