

# PF-SPE : A spectroscopic redshift measurement and spectral features extraction pipeline for the EUCLID project

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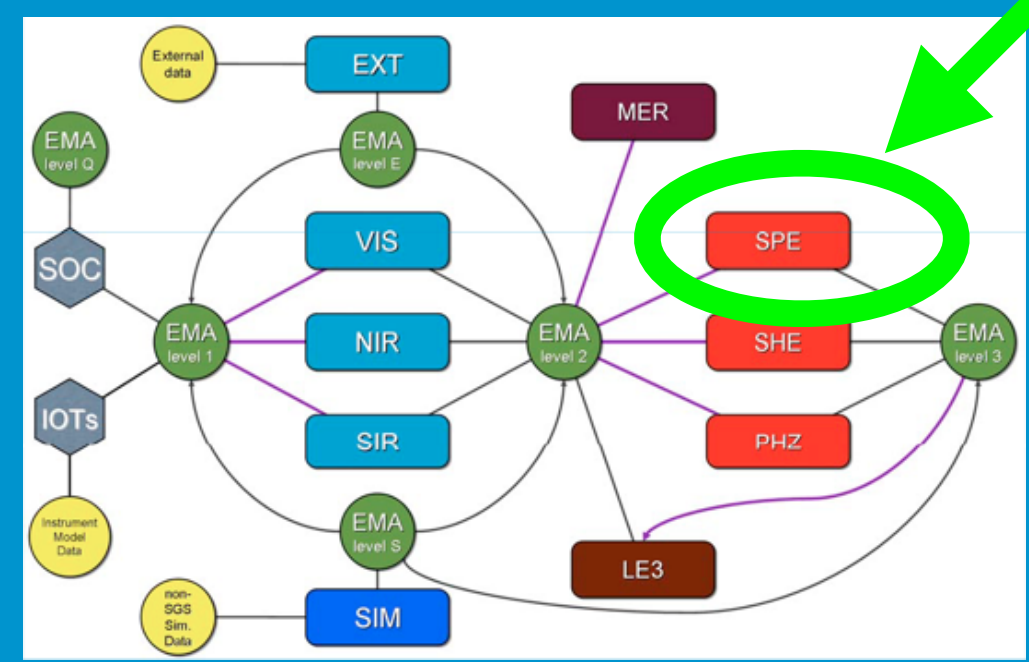
## ABSTRACT

Euclid is a space mission, currently under development, led by the European Space Agency. The reduction pipeline has been organized in Processing Functions (PF). This contribution focuses on the Processing function "SPE", the goal of which is to measure the redshift and the spectroscopic features of the objects observed with the instrument NISP. We will define the different aspects of the PF-SPE reduction elements, the way to deal with data and the insertion into the special environment that has been created for all Euclid developers. New algorithms have been tested on simulated data and have shown really good results.



## PF-SPE

The processing function SPE is one of the 10 PFs of the EUCLID pipeline, it is one of the 3 level 2 PFs. PF-SPE should deliver redshift and spectrophotometric information for each spectrum available, observed with NISP. PF-SPE should provide



- ◆ Best redshift for each galaxy, and list of 5 best redshifts with quality flags
- ◆ PDF for redshift measurement
- ◆ Measurements of spectral features (Emission, Absorption lines, breaks, continuum)
- ◆ Rest frame parameters (Line Fluxes, integrated magnitude)
- ◆ Spectral classification

