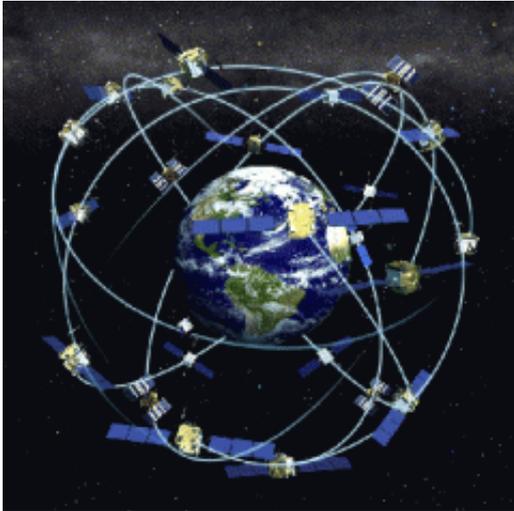


New 4G network could cause widespread GPS dead zones

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(PhysOrg.com) -- If a plan to build new 4G mobile phone base stations in the US goes ahead, engineers say GPS satellite navigation systems will be seriously jammed and huge areas of the country will become GPS dead zones.

Virginia company LightSquared communicates with satellites using low-power signals in the frequency range 1525 to 1559 MHz, which is close to the frequency range [GPS](#) uses (1559 to 1610 MHz). So far this has not caused interference problems but if the planned 40,000 new high-power [4G](#) base stations are built they would use stronger signals in the same frequency range.

LightSquared hopes to complete the 4G broadband network by 2015 at a cost of up to \$8 billion. The network is expected to deliver mobile phone users download speeds of up to 10 megabits per second.

Engineers Scott Burgett and Bronson Hokuf with Garmin International, a satellite navigation systems

manufacturing company in Olathe, Kansas, say the stronger signals will be disastrous, seriously limiting GPS reception, causing widespread GPS jamming and depriving vast areas of the US of GPS coverage.

The engineers carried out laboratory testing on a portable [GPS device](#) and a general [Federal Aviation Administration](#) (FAA)-certified aviation receiver. A Spirent GSS 6560 simulator representing the current configuration of 31 [GPS satellites](#) was used to simulate the GPS signals. The LightSquared transmission signal was simulated by a Rhode and Schwartz signal generator and amplified to produce the required signal strength.

The results were that the GPS began to experience interference when 5.8 km or closer to the simulated LightSquared transmitter and lost the fix altogether when 1.1 km away. Interference started at 22.1 km for the aviation receiver, and total loss of fix occurred at 9.0 km from the transmitter.

The US air force is also concerned about the interference. General William Shelton, head of the US Air Force Space Command, said at a recent Air Warfare Symposium in Orlando that if LightSquared's network goes ahead and GPS systems are jammed we should "think about the impact." He said he was hopeful a solution could be found but LightSquared had to prove they could operate without interfering with GPS.

LightSquared spokesman Jeff Carlisle said the base stations are not at fault, but the problem could arise because some GPS receivers may be able to "see into" the neighboring frequency at which LightSquared operates. He said the company has already spent \$9 million on a series of filters to prevent its current signals from interfering with the weak GPS signals, and if a problem will exist with the new network only some highly sensitive GPS receivers will be affected.

LightSquared was given a provisional permit late last year by the US Federal Communications Commission (FCC), but the permit stipulated that the network should not cause interference with other signals.

Burgett and Hokuf forwarded their report to the FCC on January 19. LightSquared is now required to submit an initial plan for working with federal agencies and GPS companies to determine how to deal with interference. The plan is due at the FCC by February 25, and a final report is due on June 15.

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