



## **precision approach by polish aviation differential gps - polpos**

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### **Abstract**

The inability of stand alone GPS to support all phases of flight from enroute to terminal area operations and landing has prompted the development of Differential GPS (DGPS) techniques which make use of a reference receiver at a precisely known ground position in addition to the user GPS receiver in the aircraft. Basically, the differential technique allows the generation of GPS solution corrections by computing the actual reference position with the GPS calculated position at the reference site and using the differences as a basic for correcting the navigation solution generated by the user's airborne GPS receiver. The errors are due to ionospheric and tropospheric refraction as well as satellite clock and orbital errors. These errors can be transmitted from the reference site to an airborne GPS unit and used to correct the user position. Transmission is via an additional communication link. Currently, VHF data links are being considered for DGPS, but the concept is still in a developmental phase while electromagnetic compatibility and interference issues are studied. The differential technique, to a large extent, cancels errors common to both the satellite-user GPS link and the satellite-reference station GPS link. Since atmospheric sources of error are spatially correlated, the effectiveness of the differential technique depends on the distance between the reference station and the user GPS receiver; short distances imply greater differential accuracy than long distances. Differential techniques cannot correct site unique errors such as receiver noise and multipath. Some implementations of differential techniques also allow improved integrity monitoring. In order to accelerate the introduction of GPS into terminal area operations, an operational concept called Special Category I (POLPOS) precision approach was developed based on DGPS. This concept is based on an early implementation of differential techniques

and allows a relaxation of Category I precision landing minimum requirements.