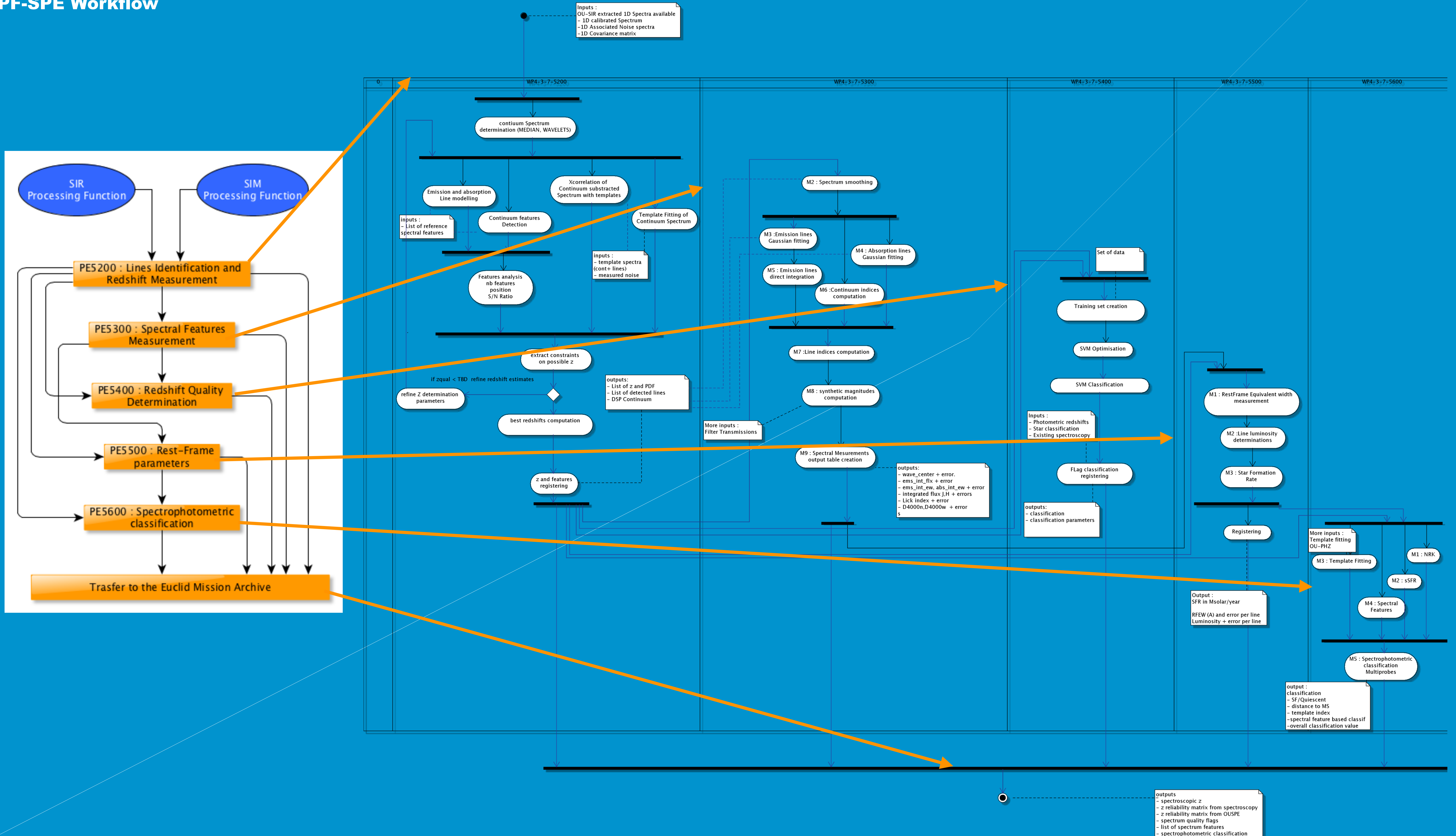
## EUCLID (<http://sci.esa.int/euclid/>)

Euclid is an ESA space mission, currently under development. Selected in October 2011 the satellite is planned to be launched late 2020. The Euclid mission aims at understanding the expansion of the Universe and the nature of the dark energy. Weak gravitational Lensing and Galaxy Clustering (Baryonic Acoustic Oscillations and Redshift Space Distortion) will be studied to capture signatures of the expansion rate of the Universe and the growth of cosmic structures. Euclid will observe 15,000 deg<sup>2</sup> of the darkest sky. Three "Euclid Deep Fields" covering around 40 deg<sup>2</sup> in total will be also observed extending the scientific scope of the mission the high-redshift universe. The complete survey represents hundreds of thousands images and several tens of Petabytes of data. About 10 billion sources will be observed by Euclid out of which more than 1 billion will be used for weak lensing and several tens of million galaxy redshifts will be also measured and used for galaxy clustering. The scientific analysis and interpretation of these data is led by the scientists of the Euclid Consortium.

