

Case Study

QuadSAT's solution optimises OneWeb's Ground infrastructure

OneWeb is a global communications network powered by a constellation of 648 low Earth orbit (LEO) satellites. Headquartered in London, OneWeb enables high-speed, low latency connectivity for governments, businesses, and communities everywhere around the world.

Objectives

- › **Optimise antenna performance to enhance ground segment performance**
- › **Implement a cost effective testing regime**
- › **Review environmental influences on antenna performance**



As the rollout of our ground segment progresses, we are utilising innovative methods to ensure that our networks are robust and accurate. By validating our antennas insitu, we can review and verify the technology in its own environment. The product and expertise provided by QuadSAT has provided us with sophisticated and detailed results from the validation campaign.

Daniel Costenbader, Ground Systems
Engineer of OneWeb

Objective

As OneWeb prepares for global rollout of its LEO constellation, the low Earth orbit satellite communications company is also busy preparing the ground infrastructure required.

With several teleports in place around the globe, OneWeb's objective was to optimise the ground segment through evaluating antenna performance and identifying any errors with its RF network. Infrastructure optimisation was a priority for OneWeb due to the scale of its ground segment; it needed to ensure that teleports were optimised within their own environment whilst being technologically capable of managing the unique complexity of LEO's requirements, such as switching and tracking. Efficiency was critical; OneWeb needed a robust and resilient infrastructure that maximised commercial opportunities.

OneWeb chose to focus on antenna testing to qualify its ground network. Its primary challenge was finding a testing solution which was both financially viable within a large network, as well as accurate enough to deliver in-depth results. With the scale of its global rollout of antennas, on-site testing would allow both cost and time efficiency as well as providing results which captured environmental influences on the performance of its antennas.





Testing with succes

At the first site, Telespazio teleport in Scanzano, (Palermo, Italy), QuadSAT sent a small team to verify the method's findings. QuadSAT measured the radiation patterns of several antennas, enabling the validation of feed alignment and the direction of pointing. Testing included the generation of antenna radiation patterns on both a known good antenna as well as those which had not yet been aligned. The measurement of north offset in antenna pointing was completed through the verification of antenna pointing precision with respect to the Azimuth axis.

Accurate data in the north

Following on from the success at Telespazio, QuadSAT worked to verify 10 antennas at the KSAT Svalbard Ground Station in Norway, the world's largest and northernmost station ideally located at 78° North, as part of OneWeb's ground segment roll-out. The tests focused on the measurements of antenna radiation diagrams, and the verification of the North offset in antenna pointing utilizing the drone as the source. QuadSAT executed several measurements, including azimuth, elevation, and raster cuts to provide accurate data for processing.

→ Solution

Aware that most existing testing methods are time-consuming, off-site, and expensive, the operator approached QuadSAT to see if its drone-based solution could provide a solution to prevent delays to the launch.

QuadSAT's drone-based system provides users with flexible and accurate antenna testing and calibration. The in-depth testing, performed by the drone mimicking a satellite, provides quality assurance and removes one of the most significant challenges within testing; testing can be performed on-site, in the antenna's own environment. Not only does this reduce downtime and the costs associated with testing logistics, but it also provides highly accurate feedback as its results incorporate environmental reflections and interactions. The system ensures repeatability, control over the drone during measurements, ease of operation and data delivery in a uniform format.

→ Results

Data was aggregated through QuadSAT's own software to deliver accurate results. The results enabled OneWeb to validate the quality of its ground segment and make minor adjustments to enhance efficiency in terms of antenna performance.

On-site testing and calibration using QuadSAT's UAS technology provide the new perspective required to enhance the ground segment and deliver the level of accuracy, resilience and cost-efficiency required to provide industry-leading standards of services to end-users.

Why QuadSAT?

- **QuadSAT provides a low-cost solution**
- **QuadSAT's UAS technology enables on-site testing**
- **QuadSAT's on-site testing reduces both the costs and downtime associated with offsite testing**
- **The results provided by QuadSAT from on-site testing consider environmental factors**