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CIA V5.0—the Legacy Package for ISOCAM Interactive Analysis

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Abstract. The ISOCAM Interactive Analysis System (CIA) (Ott et al. 1997; Delaney 2000) was developed to support the calibration of ISOCAM, (Cesarsky et al. 1996) the infrared camera on board ESA's Infrared Space Observatory (ISO) (Kessler et al. 1996) and to perform its astronomical data processing. The development, a collaborative effort involving several institutes, was led by ESA and began in mid-1994. Currently the system is used by 70 institutes, including the ISO Data Centre at VilSpa and the CAM consortium. CIA is generally available to the astronomical community and runs, using IDL 5,under DEC VMS Alpha, Solaris, DEC Unix, Debian (PC) Linux and HP/UX. CIA can be obtained electronically[7]. With the end of ISO's post-operational phase in December 2001, the legacy version, CIA V5.0, will be released. We present the latest calibration results and algorithmic improvements, give examples of CIA's current data processing capabilities and outline the foreseen scope of the legacy version.

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[7]`http://www.iso.vilspa.esa.es/archive/software/CIA/CIA_form.html`

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1. Introduction

The ISOCAM Interactive Analysis System (CIA)[8] was developed to support the calibration and operation of ISOCAM, the infrared camera on board of ESA's Infrared Space Observatory (ISO)[9].

The system is mainly IDL-based. CPU intensive tasks are coded in C++ and FORTRAN. It consists of 250,000 lines of code, 150 MB of documentation and 80 MB of calibration products.

Currently the main effort is spent on improving the system's functionalities in processing ISOCAM astronomical data without compromising its ability to continue dedicated calibration analysis. As the next version 5.0 will be the legacy version, purging of obsolete routines and upgrading the documentation is also a priority.

2. Algorithmic Improvements for CIA V5.0

The latest algorithmic improvements for ISOCAM include: sky-cube deglitching, a very powerful technique to reject the effects of cosmic ray impacts for datasets with highly redundant pointings (a sky pixel has been observed several times) (Ott et al. 2000); improved distortion correction, including circular variable filters, and an improved projection algorithm, resulting in higher quality mosaics (see Figures 1 & 2); dedicated treatment of solar system objects; improved error propagation; improved deglitching for strong point sources; use of distorted PSFs for simulations; revision and upgrade of photometric tools; and use of improved pointing information.

3. System Improvements for CIA V5.0

Major foreseen system improvements (apart from bug-fixes and the purging of obsolete routines) are: improved on-line help: new HTML based help and search for multiple topics; multiple copies for widgets; tool to recalibrate ISOCAM astrometry for wheel jitter; and upgrade to IDL V5.4.

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[8]CIA is a joint development by the ESA Astrophysics Division and the ISOCAM Consortium. The ISOCAM Consortium is led by the ISOCAM PI, C. Cesarsky.

[9]ISO is an ESA project with instruments funded by ESA member states (especially the PI countries: France, Germany, the Netherlands and the United Kingdom) and with the participation of ISAS and NASA.

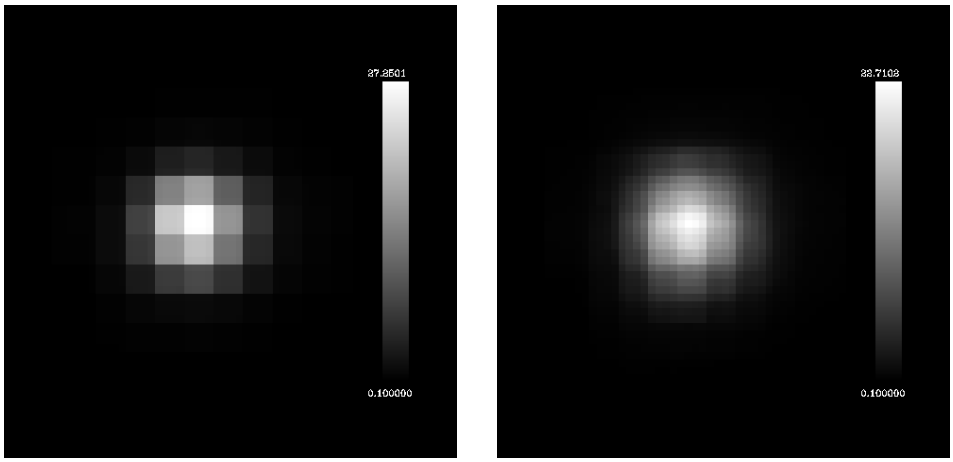

Figure 1. ISOCAM raster observation of HIC96441 at 4.5 μ. The star has been observed 81 times crossing the whole detector. Left image: Resulting mosaic without distortion correction. Right image: Previous distortion correction.