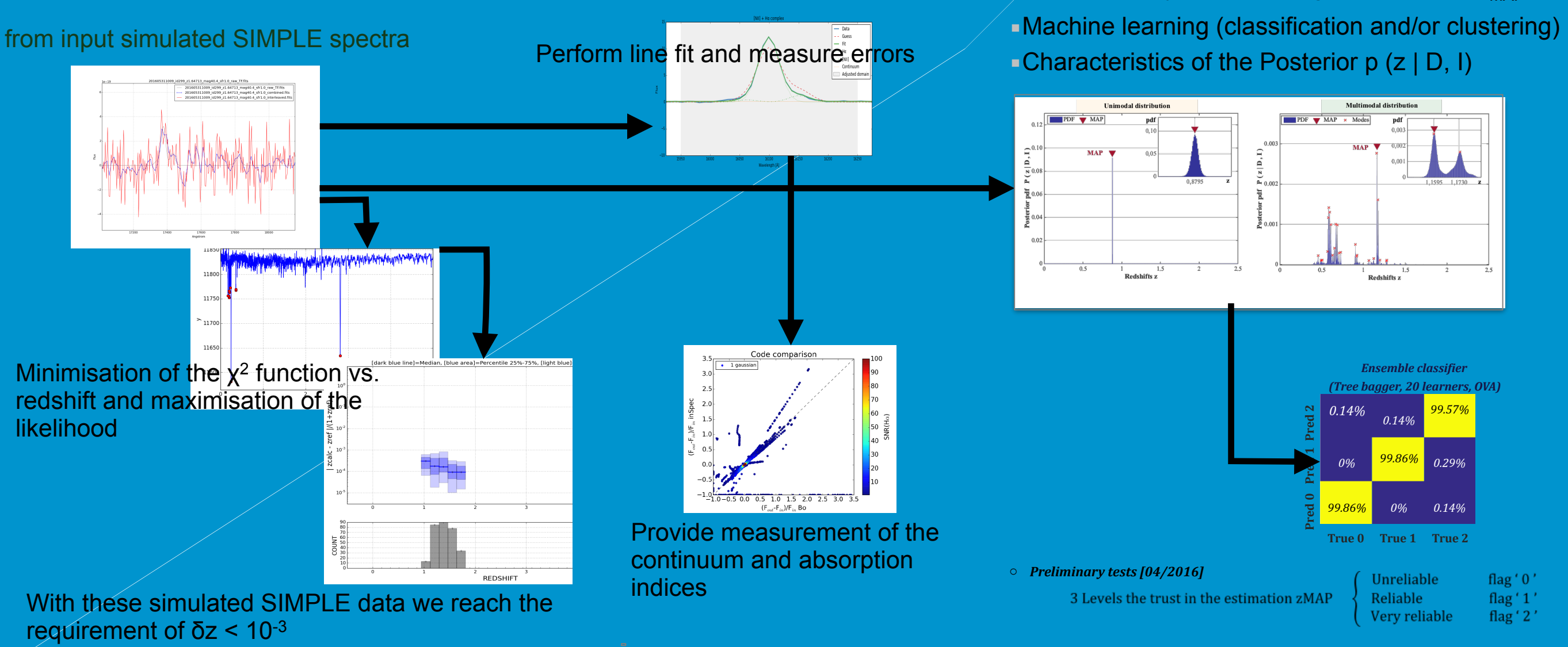


<http://www.euclid-ec.org>

## PF-SPE Workflow



## Quick Results



## Status of the Processing elements (PE)

- PE-5200 : Line model and Cross-correlation implemented, Spectral line detection implemented
- PE-5300 : Fit of lines implemented, extraction of Measurements / errors
- PE-5400 : Implementation of PDF, machine learning
- PE-5500 : Algorithms defined
- PE-5600 : Identified algorithms and methods

## CeSAM : <http://cesam.lam.fr/>

The Astrophysical Data Center of Marseille (Centre de données Astrophysique de Marseille - CeSAM). CeSAM is developing software, WEB based applications, databases, numerical simulations and Image processing modules. The developments are conducted keeping in mind the Virtual Observatory standards.