

Topic three is the Wide Area Augmentation System, or WAAS. WAAS, or Wide Area Augmentation System, is a type of differential correction that removes some of the errors associated with satellite clock errors, satellite orbit errors, and atmospheric delay errors. Not all GPS units have WAAS as a feature to them, but if it is, it should be enabled to improve the accuracy of the signal that you're receiving in. So the way WAAS works is that a GPS signal comes down from the satellites and as it comes down to the satellites to either your GPS receiver or to one of the WAAS reference stations, there's some amount of error associated with that signal. Some of that error in the time before WAAS would just be an accepted part of the data you collected, but now with WAAS as an option, the error that's associated with the signal coming down can be analyzed by reference stations that are at a fixed or known location. They can figure out how much error is in the signal that's coming down because they've had a survey done where they know exactly where these reference stations are. They figure out how much error is associated with the signal coming down from the satellites, beam those to a WAAS control station, the WAAS control station then beams those up to a WAAS satellite that's at a much lower orbit that doesn't circle the earth, but stays in a fixed spot over the United States, and then that satellite, if it's enabled on your receiver and you have that option on your receiver, sends the correction down to your GPS receiver and fixes the error associated with that. It's a really cool thing that allows you to get a much accurate representation of where you actually are. It doesn't fix everything, but it's definitely a feature that you should look for when choosing a GPS unit to purchase.

That's right, Aaron.

So the thing about using WAAS is, this is a screen capture from your GPS unit that we'll be covering in the next couple of sections. But in this section you can see that WAAS is enabled because of these little D's down here at the bottom of the bar graphs. Whenever WAAS is enabled, those D's will appear. Under Open Sky Conditions, Garmin's receiving 100% WAAS corrections, can get accurately down to 1 to 3 meters of accuracy, which is really pretty good for a recreational unit that sometimes costs less than \$200. We recommend that WAAS should always be enabled, unless you happen to notice a dramatic lack of D's down here. If there are only one or two, you might want to consider temporarily taking that WAAS setting off, but for the most part and for most of the lower 48 states, leaving that WAAS enabled will increase your accuracy and remove a lot of the error from your coordinates.

That's right, Aaron. Some of the more observant students may notice that Satellite 51 over on the far right hand side does not have a D in its signal strength bar, and that's because that Satellite 51 actually is the WAAS satellite, that's the satellite that is broadcasting those GPS corrections. You can also see that WAAS satellite on the Skyplot view just above the bar graphs and that this particular screenshot was taken in Arizona, and you can see that Satellite 51 is sitting at approximately 45 degrees of ascension, so it's quite high in the sky.

You should be able to get a good signal from the WAAS satellites in most of the lower 48 states. So WAAS is a really good thing. It can decrease some of the error, but it's important to recognize that it doesn't remove all of the error. It cannot correct the error from receiver noise, electromagnetic fields, from the signal bouncing off of other objects like buildings or cars. It can't take away the error associated with poor signal coverage that might occur from canopy trees or things like that, and it also can't affect the types of error that would come from some of the user mistakes that you might make that we'll cover in the next sections about coordinate systems and datums.