

# Select the Right GPS Hertz Rating

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Equipment response time is an important factor in precision farming. This parameter determines how fast equipment responds and how far that piece of equipment travels before a change occurs. Several factors, including the hertz rate of the global positioning system (GPS), affect response time.

Hertz rate is the speed at which the GPS delivers information. It dictates how fast new coordinates and other parameters (such as GPS speed, timing, and heading) reach the computer or controller. Although some software works autonomously — without input of GPS frequency — other types of software are dependent on output speed and greatly affect the system’s perceived precision. SiteMate and Guidemate software, for example, operate much better on a 5-hertz than a 1-hertz GPS when used for sprayer and guidance control.

To get an idea of movement resolution versus GPS speed, note in Figure 1 how much distance is covered per GPS hertz rating and speed. Higher ground

speeds require faster GPS units to maintain relatively small spatial resolutions or distances between points. Most precision farming equipment sold today comes packaged with a GPS unit rated for that purpose. Producers who need to connect several pieces of equipment often find that system to be sluggish and might need to check the GPS hertz rating.

Most current agricultural GPS units output up to 5 hertz — sufficient for most land-based agricultural operations — but many older units were rated at 1 hertz. Newer units are being developed with 10 or 20 hertz for spray control from aerial spray planes and other fast-moving vehicles. These units typically require baud rates of 19,200 or 38,400 to relay information quickly.

**Note:** Check the manufacturer’s specifications and program for the GPS/guidance system to match the output sentences structure, baud rate, and hertz rating for that operation. Output only those sentences needed for that piece of equipment.

**Table 1:** Distance traveled versus GPS hertz rating. (Areas with black fill denote acceptable GPS hertz ratings for each type of agricultural work. Figures are estimates.)

Agricultural Activity	Distance Traveled Based on GPS Hertz Rating (ft.)				
	MPH	GPS Hertz Rating			
		1	5	10	20
Tillage and Planting	1	1.5	0.4	0.1	0.0
	2	2.9	0.9	0.1	0.0
	3	4.4	1.3	0.2	0.0
	4	5.9	1.7	0.3	0.0
	5	7.3	2.2	0.3	0.0
Spraying	10	14.7	4.3	0.6	0.0
	15	22.0	6.5	0.9	0.1
	20	29.3	8.6	1.3	0.1
	50	73.3	21.5	3.2	0.2
Agricultural Airplane	100	146.7	43.0	6.3	0.5
	150	220.0	64.5	9.5	0.7
	200	293.3	86.0	12.6	0.9

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