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Title: The Nationwide Differential Global Positioning System and Electric Power Line Interference

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Abstract: Electric power lines can be sources of unwanted electromagnetic energy (noise) at low-medium frequencies. Power engineers have long been aware of the potential for AM radio reception problems in the vicinity of some power lines. It should be expected that DGPS signals, in a band just below the AM radio band, could experience similar problems. This has not been widely observed because many DGPS users had marine applications and not many power lines are on the coast. This will change because NDGPS expansion to cover inland areas will place non-marine DGPS users in proximity to power lines. Some agricultural users have reported that power line noise can be a problem for DGPS receivers under certain conditions. Some DGPS user manuals have vague warnings about operating receivers close to power lines, but power line noise sources are poorly understood by the DGPS user community. This paper describes electric power line noise sources: corona, gap discharges, signal reradiation, and power line carrier signals, all of which can produce electromagnetic energy in the DGPS band. Factors that affect the potential for degraded DGPS receiver performance include noise source characteristics, receiver/antenna design, power line design, proximity to power line, weather conditions, and DGPS signal strength. Possible mitigation options are discussed for power line noise sources.

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