ETC-42

a generic, VO compliant, Exposure Time Calculator

ADASS 2011 – Focus Demo

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ETC-42 Introduction

- What is it?
- Don't we have enough of them already?
- ETC-42 is a **generic** ETC
  - Not designed for a specific instrument
  - Very flexible calculation of the SNR
  - Easily extensible to reach any requirements
  - Targets a broader range of users
ETC-42 Main Window

Menu Panel

Input Panel

Output Panel

Instruments

Choice: new
Description:

Telescope
Aperture
Diameter: 0.0 cm
Obstruction: 0.0%

PSF
Distribution:

Transmission
Total:

Detector
Dark: 0.0 e/pixel/s
Readout: 0.0 e/pixel
Pixel Scale: 0.0 arcsec/pixel

Type: Imaging

Filter Transmission:
Input configuration is grouped in four components:

- Instruments
- Sites
- Sources
- Observing Parameters
Instrument configuration

**PSF modes:**
- Automatic
- Gaussian FWHM profile

**Instrument types:**
- Imager
- Slit Spectrograph
- Fiber Spectrograph
- Slitless Spectrograph
Site configuration

Ground and Space sites

Ground Sites:
- Seeing
- Sky information

Space Sites:
- Zodiacal light
- Galactic light
Source configuration

Spatial Distribution:
- Point Source
- Extended Source (circularly symmetric)

Spectral Distribution:
- Continuum
- Black Body
- Emission Line
- Template
Observing Parameters configuration

Calculation for:
- Fixed exposure time
- Fixed SNR

Calculation in spectroscopy mode:
- Per spectral pixel
- Per spectral resolution element
Export Functionality

Components can be exported as XML files for backup or distribution.
Import Functionality

Components can be imported from:
- local XML files
- Data repositories (remote web servers)
Import Functionality

Source spectral distribution template can be imported via SAMP as a spectrum type.
Simulation is executed by pressing the Execute button. Results of multiple simulations are shown in different tabs for easy comparison. The amount of visible results is controlled from the Options menu.
Simulation Results

Results can be viewed in the graphics panel or be broadcasted via SAMP as a VOTable.
The Graphics panel is based on the JfreeChart library and it provides all the default functionality (zoom, line styles, etc). It has been extended to support over-plotting by drag and drop of the tabs.
Command Line Mode

The command line mode provides several commands for setting the input configuration.

The command “sh” can be used to execute native terminal commands.
Command Line Mode

The “calculate” command runs the simulation and saves the results in ASCII files. Results of multiple simulations can be distinguished by using the “outprefix” command.

Commands can be executed from a file as a script, using the “script” command
Plugin Framework

To easily extend the ETC-42 a plugin framework is provided. Each plugin has its own window and it can:
- access and modify the input configuration
- run the simulation (one or multiple times) and retrieve the results
- use the ETC-42 results panel for presenting extra results
**Plugin example**

- Writing plugins is simple!

```java
@Plugin(menuPath="ADASS","Demo Plugin"){, tooltip="A demo plugin for ADASS")
public class DemoPlugin extends PluginFrame {

    ...

    // Set the fixed parameter to the exposure time
    ObsParam obsParam = getCommunicator().getCurrentSession().getObsParam();
    obsParam.setFixedParameter(ObsParam.FixedParameter.EXPOSURE_TIME);

    // The object to keep the plugin results
    CalculationResults pluginResults = new CalculationResults();

    // Set the time, run the simulation and add the results
    for (double time = time1; time <= time2; time += step) {
        obsParam.setExposureTime(time);
        CalculationResults simulationResults = getCommunicator().runSimulation();
        Result snrResult = simulationResults.getResultByName("SIGNAL_TO_NOISE");
        double snr = getSnrForWavelength(snrResult, wavelength);
        pluginResults.addResult("Plugin demo result", time, snr, "sec", null, Level.FINAL);
    }

    // Show the results using the ETC-42 panel
    getCommunicator().showResults(pluginResults);
}```
Demo highlights

- GUI or command line mode, supporting script execution
- Import / Export of the query configuration
- SAMP enabled
- Flexible calculation framework supporting smart caching
- Plugin framework
Coming soon

- PSF calculation from image and data cube
- Adaptive Optics support
- Integral Field spectroscopy
- Simulated image as output
- Hybrid mode (GUI with command line)
- many more (suggestions are welcome)
More information

ETC-42 web page:
http://projets.oamp.fr/projects/etc

- Download the ETC-42
- Download documentation
- Download configuration files
- Report bugs
- Request new features
- Stay updated with latest news via Atom feed
Want to contribute?

- Download and use ETC-42
- Let other people know about it
- Contribute instrument and site configurations
- Suggest new features
- Build and contribute plugins

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