AN OPTICAL SURVEY OF THE ELAIS-S2 FIELD. DATA REDUCTION WITH Astro-WISE

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Abstract. We used Astro-WISE to reduce observations on the ELAIS-S2 field obtained in the B, V, R and I-bands with the Wide-Field Imager at the 2.2m ESO/MPG telescope. We present the main data reduction steps performed by the prototype version of Astro-WISE.

1 Introduction

The European Large-Area ISO Survey (ELAIS) (Oliver et al. 2000, Héraudeau et al. 2004) was the largest open time project conducted by the Infrared Space Observatory (*ISO*). This survey consists of more than 12 deg^{-2} of the sky surveyed at 15 and 90 μm, nearly 6 deg^{2} at 6.7 μm and 1 square degree at 175 μm (i.e. the FIRBACK survey, Puget et al. 1999) in four large, high Ecliptic latitude regions ($|b| > 40$deg) with low IRAS 100 μm sky brightness ($< 1.5 MJy/sr$) and no IRAS 12 μm sources brighter than 0.6Jy. In addition to the large areas, smaller regions were also observed and this work focusses on the ELAIS-S2 field (Right Ascension = 05h 02m 24s; Declination = -30°35′ 55″). The area covered by *ISO* on the S2 field represents 0.12, 0.12 and 0.11 square degrees at 6.7, 15 and 90 μm, respectively.

2 Observations

We used the Wide-Field Imager (WFI) at the 2.2m ESO/MPG telescope to acquire B, V, R and $LSB_s truc_v 2.tex I$-band observations of the field. Complementary K-band imaging of the central part of the field was carried out at the ESO 3.5 NTT using the SOFI camera. Total exposure times from 5 dithered exposures in B, V, R and I are 4500, 3000, 4200 and 3000s, respectively. The seeing was typically 1.0″.

3 Astro-WISE: an Astronomical Wide-field Imaging System for Europe

The Astro-WISE programme co-ordinates European wide development work to deal with and access astronomical wide field imaging data, providing a distributed operational environment for researchers to analyse and access the huge data volumes of observational data produced by a new generation of wide field imagers such as OmegaCAM at the VLT Survey Telescope.

Astro-WISE develops an information system which integrates and federates archives of raw and processed observational data together with various data reduction pipelines to derive the processed data, optionally on the fly, on request of the end user.

One of the pipelines imbedded in the Astro-WISE system is the flat field pipeline which has been developed by the Astro-WISE consortium and allows the user to make optimal Masterflat fields by combining results of Domeflats, twilight flats, night sky flats, fringe flats and illumination correction maps (represented by the red boxes on the data model). Illumination correction maps are constructed by the system for different periods using Landolt and standard stars from the Sloan Digital Sky Survey. The flat field pipeline Fourier filters low frequencies on dome flats and high frequencies on twilight flats.

For the present results, the prototype Astro-WISE system has been used and the new flat field pipelines have been qualified. Figure 1 shows the data model of Astro-WISE and the different pipeline.

The Astro-WISE partners are :

- The OmegaCEN team in Groningen,
- Universitäts-Sternwarte München
- Osservatorio Astronomico di Capodimonte (Naples);
- Institut d'Astrophysique de Paris;
- The European Southern Observatory (Garching).

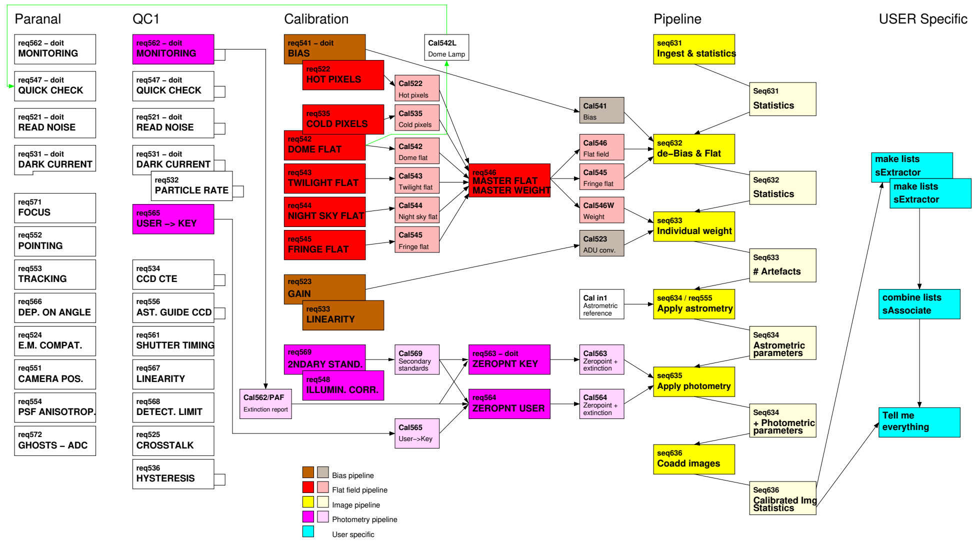

Figure 1: The data model of Astro-WISE illustrating the data reduction steps from left to right and the different pipelines in different colors.

4 Conclusions

Galaxy number counts were derived and are used as an extra quality check of the photometric accuracy obtained with the Astro-WISE pipeline. The zeropoints, extinction and color coefficients were derived from standard stars observed during the night. A forthcoming paper presenting the number counts in the optical and near-infrared regimes is in preparation. A previous analysis of these data was used to study the nature of the 15 μm sources in the ELAIS S2 region (Pozzi et al. 2003) where the optical and near-infrared observations were correlated with the mid-infrared ISOCAM observations. The ELAIS final band-merged catalogue is presented in Rowan-Robinson et al.(2004).

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