

NASA TECH BRIEF

Langley Research Center

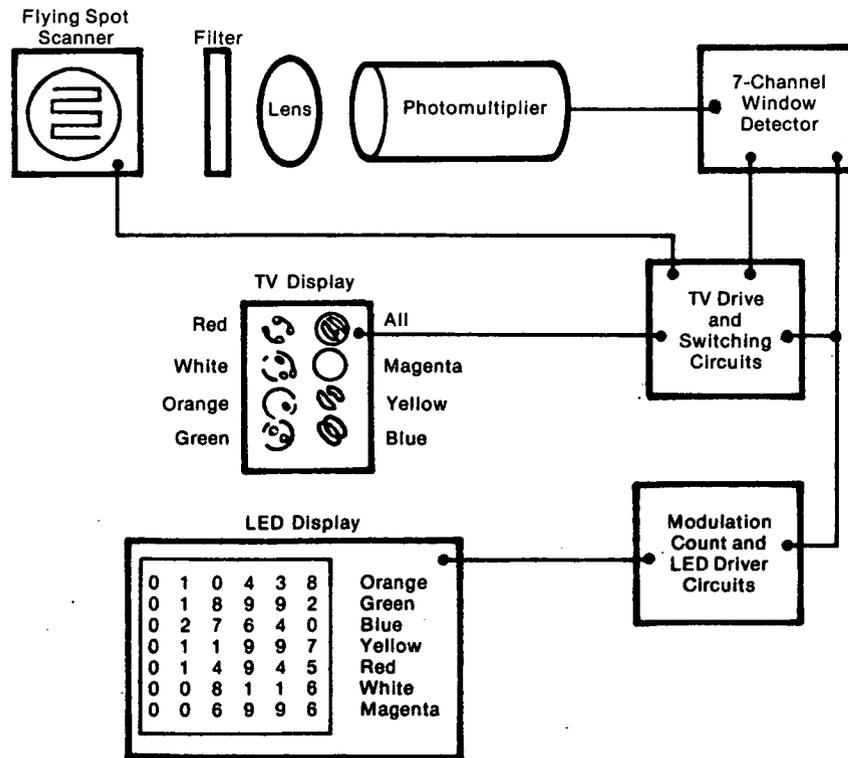


NASA Tech Briefs announce new technology derived from the U.S. space program. They are issued to encourage commercial application. Tech Briefs are available on a subscription basis from the National Technical Information Service, Springfield, Virginia 22151. Requests for individual copies or questions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

Color-Coded Area Sensitivity Maps of Photomultipliers

A technique has been developed at Langley Research Center for obtaining color-coded area sensitivity maps of photomultipliers. These maps are needed to indicate just how nonuniform the area sensitivity can be, to indicate what parameters affect the area sensitivity, and to demonstrate how the maps can be optimized. This technique was devised specifically for testing photomultipliers and other photodetectors, but it could also be used to color code any type of mapping data, such as weather or topographical maps, thermal or pressure distributions on reentry surfaces, or any other three-dimensional data to be displayed in two-dimensional form.

A schematic of the apparatus used for obtaining color-coded area sensitivity maps of photomultiplier tubes is shown in the illustration. In the mapping technique, a flying spot scanner is used which is driven in synchronism with a modified color television. The flying spot is imaged optically on the face of the photomultiplier tube (PMT). The PMT output is applied to a seven-channel detector with a reference voltage set at the maximum output voltage of the PMT. This reference voltage is divided into seven parts (not necessarily equal) which are the window voltages.



Apparatus Schematic for Color-Coded Area Sensitivity Maps of Photomultiplier Tubes

(continued overleaf)

Each window detector produces an output only when the PMT output voltage remains at levels within the detector voltage window. The window detector output voltages drive the color guns of the TV and are read out on a light-emitting diode (LED) display. The numbers in the display are proportional to the color-coded area of the TV. This type of presentation, which takes less than a minute, provides quantitative information of the sensitivity variations across the face of the photodetector.

The system with slight modifications can be used in other applications, such as Earth resources, water pollution, atmospheric, and packaging. For example, in Earth studies the circuitry could be used to present in real time the percentage area of healthy vegetation, arid areas, water areas, and the like. In packaging the circuitry could be used to determine the percentage areas of unused space.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
Langley Research Center
Mail Stop 139-A
Hampton, Virginia 23665
Reference: B74-10259

Patent status:

This invention has been patented by NASA (U.S. Patent No. 3,649,907). Inquiries concerning nonexclusive or exclusive license for its commercial development should be addressed to:

Patent Counsel
Langley Research Center
Mail Stop 313
Hampton, Virginia 23665

Source: Otto Youngbluth, Jr.
Langley Research Center
(LAR-10320)

Categories: 01 (Electronics - Components and
Circuitry)
02 (Electronics Systems)
03 (Physical Sciences)