

Enhanced CCD Design and Process ESCC Evaluation - Objectives

A preliminary assessment program was carried out by European manufacturers on their CCD manufacturing activity with GSTP support in 2002. Since that time a large number of space programs have been supplied with detectors from these facilities and have benefited from the information supplied by this program. Over the last decade significant advances have been made in CCD design and manufacturing technology, which are being exploited for ground based science and industrial programs. These advances would also benefit for the different space applications:

- CCDs for space science instruments, typically large area back illuminated detectors operated at cryogenic temperatures and requiring lower noise, higher quantum efficiency and larger area.
- CCDs for Earth Observation, by specifically improving the signal to noise, readout speed, the uniformity and MTF.

In order for these advances to be available at low risk for use in future space missions it is necessary to perform evaluation activities to prove their performance stability and reliability in a space environment. The main enhancements in the design and processes resulting in these improved performances would therefore need to be evaluated. The required approach to the evaluation of this wide variety of design and processes enhancements is to embed these aspects into a suitable suite of test devices designed to exercise a matrix of combinations. These test vehicles, should be aimed to optimize the data available without requiring a large range of variants.

The work and activities described in this SoW are part of the GSTP-4 program and target the ESCC evaluation of Enhanced CCD Process both in terms of design and manufacturing techniques. This activity is identified as a part of the France/UK compensation measures, and agreed by CNES and UK Space Agency for this purpose.

The establishment of ESCC evaluated process has been marked as highly critical and highly urgent by CTB representatives for CNES, EADS-Astrium and TAS and is considered to be essential for all future space projects involving CCDs and is expected to result in significant cost and schedule advantages for these future projects.

Objectives of the Activity

This activity is part of the GSTP-4 program. The main goal of this frame of activities is to ESCC evaluate enhanced CCD design and processes. For this purpose, different relevant Test Vehicles (TVs) of CCDs shall be defined and manufactured. The manufactured TVs shall go through an evaluation program in conformity with ESCC standards.

Pending successful evaluation, the intention is to propose the process to be listed in the European Preferred Parts List (Part 2).