

GPS Issues for Kontrol-Flo II

1. A recent governmental action has increased the accuracy of GPS receivers.

The Global Positioning System (GPS) was deployed as a military navigation system that was allowed to be used by commercial devices. However, the military wanted to be able to distort the accuracy of the position and velocity signals to non-military users in a national emergency so they designed the system with selective availability (SA). SA introduced an error into the system that made position and velocity measurement considerably less accurate. For the most part, even though there has not been a "national emergency," the government has kept the SA feature turned **ON**. This meant that commercial users were **not** able to get the most accurate position and speed data from the system. In January of 2000, the government decided to turn **OFF** the SA feature and let commercial users of the GPS system have access to all of its potential. Since that time, the Kontrol-Flo system has **automatically** benefited from the increased accuracy. The measured speed used to control the application rate became MORE ACCURATE than before and is now able to approach an accuracy of +/- .1 mph.

2. The importance of proper antenna mounting.

The GPS system operates by receiving signals from **multiple** GPS satellites simultaneously and using that information to determine position and velocity (speed). The GPS satellites can be anywhere in the sky including positions rather low and close to the horizon. In our system, we only use the velocity component to determine ground speed and adjust application rates accordingly. Incoming GPS satellite signals travel "line of sight" meaning that essentially any structure between the GPS antenna and a transmitting satellite will block the signal from that satellite. When enough satellites are blocked, the triangulation necessary for accurate speed calculation is impaired and the speed signal becomes very inaccurate or is blocked completely. Passing under a bridge or overpass will typically block all or most signals from available satellites.

THE IMPORTANT THING TO REMEMBER IS THAT THE **TRACTOR ITSELF** CAN BLOCK RECEPTION OF AVAILABLE SIGNALS AND COMPROMISE THE ACCURACY OF A SPEED CALCULATION.

- **It is important therefore to mount the antenna on top of the cab with no obstructions in any direction.**
- **The antenna must NOT be mounted on a pole or other structure that will SWAY significantly while the tractor is in operation.** The swaying motion will be picked up erroneously as tractor speed, and will confuse and distort the speed calculation used to control the application rate.