

Advancements in GPS Research

Interference and Multipath Suppression for GPS Receivers

ESL researchers are developing and characterizing new antennas and antenna electronics (adaptive/smart antennas) for RF interference and multipath suppression in global positioning system (GPS) receivers. Technical support is being provided to the GPS Joint Program Office (JPO), Joint Precision Approach and Landing System (JPALS) program and to the Air Force Research Laboratory. Complete end-to-end computer simulations have been developed to study the performance of current and future adaptive antenna systems mounted on any platform of interest. In these simulations, measured and/or analytical antenna element patterns are used to account for the platform-generated multipaths of incident signals.

Ground Plane Design for GPS Antenna Qualification

A new ground plane for the qualification of GPS Controlled Reception Pattern Antennas (CRPA) and Fixed Reception Pattern Antennas (FRPA) has been developed at ESL. The ground plane can be used to measure the volumetric radiation patterns of the individual elements of the antenna over all GPS frequency bands. The ground plane is designed to minimize diffraction arising from the discontinuities in its surface and thus leads to very accurate pattern measurements. GPS JPO has selected the new ground plane for qualification of all CRPA to be purchased under its newly announced Advanced Digital Antenna Production (ADAP) program.

Reduced Size GPS Antennas

ESL researchers are developing a reduced size CRPA for GPS receivers. A current project is focused on a seven-element CRPA with a 4.25" footprint that can be used with advanced antenna electronics (based on STAP/SFAP) to provide RF interference protection to GPS receivers mounted on relatively small platforms. New techniques to improve the performance of advanced antenna electronics are also being developed.

