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ABSTRACT

To fully realize the potential of charge coupled devices for solid state low light level imaging additional gain before the array appears necessary. This can be accomplished either by coupling the device to an image intensifier tube optically or by operating in the electron bombarded mode (i.e. EBS). As in the case of the electron bombarded silicon diode array vidicon the performance in the electron-in mode is expected to be superior to the performance in the optically coupled mode.

100 x 160 element, thinned, CCD arrays supplied by Texas Instruments have been imaged in the EBS mode. Imaging data were obtained on an RCA (C-33052) 60/18 image intensifier tube modified so that the back surface of the CCD could be placed in phosphor plane. A low temperature bake (i.e. 100°C 2 hrs) allowed the tube to be operated in the low 10^{-7} torr range with a gold photocathode.

Electron imaging results indicate that substantial improvement in low light level performance can be realized when compared to direct photon-in performance. Room temperature imaging at TV frame rates has been demonstrated at an equivalent signal level of 5 electrons/pixel (i.e. actual signal/gain) for an array operated at 10kV with a gain of 600.

FULL PAPER TO BE FOUND IN SECTION B

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