

Photonic Technologies in Space Device Engineering

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Abstract. The article provides an overview of the basic technologies where products of photonics and optoelectronics are used or potentially can be used to create a target and service equipment of navigation, communication, and Earth remote sensing spacecraft. The possible range of technology solutions needed to ensure precision satellite positioning, creation of optical communication technologies used for information exchange on the lines of "spacecraft-spacecraft" or "spacecraft-Earth", as well as the choice of materials for photodetectors and measuring sensors is presented. Moreover, technological trends of modern and advanced developments based on the use of photonic technologies, providing record characteristics that meet the global standards in the development of space device engineering are shown. The main recommendations for the development and intensification of the introduction of photonic technologies in the space industry of the Russian Federation are given in the conclusion.

Keywords: Photonics, optoelectronics, fiber optics and optical communications, onboard time scales, coordinate-time and navigation support, frequency instability, optical frequency standards, small-sized atomic clock, optical gyroscope, annular resonator on "whispering waves", photoelectronic receivers, hyperspectral devices, photon sensors