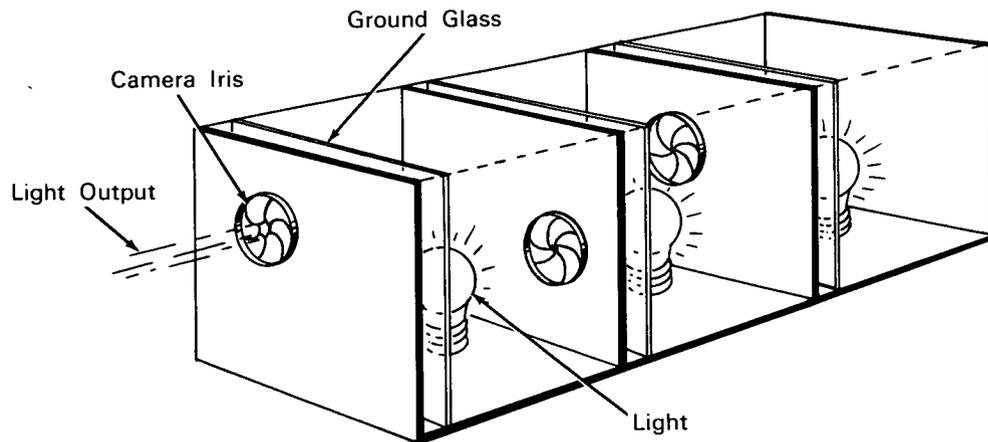


NASA TECH BRIEF



This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the NASA space program.

Variable Light Source With a Million-To-One Intensity Ratio



The problem: Development of a wide-range variable-intensity light source of constant color characteristics, that can be used for the testing and calibration of photo-multiplier tubes.

The solution: A light attenuator having a 1,000,000 to 1 intensity ratio that first diffuses light from a constant source, and then permits variable attenuation through a series of chambers and adjustable apertures.

How it's done: A lightproof box is divided into several chambers, each containing one or more electric lamps. The device actually used consisted of three chambers, but a greater range can be obtained with the use of more chambers. Each of these chambers is painted white, and the rear and middle chambers have exit apertures leading to the chamber ahead. The output aperture is located in the forward chamber on the wall opposite the middle-chamber exit aperture. Each aperture is fitted with an iris which

can be varied to control the output from its respective chamber. Apertures are not aligned. In order to provide the necessary diffusion, a ground glass is placed between each light source and its respective exit aperture.

Each chamber is inherently a high initial-loss device. Light intensity variation is achieved by manipulation of irises to admit light in measured amounts from one chamber to the next. Since the source lamps operate on constant voltage and current, color temperature output remains unchanged throughout the wide intensity range.

Operation of the light attenuator, as in the testing of photo-multiplier tubes, requires only the lighting of the required lamps and setting the openings of the apertures. In a typical application, the output of this device would go into the input of a phototube amplifier circuit, either directly, or first interrupted by a chopper.

(continued overleaf)

Notes:

1. This light attenuator can be easily and economically constructed. Its uses within NASA have been limited to specialized testing.
2. For further information about this innovation inquiries may be directed to:

Technology Utilization Officer
Jet Propulsion Laboratory
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Pasadena, California 91103
Reference: B63-10424

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

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