

October 1971

Brief 71-10378

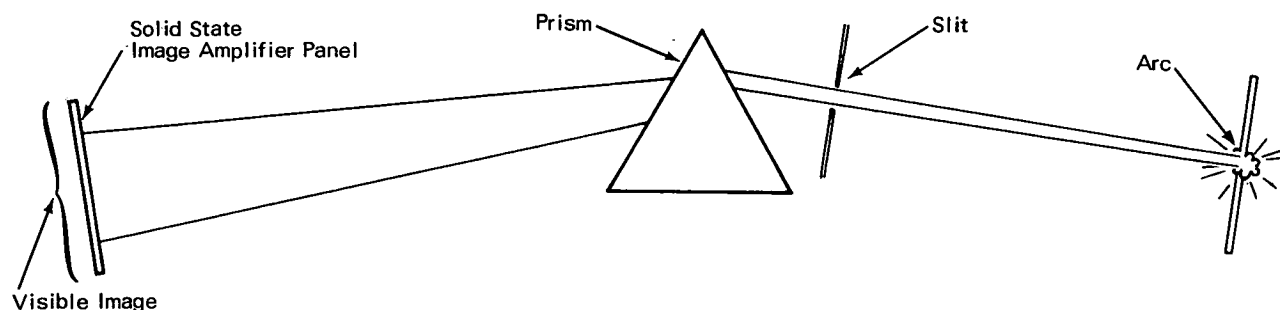
NASA TECH BRIEF

Marshall Space Flight Center



NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions relating to the Tech Brief program may be directed to the Technology Utilization Office, NASA, Code KT, Washington, D.C. 20546.

Simple Spectroscope Used with Solid State Image Amplifier Over Wide Spectral Range



Relatively inexpensive, solid state image amplifier panels (see Ref.) can be used with simple spectroscopes over a range of wavelengths extending from the infrared (IR), through the ultraviolet (UV), and into the X-ray regions.

Ordinary spectroscopes cannot be used for visual observation of spectral bands in the IR or UV regions because the eye is not responsive to these portions of the spectrum. Elaborate, expensive spectroscopes instrumented to detect IR and UV spectra are often difficult to align or focus when the operator must depend on his eyes for performing these operations.

In an experimental setup (see fig.), an optical-glass prism used as a detector in conjunction with an image amplifier panel provided a visual image of numerous IR spectral lines from a carbon arc impregnated with a metal compound. Various common metal compounds can be introduced into the arc to generate the desired spectra. The image amplifier panel (an early prototype) was mounted on a thin glass substrate coated with an appropriate phosphor for conversion of the IR radiation into visible light.

Particular phosphors can be selected to extend the detection range of the instrument into the shorter wavelength regions. With the infrared setup, a resolution of better than 70 lines per cm (180 lines per in.) and a sensitivity of 110 nm (1100 Å) was demonstrated. A simple 110 V, 100 mA, ac power supply was ample for a 15.2-cm square (6-in. square) panel.

The image on the panel is not permanent. It can be erased simply by interrupting the supply voltage. Permanent records can be made, however, by photographing the visual image on the panel. In addition to its detection capability, the panel may be used to align and focus simple spectroscopes for detecting spectral lines outside of, as well as within, the visible region.

Reference:

NASA Tech Brief 68-10363, Improved Radiographic Image Amplifier Panel.

Notes:

1. The optimum design would incorporate front-reflection diffraction gratings, which are not limited to specific wavelengths, in conjunction

(continued overleaf)

with the solid state image amplifier panel. The panel must be shaded from extraneous illumination, and a means of reducing the intensity of the source radiation may be needed for high-intensity spectra.

2. Requests for further information may be directed to:

Technology Utilization Officer
Code A&TS-TU
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: TSP71-10378

Patent status:

No patent action is contemplated by NASA.

Source: R. L. Brown, Sr.
Marshall Space Flight Center
(MFS-21345)