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NASA TECH BRIEF

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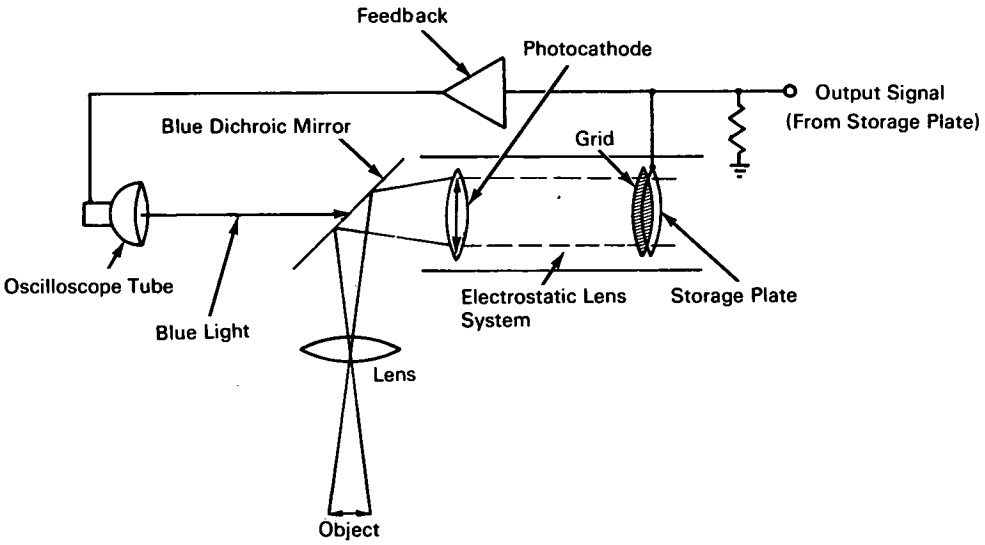
Design Concept for Improved Photo-Scan Tube



A particular design concept is presented for an unattended television photo-scan camera-tube where the complexity of internal beam scanning and critical beam-current adjustment of the conventional image orthicon is avoided by optical scan readout.

The conceptual photo-scan tube proper is roughly similar in construction and operation to a conventional image orthicon, with the important difference that with the photo-scan tube an external oscilloscope tube is used to scan the elements of an object in the field of view. There is no electron gun in the photo-scan tube proper.

The incident light from the object passes to a dichroic mirror, which reflects the ultraviolet and blue end of the spectrum and transmits the complementary portion of the visible spectrum. A photocathode having adequate spectral range converts the complementary optical image focused onto it, into an equivalent electron image, exactly as in the image orthicon. The electron image is focused by an electrostatic lens system onto a storage plate (again, as in the image orthicon). The light emerging from the oscilloscope tube is the spectral complement of the light passing through the dichroic mirror. In other words, the spectrum of the light excluded by the dichroic mirror and that emitted by the oscilloscope tube should be similar. The oscillosocpe tube scans the dichroic mirror, hence the photocathode, element by element, to produce effectively a scanning electron beam at the storage plate. The effect of the scanning beam is to discharge the electron image at the storage plate, element by element thus producing a video output signal as a function of time. The spectral separation of the two types of illumination on the photocathode avoids interference by the illuminated oscilloscope tube with the optical image except for the

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particular element being scanned at that instant in the beam. Secondary electrons are captured by the grid positioned in front of the storage plate.

Feedback may be employed from the storage plate to the oscilloscope control grid to improve operation at low light levels.

Note:

This innovation is in the conceptual stage only; as of the date of publication of this Tech Brief, neither a model nor a prototype has been constructed.

Patent status:

No patent action is contemplated by NASA.

Source: Leonard R. Malling
(JPL-818)