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Goddard Space Flight Center



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Noise Diffraction Patterns Eliminated in Coherent Optical Systems

Noise diffraction patterns formed in the images of coherent optical systems can be eliminated by rotating the lenses about their optical axes. Such patterns, usually caused by dust or bubbles in or on the lenses, were previously reduced by carefully selecting the lens so that there was a minimum of bubbles and defects in the glass, and by keeping the lens surfaces extremely clean, even to the point of putting entire systems in vacuum. Neither of these methods, however, proved completely satisfactory, since any minute defect in the lens produced objectionable noise in coherent light, and the use of a vacuum system increased the cost and made working conditions more difficult.

With the lens rotation technique, the diffracted energy, normally concentrated over a very small area of the image, is spread over a much larger annular area. Unless the defect causing the diffraction lies very close to the optical axis, the diffracted energy is averaged out and can be ignored.

Specific advantages of the technique include a much simplified process of selecting the lenses to be used, reduced clean room requirements, and relatively low cost equipment requirements. In addition, the tech-

nique does not destroy the coherent filtering capabilities of the optical system.

Note:

Requests for further information may be directed to:

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Patent status:

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