

Multiband Fractal Patch Antenna for Small Spacecraft of Earth Remote Sensing

Authors : Beibit Karibayev, Akmaral Imanbayeva, Timur Namazbayev

Abstract : Currently, the small spacecraft (SSC) industry is experiencing a big boom in popularity. This is primarily due to ease of use, low cost and mobility. In addition, these programs can be implemented not only at the state level but also at the level of companies, universities and other organizations. For remote sensing of the Earth (ERS), small spacecraft with an orientation system is used. It is important to take into account here that a remote sensing device, for example, a camera for photographing the Earth's surface, must be directed at the Earth's surface. But this, at first glance, the limitation can be turned into an advantage using a patch antenna. This work proposed to use a patch antenna based on a unidirectional fractal in the SSC. The CST Microwave Studio software package was used for simulation and research. Copper ($\epsilon = 1.0$) was chosen as the emitting element and reflector. The height of the substrate was 1.6 mm, the type of substrate material was FR-4 ($\epsilon = 4.3$). The simulation was performed in the frequency range of 0 - 6 GHz. As a result of the research, a patch antenna based on fractal geometry was developed for ERS nanosatellites. The capabilities of these antennas are modeled and investigated. A method for calculating and modeling fractal geometry for patch antennas has been developed.

Keywords : antenna, earth remote sensing, fractal, small spacecraft

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020