

International Conference on Space Optics—ICSO 2004

Toulouse, France

30 March–2 April 2004

Edited by Josiane Costeraste and Errico Armandillo



Electrical characterisation of a commercial CCD signal processor

Jean-Marc Biffi, Gilbert Villalon



International Conference on Space Optics — ICSO 2004, edited by Errico Armandillo,
Josiane Costeraste, Proc. of SPIE Vol. 10568, 105681V · © 2004 ESA and CNES
CCC code: 0277-786X/17/\$18 · doi: 10.1117/12.2308027

Writers : Jean-Marc BIFFI^a, Gilbert VILLALON^a

^a CNES - 18 av. E. Belin 31401 Toulouse Cedex 09 France

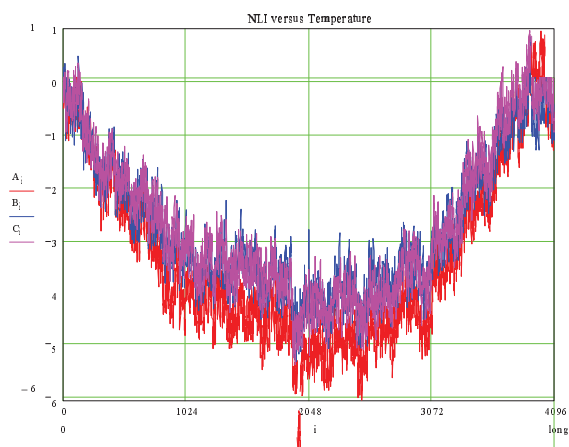
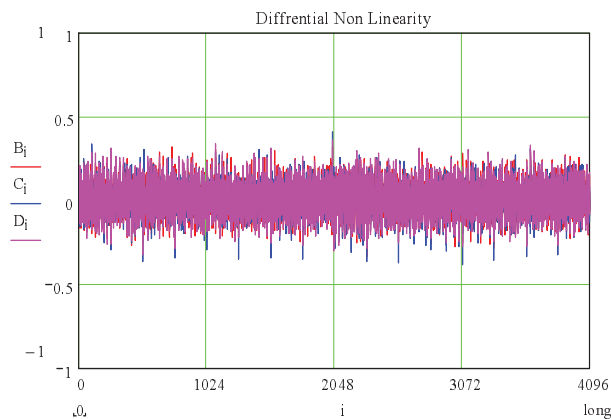
In space applications, analogue electronics for CCD signal processing use specifically developed devices such as ASIC or Hybrid circuits. Today, performances (maximum pixel frequency, linearity, noise...) are increasing while in the meantime power consumption should be decreased. Commercial CMOS CCD signal processors (CSP) are a possible solution to cope with all constraints.

In the last years, low power CMOS CSP where introduced on the market for wide diffusion applications (digital imaging, video,...). According to their incomplete datasheets it is not possible to accept those devices in a space payload without complementary measurements.

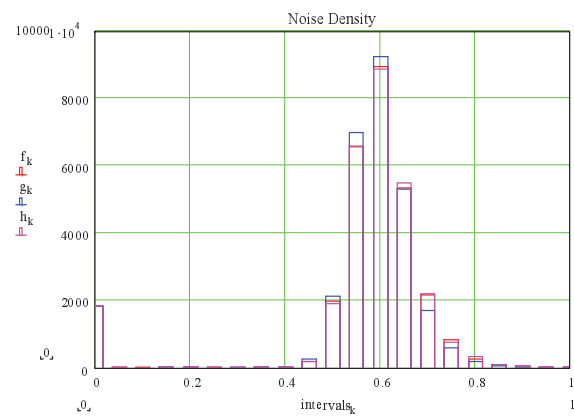
Indeed parameters variation and radiation effects are not specified. So, we have developed a specific electronic bench to characterise critical parameters (linearity, noise) and their sensibility to environmental influence.

The bench consists in a hardware specific analogue pattern generator and a memory acquisition unit. Those modules and the device under test (DUT) are driven by a pulse generator. All parts of the bench are controlled by a PC computer (that manages acquisition mode and processes acquired data).

Linearity and noise performances with a reference analogue CDS chain are presented below (Y axis unit is 12bitsLSB)

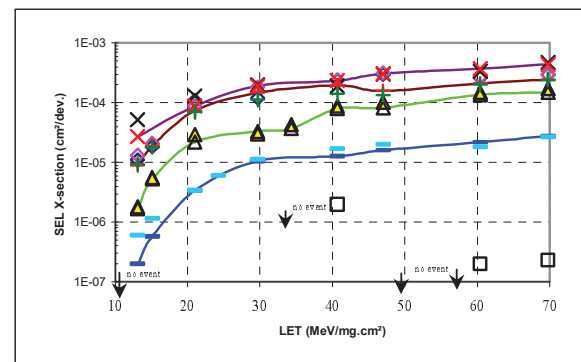


Fi



Evolution of integral non linearity at different temperatures for an commercial CSP is shown figure 2.

We also present a characterisation of different CSP latch-up sensibility is shown below :



A comparison of CSP measured performances versus up to date specifications of space application CCD processor indicate that this kind of devices is compatible with high performances applications. Of course complementary measurement are required to validate this preliminary results.