Potapova M., bachelor of MPEI
Moskauer Hochschule für Energetik, Lehrstuhl für Lichttechnik
Krasnokazarmennaya 14, 111250 Moskau

Analysis of modern panoramic units consisting of lenses and mirrors.

While working with a range of scientific and practical problems there can appear such a problem as a necessity of field of vision within a semisphere or within a wide circular zone. Optical electronic systems that realize vision of such a space with the object of discovering, monitoring and so on, are called panoramic-view optical electronic systems.

Among them the most timely systems are those with panoramic optical systems; their receiving optical system transforms a panoramic view into a plane circular image on a multielement photodetector which is further analysed by next devices. Today literature include only four works of panoramic-view optical system using single-component panoramic units; two of them were carried out in the USA and two in Russia, one of them belongs to The Moscow state university of a geodesy and cartography, the other to MPEI (Moscow Power Engineering Institute (Technical University)).

In the most constructions the telecentric run of main rays is realized on the way out of the panoramic unit, that is the most favourable factor for forming of an image of high quality. But there is no construction with spherical and aspherical reflecting surfaces in which would be possible to remove completely the aberrations even in the area of third order.

And following point should be stressed: in all the works offered by the USA and the works of the The Moscow state university of a geodesy and cartography, with any composition of reflecting and refracting surfaces and with any indexes of refraction of the material of the unit the attempts to take the image out of the unit to pass it directly to the photodetector were not a success. That's why receiving optical system of panoramic-view optical electronic devices on the base of known panoramic units must have an additional optical devices for passing an image inside the panoramic unit to a multielement photodetector.

That's the reason to mark the panoramic unit that is an objective, elaborated by the Light Technics Department of MPEI. First of all, such panoramic unit-objective forms a

real image of panoramic view in an accessible place for putting a photodetector. Such an objective can assure a much more wider angular field than in other constructions.

Having only quite simple to make spherical surfaces, the units of MPEI assure better quality of an image, than American analogues, that have in there construction aspherical surfaces.

Thus new constructions of single-component panoramic units using lenses and mirrors can assure protecting modern panoramic-view optical electronic devices of new generation, their sensor block can only consist of a panoramic objective and up to date multielement photodetector.

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