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DEVELOPMENT OF DATA REDUCTION PIPELINES FOR GTC INSTRUMENTS AT THE UCM

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The UCM Instrumentation Group (GUAIX) is developing currently Data Reduction Pipelines (DRP) for four instruments of the GTC: EMIR, FRIDA, MEGARA and MIRADAS. The purpose of the DRPs is to provide astronomers scientific quality data, removing instrumental biases, calibrating the images in physical units and providing a estimation of the associated uncertainties.

The DRPs will be provided as stand-alone packages, independent of the GTC control System. Additionally, the group is developing an Automated Data Processing System. It can be used to process data as is obtained at the telescope or to process a full observing run with all the data available.

We are developing all our processing tools using Python. The development is compatible with Python 2.7 All the developed packages are be released under GPLv3. They will be free for everyone to install, share and modify. An schematic view of the components is shown in Figure 1.

Instrument Pipeline Each instrument pipeline package contains the reduction recipes for all observing modes of the instrument. The pipeline includes also the description of the different data products. Other utilities, such as instrument simulation modules, are included as well if available.

EMIR DRP is currently in the latest stages of development. FRIDA DRP has finished its design stage. MEGARA DRP and MIRADAS DRP are in the preliminary design stage

Common Services Package Recipes implement a plugin interface so that they can be loaded from the system given the name of the observing mode they process.

A command line tool is provided so that the user is able to run recipes by hand. The command line tools is in charge of loading the recipe, configure it and run it with available data.

Automatic Processing Package This package provides a processing server, a set of processing hosts and a command line tool to control the server.

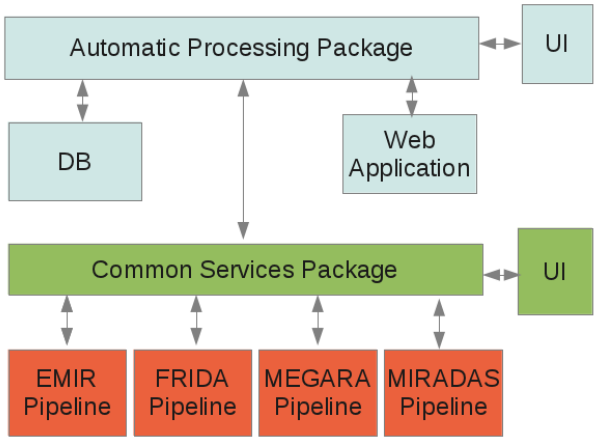

Fig. 1. Architecture of the different software components: Automatic Processing Package, Common Services and Instrument DRPs.

With a distributed architecture, the server monitors a database of scientific products and uses the hosts to process the observing blocks as they enter the database.

Calibrations and reduction parameters are also stored in the database. The server selects the best calibrations from those available. Calibrations can be grouped in sets and reused to process different observing runs with the same calibrations.

Command line tool Users can send commands to the server using the command line tools. Current available commands are: reprocess observing block (with a given calibration set) and create a calibration set.

Web application A web application component is used to monitor the status of the different processing tasks. Each bit of information stored in the scientific database will be available through the web application.

Users will be able to list observing blocks in a given observing run, reduction tasks of a given observing block and data products produced by each reduction task.

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