

Re: Why are some GPSs so much better than others?

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In article <7ub1h01e3e473vvresa6b3oqqe69hvh68p@4ax.com>, Peter <peter@no-spam-please-6644.co.uk> wrote:

[SNIP of material to which I am not responding]

>I also wonder what is the point of a 12-channel GPS when most of the time there are 8 or fewer satellites in the sky.

>Peter.

>Return address is invalid to help stop junk mail.

>E-mail replies to peter4400@peter2000XY.co.uk but remove the X and the Y.

>Please do NOT copy usenet posts to email – it is NOT necessary.

Rhetorical question: why have more than one channel when the receiver can switch between the satellites rapidly (e.g., the early Garmin receivers)?

- 1) There can be fourteen GPS satellites above the mask horizon at one time at the present time. In my experience, with a number of Garmin receivers made over the last decade, under field conditions without external antennas, eleven satellites is actually quite common.
- 2) The WAAS satellites share channels with the GPS satellites. There generally are two visible in many regions of the world and in the future there may be even more.
- 3) If Galileo is successful (and I assume it will, if for no other reason than European pride) as many as thirty satellites may be above the mask horizon at one time.
- 4) Spare channels can be used for signal acquisition of GPS, WAAS, Galileo, EGNOS (the Galileo equivalent to WAAS) satellites about to come above the mask horizon, to

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anticipate Doppler frequency shift effect, etc. They also can be used during the initialization of the receiver at power-up to massively search for single satellites until enough have been found to acquire ephemeris, almanac and rough time, location, velocity and acceleration data to do a full solution acquisition.

- 5) Since the channels share the receiver radio frequency front-end, adding channels is relatively cheap as only computing resources need to be added to the signal demodulation section of the receiver. With massively parallel correlators (channels), thousands and even hundreds of thousands of channels are practical (even at cell phone prices). Such massively parallel correlators (channels) permit signal acquisition and maintenance even in weak and radio-noisy environments (e.g., inside indoor shopping malls and on battle fields with jammers operating).

<http://www.clickerado.com/g/gps/positioning.htm>

- 6) Locations requiring extremely reliable and precise solutions may provide ground transmitters of weak GPS/Galileo-like signals from several locations near the location requiring such signals to provide additional navigation signals, differential corrections and declarations about the quality of all GPS/Galileo-like signals usable at that location (LAAS). These additional signals also require channels.

- 7) Consumer grade 16 channel receivers exist. E.g.:

<http://www.highpointscientific.com/meade.html>

http://www.celestron.com/prod_pgs/tel/nx_gps_table.htm

<http://www.aircotec.net/xctrainer.htm>

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