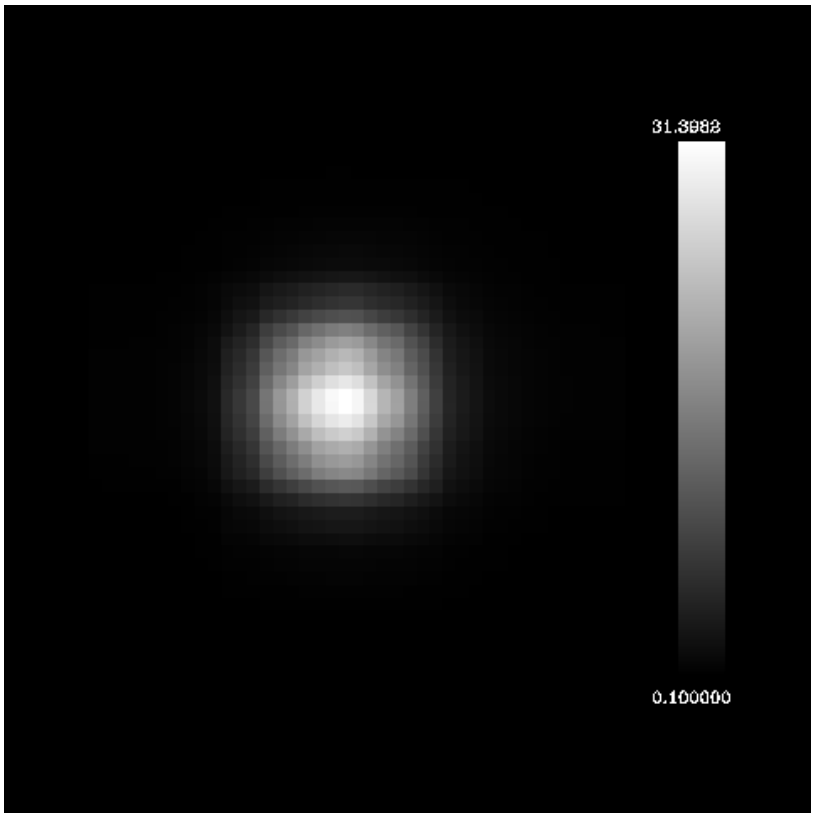

Figure 2. Mosaic of HIC96441 using the new distortion correction. Note the better reconstruction of the PSF.

4. New and Updated Contributed Packages

The following contributed packages are expected to be delivered together with CIA V5.0:

- BESD. *B*aseline *E*xtraction and *S*ky *D*eglitching is a tool to extract very faint sources for observations with many redundant pointings (Metcalfe et al. in preparation);
- PRETI. *P*attern *RE*cognition *T*echnique for *I*SOCAM is a tool using multiresolution analysis for faint source processing (Starck et al. 1999);
- SLICE V1.0. *S*imple and *L*ight *ISOCAM E*nvironment is a powerful tool to correct ISOCAM's long-term transient and variable flat-field (Miville-Deschênes et al. 2000);
- ISOCAM Parallel processing package. This package is tailored to analyse CAM parallel data (Ott et al. in preparation).

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Starck, J-L., et al. 1999, A&AS, 138, 365

[10] `http://www.iso.vilspa.esa.es/manuals/CAM/users_manual_v4_0.ps.gz`

[11] `http://www.iso.vilspa.esa.es/science/pub/adass.ps`

[12] `http://www.iso.vilspa.esa.es/science/pub/2000/cosmic_ray.ps.gz`