The GTC/OSIRIS Data Reduction System

Alessandro Ederoclite[1,2], on behalf of the OSIRIS Team

[1] Instituto de Astrofísica de Canarias, C/Via Lactea S/N, La Laguna, Tenerife, Spain

[2] Departamento de Astronomía, Universidad de La Laguna, Spain

Abstract

We present the online and the offline data reduction system for OSIRIS (Cepa et al. 2010), the optical multi-mode instrument for GranTeCan. The software is written in Python and invokes PyRAF tasks which have been optimized for the instrument. The flexibility of the software makes it easy to be adapted to other telescopes/instruments.

The OSIRIS Data Reduction System (DRS)

The main idea behind the development of the pipeline was its simplicity both in terms of code writing and in terms of maintenance. Another big concern was the possibility to distribute this software to the largest community as possible. Python guarantees minimal requirements.The OSIRIS DRS only uses standard Python modules. The only additions being PyRAF and `numpy`. The OSIRIS DRS also uses SExtractor which should therefore installed (and working).

Broad Band	Tunable Filters	Long Slit
Overscan	Overscan	Overscan
Trim	Trim	Trim
Bias	Bias	Bias
Dark	Dark	Dark
Flat	Flat	Flat
		Illumination
(Fringes)	Sky-rings	
WCS	WCS	wavelength calib.

Schematic view of the OSIRIS Data Reduction System.

OQuLTo: OSIRIS Quick Look Tool

OQuLTo is the online software that can be used for real–time assessment of the quality of the data. OQuLTo is a set of scripts:

- `startOQuLTo.py` starts up the scheduler
- `onlinepipeline.py` is the scheduler: checks every 5 seconds if every file in the raw data directory has been reduced and, if needed, it starts the reduction, calling `IRAFpipeline.py`
- `IRAFpipeline.py` is the actual pipeline which reduces the images depending on their header keywords
- `stopOQuLTo.py` stops the scheduler and saves the log

OQuLTo only needs two configuration files: one with the IRAF parameters to be used (normally using a copy of the one used by OOPS) and one with the name of the directories where the raw data is placed and where the reduced data will be placed.
If a calibration frame does not exist, the software uses a temporary solution (informing the User about this). At the end of the reduction process, OQuLTo re–builds the multi–extension fits file.
OQuLTo can also work "offline" reducing, in alphabetical order, all the data which is present in a directory.

Figure 2 *The instrument OSIRIS attached at the Nasmith focus of GTC and the authors of the poster during commissioning.*

The OOPS: OSIRIS Offline Pipeline Software.

The OOPS has been designed to fully support all the observing modes of OSIRIS (although `v1.0` only supports broad–band imaging, tunable filter imaging and long–slit spectroscopy). It is fully customisable and the user can do all the reduction step-by-step.
All PyRAF tasks can be tuned and the parameters are stored in a file for future use or to be used in the OQuLTo software.
The User must define the directories where the raw data is stored, where the reduced data is stored and where the "intermediate" data (i.e. the frames at intermediate steps of the reduction process) is stored. Whenever a task is called, the OOPS checks that the required calibration data exists and that the execution of such a task does not overwrite an already existing file. The OOPS also checks that a user does not combine images which have been taken with different modes of the CCD or different optical elements in the optical path (if applicable).

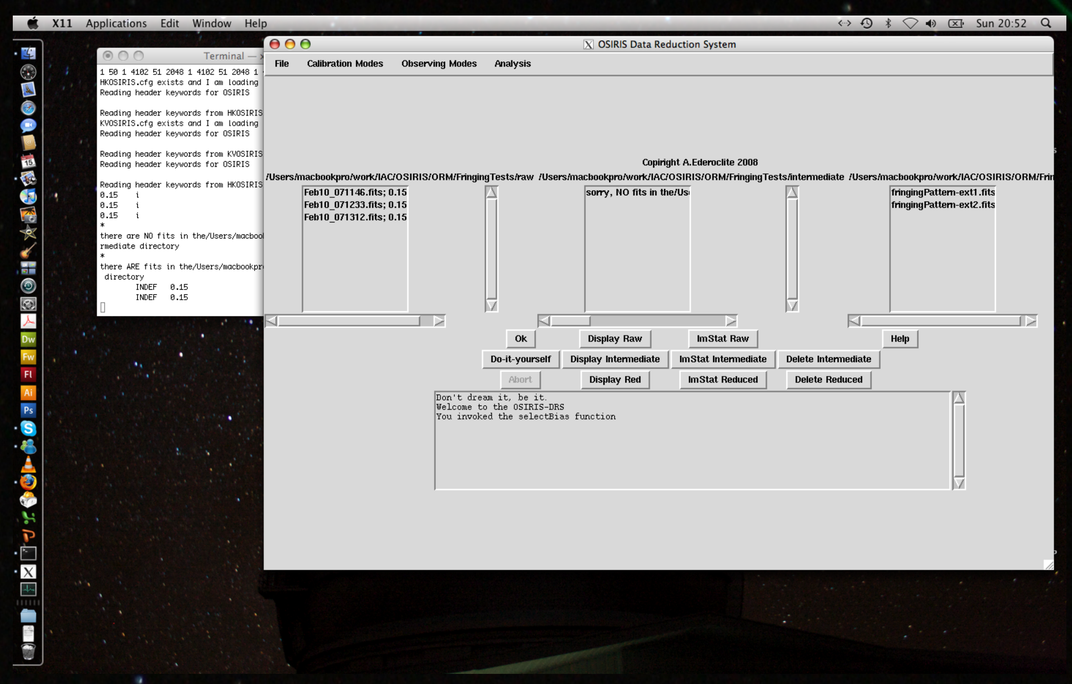

Figure 1 *The OOPS running. The graphic user interface contains a menu from which a User can setup the program and call the appropriate function. The functions are grouped as "calibration", "observation" and "analysis". The three file lists correspond to the directories where the raw, intermediate and reduced data is stored. The box at the bottom shows the log of the program.*

Release Schedule

The OSIRIS-DRS can be downloaded from the website
`http://www.iac.es/galeria/ale/OSIRISPipeline.html`

version	release date	features
V1.0	1 Nov 2010	broad band and TF imaging; long-slit spectroscopy; basic reduction steps
V1.01	1 Jan 2011	World Coordinate System
V1.02	1 Feb 2011	fringes removal
V1.1	1 Apr 2011	MOS
V1.2	1 May 2011	Fast Modes
V1.3	1 Jun 2011	Basic data analysis included in OOPS
V2.0	1 Dec 2011	Separate GUI from tasks in OOPS
V2.1	1 Jan 2011	GUI for OQuLTo

The simplicity and the versatility of OOPS and OQuLTo make them ideal to be adapted to a similar instrument (i.e. any multi–mode instrument in the optical).

References:

Cepa, J. et al. 2010, A&A, *in prep.*

All the pictures in this poster belong to the author (A.Ederoclite, 2008)

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