A technique, used in geophysical prospection to measure the ground permittivity, has been successfully transposed to space plasmas. The basic principle is to measure the self impedance of a single electric antenna or the mutual impedance between two sets of Hertz dipoles. Since the impedance of the probe depends on the dielectric properties of the medium in which the probe is immersed, characteristics of this medium such as the density and temperature of thermal electrons can be determined. As a bonus, natural waves are also investigated in a large frequency range. The quadripole probe technique has been used for many years on sounding rockets and spacecraft (GEOS-1, GEOS-2, VIKING, ARCAD/AUREOL-3, MARS-96). Electric-field impedance measurements will also be made on ROSETTA and BepiColombo and have been proposed as part of the Radio and Plasma Waves Investigation for the EJSM/JGO Cosmic Vision mission candidate. To illustrate the capabilities of this technique, results obtained by the Mutual Impedance Probe, MIP, onboard ROSETTA will be shown. MIP and the 4 other instruments of the ROSETTA Plasma Consortium, RPC, were switched on during the three Earth swingbys, in early March 2005, mid-November 2007, and mid-November 2009. Calibration and general testing were the main objectives, nevertheless valuable observations of the Earth’s space environment have actually been made, in particular by the MIP, in the plasmasphere, the cold and high electron-density region dominated by the Earth’s magnetic field.