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Solid State Television Camera Has No Imaging Tube

Important advances have been made in recent years in the area of image sensors, particularly in areas of solid-state image converters, peripheral video, and digital-data-handling circuits using large scale integration. A mosaic produced only a few years ago contained 2500 photo-transistors on a single wafer of silicon 1.25 cm on a side and arranged in a 50 by 50 square array spaced on 0.25 mm centers. Since then, three other generations of mosaic arrays have been produced, with the final one containing 200,000 photo-transistors on a single silicon wafer approximately 2.5 cm on a side.

A solid-state television camera that has no imaging tube and has characteristics of a vidicon camera and a resolution greater than the home TV receiver has been developed using a mosaic of photo-transistors. The camera is rectangular in shape, approximately 5 cm (2 in.) by 25 cm (10 in.) by 31 cm (12 in.) and has a 50-mm lens in the center of the large side. The camera has a resolution of 500 lines horizontal and 400 lines vertical, and, due to the completely solid-state construction, it has the usual advantages offered by integrated circuit systems, i.e., reduced weight, volume, and power consumption plus greatly increased reliability and environmental immunity. In addition, the photo-transistor mosaic performs the functions of a vidicon without the necessity for high voltages, magnetic fields, vacuum envelopes, filament power, and protection against mechanical shock. The elimination of the high-voltage requirement is a particularly salient advantage for space environments. The fact that the image plane of the sensor consists of discrete sensor elements, geometrically precise in position, eliminates tube beam deflection errors. These errors are important in optical processing systems such as stereo imaging, motion detection, and scene correlation, where it is important to return to an exactly known segment of the image over relatively long periods of time. The electrical accessing of the image area could also facilitate random scanning in these applications.

Because of its low power and small size, the camera may have a large number of applications. The mosaics can be utilized as cathode-ray tubes and analog-to-digital converters, for the assessment of nuclear blasts.

Note:

Requests for further information may be directed to:

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Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to:

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Category 02