GPS Simulation for Avionics Applications with the OSPREY

When it comes to aircraft testing GPS reception is needed for wide variety of tests. Without high accuracy and integrity GPS, several avionics systems wont function to the required standards. The VIAVI OSPREY can fill that need without the use of in hangar GPS repeaters or towing an aircraft outside. It's also able to simulate this high accuracy and high integrity GPS without the use of WAAS correction.

#1 ADS-B Testing - The OSPREY GPS simulator helps facilitate a full ADS-B test per AC 20-165B. The requirement for ADS-B out testing is that it can rebroadcast GPS information that meets or exceeds the minimum Accuracy and Integrity shown in AC 20-165B and 14 CFR § 91.227. Even without WAAS, the simulated accuracy the Osprey provides is well above the testing requirements shown below and in ideal conditions can output even higher accuracy.

NIC ≥ 7	Rc < 370.4 m (0.2 nm)
NACP ≥ 8	EPU < 92.6 m (0.05 nm)
NACV ≥ 1	< 10 m/s
SIL ≥ 3	≤ 1x10-7 per-hour or per sample
SDA ≥ 2	≤ 1x10-5 per-hour

AC 20-165B Accuracy and Integrity Requirements

Category	NIC	NACp	NACv	SIL	SDA
Avg	8.0	9.0	2.0	3.0	2.0
Min	8	9	2	3	2
Max	8	9	2	3	2

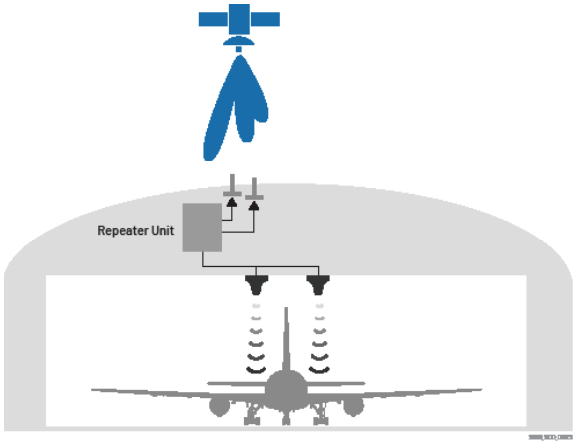
GPS Accuracy and Integrity Simulated by Osprey

With these Accuracy and integrity values consistently achieved there is no limitation on using the OSPREY for ADS-B testing. It also has additional features that will make the testing of ADS-B much easier.

- Easy to start and stop simulation to verify the system adjusts the broadcast within specified time requirements per AC 20-165B.
- Dual antenna couplers that can be toggled on and off to verify system change overs.
- Dynamic motion to view advisory messages as the aircraft closes in on simulated targets.
- User defined GPS position. There are some avionic maintenance facilities so close to the ADSB towers that there is nearly no way to provide enough isolation to stop signals from being received, resulting in false alarms during testing. In this scenario, you could use the OSPREY to have the aircraft broadcast a position in a designated remote area.

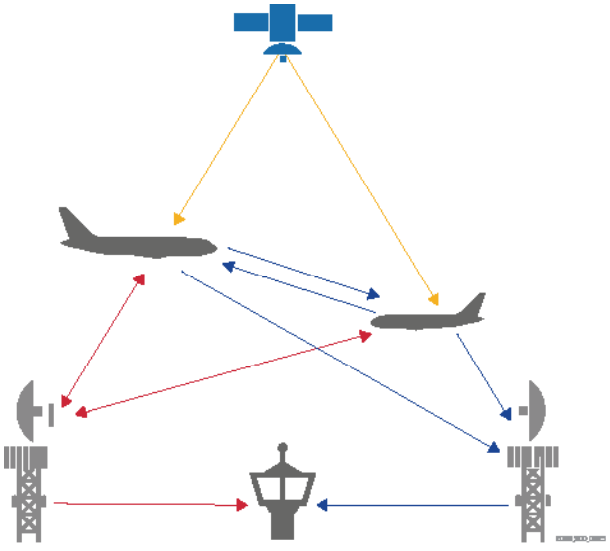
#2: GPS Movement - Many smaller aircraft rely on a GPS dynamic position to show movement or altitude. For example this is what inhibits or allows the ADS-B signal to broadcast. In this scenario, you would have to fly an aircraft with untested equipment and pull the FAA flight report to verify you have configured the equipment correctly. This can lead to multiple check flights, which can be very expensive. The OSPREY, with its dynamic route simulation capability, solves this issue.

#3: GPS repeaters have proven to be unreliable and can cause interference with nearby aircraft should you have your hangar door open. You can eliminate downtime and avoid interference by using a GPS simulator that couples directly to your aircraft antenna(s), making for a quick and easy setup.



The OSPREY replaces GPS repeaters.

#4: Many airborne avionics such as FMS, Flight Director, Synthetic Vision, Autopilot, TAWS, TCAS, Transponder w/ADS-B and Datalink require GPS input. Having a reliable controlled GPS input ensures your technician will not experience downtime or be required to move the aircraft outside.



The OSPREY is used in place of "open sky".

#5: Isolate issues by direct connecting to your GPS Receiver. This will allow you to determine if the aircraft wiring and possibly the antenna are at fault vs. the GPS Receiver.

#6: For GPS simulation in the lab, you can eliminate the need for a roof top antenna. The OSPREY also has the capability to direct connect to devices requiring a GPS input via either an SMA or TNC connector port.

#7: XM Weather testing can be difficult to verify that indications are working correctly due to needing actual live weather events. With newly developed systems each of those weather events needs to be verified on screen. The OSPREY can be used to virtually relocate your aircraft near the inclement weather. The XM satellite antenna will require access to the open sky.

Virtually locate the aircraft near inclement weather.

The OSPREY is applicable to most common use cases for a GPS simulator and with up to 10 satellites the accuracy is sufficient. However, the lack of WAAS does come with some limitations. WAAS is correction information sent to the GPS system thats collected from ground station to continuously update position accuracy in real time. WAAS correction is essentially Turbo Charging each satellites accuracy. This is generally only needed for vertical guidance systems and LPV approaches. In this case you would likely need the GPSG-1000.

Product Comparison

Use Cases	OSPREY	GPSG-1000
AC 20-165B and 91.227 ADS-B testing	*	*
RAIM	*	*
Dynamic Routes	*	*
Static Positions	*	*
Standard Dual Antenna Testing	*	*
GPS Changeover Testing	*	*
TAWS	*	*
TCAS	*	*
GBAS	*	*
LPV		*
FMS	+	*
Flight Director	+	*
Autopilot	+	*
Full GPS Certification and Engineering Level Testing		*
Avionics Integrated with GPS	*	*
L1, L1C, L2C, L5, E1, E5, E5a, and E5b	L1	*
Channels simulated	10	12

Note: Use cases marked with a + will have some vertical limitations until the OSPREY is able to simulate altitude changes.

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