The control of the laser beam divergence diagram in the systems with two-coordinate acousto-optic deflector

© D.A. Bondarenko[1, 2], V.E. Karasik[1], V.P. Semenkov[2]

[1] Bauman Moscow State Technical University, Moscow, 105005, Russia
[2] FGUP GRPZ, Moscow, 117342, Russia

The method of control of two acousto-optic deflectors is considered in this work, which provided fast-acting scan of laser beam in space while filing constant-frequency signal on first deflector and linear frequency-modulated signal (LFM) on the second. The influence of parameters of LFM signal on instantaneous divergence diagram of diffracted beam is analyzed. Method of diagonal beam scan using two generators of LFM signals is proposed and researched, that allow forming laser rasters with specified divergence diagram while working with two-coordinate acousto-optic deflector. It's shown that while using parathellurite acousto-optic deflectors with non-axial geometry of acousto-optic interaction and aperture 9 mm, it's possible to control instantaneous divergence diagram of laser beam within from 40" to 3°. The recommendations on selecting parameters of controlling signals, providing realization of proposed method, are given.

Keywords: *acousto-optic deflector, linear frequency-modulated signal, laser raster, divergence diagram of laser beam, teleorientation system.*

Bondarenko D.A. (b. 1975) graduated form the Moscow Institute for Engineers in Geodesy, Air-Photography and Cartography in 2000. Ph. D., Head of laboratory of FGUP GRPZ. Author of more than 20 publications in the field of optoelectronic instruments and laser control systems. e-mail: bondar_art@mail.ru

Karasik V.E. (b. 1939) graduated form Bauman Moscow Higher Technical School in 1964. Dr. Sci. (Eng.), Professor of the Laser and Optoelecrtonic Systems Department of Bauman Moscow State Technical University. Author more than 150 publications in the field of laser probe, detecting, laser ranging.

Semenkov V.P. (b. 1948) graduated form the Leningrad Electrotechnical Institute n.a. V.I.Ul'yanov (Lenin) in 1972. Ph. D., Chief Designer in trend of FGUP GRPZ. Author of more than 100 publications in the field of laser control systems and acustooptics.