

## **Enabling BVLOS Drone Operations With Absolute Connection Confidence**

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When embarking on drone BVLOS operations, you will find that regardless of the mission, all drones require a number of key elements and components for top performance: Optimal SWaP (Size, weight, and power consumption), flight computer, mission planner, and a connectivity solution.

The mission planner is required in order to optimize the operations, taking into account the various conditions pre- and during flight. The optimal SWaP is a necessity for completing long-range missions. The flight computer and connectivity solution are the unique elements, which will end up being the factors determining whether, or rather how successfully, your drone can fly BVLOS missions.

This where the Elsight Halo comes in. Halo is a device, about the size of a credit-card, which provides unparalleled and unmatched connection confidence for drone BVLOS missions. It takes up to four LTE mobile networks, RF SatCom, and bonds them into a single, secured VPN link for C2 between the drone and the ground control station (GCS) – alongside complete data redundancy.

Essentially, Halo is what you would get if you were to connect a massive (virtual) LAN cable between the drone and the GCS, with an unprecedented and unheard of 99.8 percent continuous uptime.

### **Connection Confidence**

The Halo was born, based on more than 10 years of experience with transmitting uninterrupted A/V transmissions, as well as Elsight's proprietary "6th Sense" AI-powered connectivity monitoring solution.

Today, Halo is used by more than 60 drone operators and manufacturers around the globe, including large and well-known names such as DroneUp and Spright in the United States, Speedbird.Aero in Brazil, as well as many others in Europe, Canada, Latin America, Africa, Asia, and Australia.

Halo aggregates numerous LTE and 5G mobile networks, plus other forms of communications such as RF and satellite, into a secured network pipeline. It breaks down transmitted data into packets, which are then duplicated and sent over multiple paths through the Elsight cloud, upon which the data is recombined with zero packet loss, thus creating a comprehensive whole which never loses any of the data sent over the network –be it sensor data, control, telemetry, or otherwise.

Joining this is the company's proprietary AI technology, "6th Sense", which monitors the network strength multiple times each second. "6th Sense" automatically balances the traffic along the bonded networks, shunting traffic to the links, which are most ideal for the specific drone's

unique requirements, as well as the link's capability and capacity. Halo and "6th Sense" can choose a network based on the user's preferred network, a predetermined minimum bandwidth, or based on other custom preferences as decided by the drone operator.

The powerful functionality is what enables the redundancy essential for long-range UAS operations, while also avoiding the standard failover, which requires a network disconnect, drop or connectivity loss before switching over to a new network.

### **Additional Features**

In addition to the absolute connection confidence – which provides BVLOS drone operators with the assurances that they will remain constantly and consistently connected with their drones – Halo also has a number of other supported features, each of which provide the user with added benefits, without increasing the drone's SWaP profile.

### **Broadcast and Network Remote ID**

Drone manufacturers must soon begin to comply with the FAA's ruling requirements, and by September 2023, all drone pilots will also be required to meet the part 89 operating requirements. For most operators, this will entail flying a Standard Remote ID Drone, one which is equipped with a standard broadcast module. Halo supports both Bluetooth and cellular network Remote ID, and is working on also implementing support for Wi-Fi. With this system a drone operator will have a fully FAA-compliant Remote ID solution, well before the compliance dates come into effect.

### **5G Support**

5G, the 5th generation of cellular-mobile communications, is poised to eventually take over from 4G as the dominant communications method. 5G brings with it greatly increased connection speeds, theoretical maximums 100 times faster than 4G. 5G supports a larger density of unique devices (which is a critical component to enabling UTM as the field develops in the future), and has much-reduced latency when compared to 4G.

When all of these features are combined, they can help BVLOS drone operators keep abreast of the ever-growing amounts of data, which are generated by sensors and modern HD cameras, while also allowing operators to take advantage of cloud server data processing. When joined with the increased density capacity of unique devices, this can facilitate drone-swarm operations at a range and level previously unheard of. Halo provides support for SA and NSA 5G services – as drone manufacturers are

ready to take advantage of the characteristics that the 5G rollout has to offer.

### Hyper-Accurate GNSS

In conjunction with a partner, running the partner's software on Halo by means of a dedicated, robust API, it offers a cost-effective and precise positioning solution, which requires no additional software or hardware requirements. This hyper-accurate GNSS operates in both open-sky and urban area environments and provides cm-level accurate results on the ground. The GNSS has zero-latency positioning, and instantaneous precise positioning which eliminates convergence time. The Future of BVLOS Operations

When looking beyond the now and into the future of BVLOS drones, it is easy to see that BVLOS is about far more than just flying outside the operator's line of sight, and includes two main industry goals:

- The ability to take off, land and operate a drone without requiring it to be "led by the hand" by a trained pilot.
- Allowing one single drone pilot to simultaneously control and supervise multiple drones from a Drone Network Operation Center (DNOC).

BVLOS operations, paired alongside a Drone Network Operation Center will exponentially increase the possible applications for the controlled drones, as well as their distance. Utilities operators will be able to inspect hundreds of miles of pipes or cables with drones. Agricultural operators will be able to cover fields hundreds of acres in size by using several drones at the same time.

Retailers and delivery centers will begin carrying out efficient mid- or last-mile deliveries.

These are just a small number of the use cases, which become available once operators can take full advantage of flying their drones beyond the visual line of sight.

The Halo is a tool enabling these goals and turning them into reality. With Halo and Allsight, the Elsieht cloud management platform, a single remote pilot is able to pilot hundreds of drones at ease from any spot on the planet, where each drone broadcasts its own unique ID and knows its precise location within a few cm.

Halo is the launching pad upon which future BVLOS drone operations can become reality.

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