

Guidelines for choosing between the SBG Ellipse 3N and 3D

Resonon offers two choices for the GPS/IMU in our airborne systems: the Ellipse 3N and the 3D. The 3N is a single GPS antenna system that uses a magnetometer to determine heading, whereas the 3D is a dual antenna system that uses the GPS antennae to compute heading.

Both systems share the following features and accuracies when used in their appropriate manners:

- Four constellation GNSS:
 - GPS
 - GLONASS
 - GALILEO
 - BEIDOU
- RTK Capability
- Navigation Accuracy:
 - single point: 1.2 meter
 - SBAS: 1 meter
 - RTK: 1 cm
- Roll/Pitch Accuracy:
 - single point: 0.1°
 - RTK: 0.05°
- Heading:
 - single antenna with dynamics: 0.2°
 - dual antenna with 2-meter baseline: 0.2°

The primary advantage of the 3N is the need for only a single antenna. However, it does require a precise magnetic calibration and frequent flight dynamics to achieve the stated heading accuracy. Frequent flight dynamics are defined as a turn or other accelerations over 30-60 seconds.

The primary advantage of the 3D is the ability to maintain heading accuracy during extended periods of low dynamic flight, as well as the elimination of the magnetometer calibration and potential magnetic disturbances common in drones and piloted aircraft. It requires a minimum 1-meter separation between antennae which can add complexity to use on drones. It is also more sensitive to electromagnetic interferences.

In general, the 3D is recommended if the use of dual antennae is not prohibitive. It is always recommended for piloted aircraft due to the difficulty of achieving a clean magnetic environment on board. If the 3N is used, flight plans should be created to include turns and/or accelerations every 30-60 seconds, or at least before data collection passes.