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Electric filed measurements onboard satellites – method, instrumentation and recent results

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The electric field measurements in the conductive media, such as ground, water and space plasma, are one of the most complicated metrological tasks from the point of view of proper measurement method application. This is because the electric field sensors are always interacting with the surrounding medium and the parasitic potential is formed at this. In the result, the measured value consists of the sum of useful and parasitic signals; by this the signal-to-noise ratio is mostly below unity.
To overcome these problems, special high demands are made to the electric sensor parameters, especially to its equal form and surface homogeneity. These are analyzed in the report and the ways to fulfill them are discussed. The successful examples of DC electric field measurements in space plasma are given.
But if only AC component is necessary to measure, the problem becomes much easier to overcome and even the sensors with non-uniform surface may be used.
Some examples of AC electric field measurements during recent space missions are given and main peculiarities of sensors installation onboard the satellites are discussed. The possible sensor arrangement for future spatial mission onboard cubesat is also discussed.
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