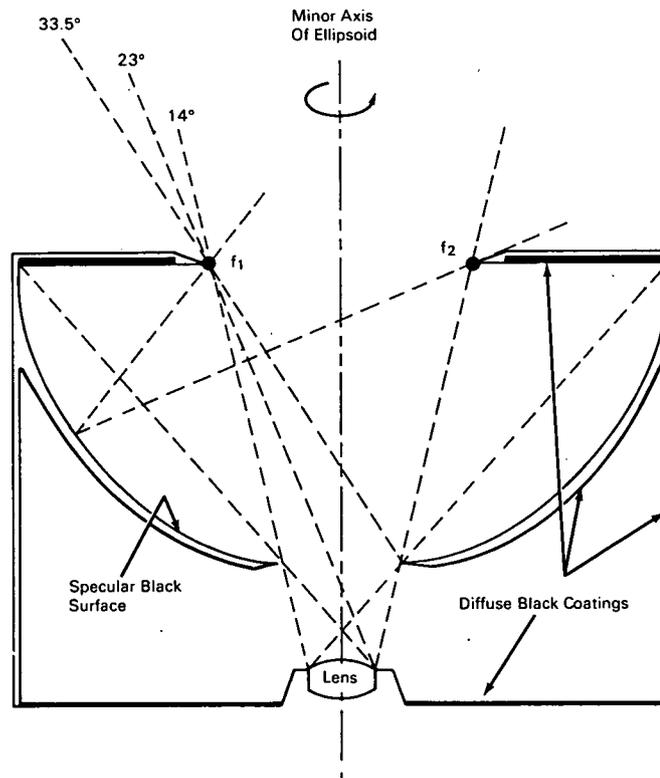


NASA TECH BRIEF



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Antiglare Improvement for Optical Imaging Systems



A baffle configuration has been designed to provide a more efficient shade against interfering sources of illumination outside the desired field of view of optical imaging systems. This baffle consists of a semi-ellipsoid of revolution about the minor axis with a black specular reflecting surface and an aperture defined by the locus of the foci (f_1 , f_2) of the generating ellipse. The baffle depends on the property of this ellipsoid that any ray entering it which intersects the locus of foci (the locus being a circle in the plane of

the foci normal to the axis of revolution) also intersects the locus of foci at a diametrically opposite point upon emerging from the ellipsoid. Therefore, the geometry and specular reflecting surface make a virtually perfect internal baffle for a stray-light shade. None of the light entering the baffle is trapped inside.

The illustration represents a cross section of a 3-inch-long shade for a 0.500-inch diameter lens with a conical field of view of 14° half angle. The foci f_1 and f_2 in each elliptical section lie on the rays defining

(continued overleaf)

the clear field of view of the optical system. The major axis of the ellipsoid is chosen so that the surface which is directly illuminated with stray light is not visible from the lens. The shading properties of this ellipsoid configuration are effective for all stray light emanating from angles greater than 33.5° . All surfaces of the shade which are visible from the lens are made as diffusely black as possible to prevent interference from internally diffused light.

Notes:

1. This device, by utilizing the low diffuse reflectance of certain materials (e.g., plastics, gloss black anodized aluminum, and black glass), improves shading effectiveness by 1 to 3 orders of magnitude over conventional shades using matte black finishes such as flat black paint or Parson's black.
2. This shade should be useful in optical imaging systems where there is a need to reduce optical radiation scattered onto the image plane from sources outside the desired field of view. Such systems include cameras, radiometers, photometers, star sensors, and other electro-optical position sensors.

3. Inquiries concerning this device may be directed to:

Technology Utilization Officer
NASA Pasadena Office
4800 Oak Grove Drive
Pasadena, California 91103
Reference: B68-10090

Patent status:

This invention is owned by NASA, and a patent application has been filed. Royalty-free, nonexclusive licenses for its commercial use will be granted by NASA. Inquiries concerning license rights should be made to NASA, Code GP, Washington, D.C. 20546.

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