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Embedded Digital Image System

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Abstract : This paper introduces an embedded digital image system for Chinese space environment vertical exploration sounding rocket. In order to record the flight status of the sounding rocket as well as the payloads, an onboard embedded image processing system based on ADV212, a JPEG2000 compression chip, is designed in this paper. Since the sounding rocket is not designed to be recovered, all image data should be transmitted to the ground station before the re-entry while the downlink band used for the image transmission is only about 600 kbps. Under the same condition of compression ratio compared with other algorithm, JPEG2000 standard algorithm can achieve better image quality. So JPEG2000 image compression is applied under this condition with a limited downlink data band. This embedded image system supports lossless to 200:1 real time compression, with two cameras to monitor nose ejection and motor separation, and two cameras to monitor boom deployment. The encoder, ADV7182, receives PAL signal from the camera, then output the ITU-R BT.656 signal to ADV212. ADV7182 switches between four input video channels as the program sequence. Two SRAMs are used for Ping-pong operation and one 512 Mb SDRAM for buffering high frame-rate images. The whole image system has the characteristics of low power dissipation, low cost, small size and high reliability, which is rather suitable for this sounding rocket application.

Keywords : ADV212, image system, JPEG2000, sounding rocket
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