

## **Algorithms for processing images of space debris in a ground-based aperture synthesis matrix**

*K. N. Sviridov*

Branch of IEE RAS  
32a Leninsky Prospekt, Moscow, 119334, Russia  
E-mail: sviridovkn@yandex.ru

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*The article considers the problem of controlling fragments of space debris of technogenic origin. For dynamic low-orbit fragments of space debris, algorithms for digital statistical processing of short-exposure images obtained in a non-redundant aperture synthesis matrix are studied. The specific features of the optical transfer function (OTF) of a non-redundant matrix, namely, its "island" character, lead to difficulties in restoring the spatial spectrum of the test object undistorted by the atmosphere in the entire spatial-frequency region of the matrix. It is shown that in order to restore the modulus of the spatial spectrum of the object undistorted by the atmosphere in the entire region of the spatial frequencies of the matrix, it is necessary to use the algorithm of the Labeyrie method modified by us. To restore the phase of the spatial spectrum of the object on the "islands" of the spatial frequency domain, it is necessary to use a modified algorithm of the Knox-Thompson method, and to merge the phases obtained in the "islands" over the entire region of the spatial frequencies of the matrix and restore the phase of the spatial spectrum from the object, it is necessary to use the modified algorithm of the triple correlation method.*

*Keywords:* non-redundant matrix, Labeyrie method, Knox-Thompson method, closed-phase method, triple correlation method, expansion of closed-phase equations.

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