Laboratoire d'Astrophysique de Marseille

LISA DPC

## C. Surace and the CeSAM team

Organisation

- **Head** : C. Surace
- **Scientific responsible** : L. Jorda

  (since april 2016)

12 permanent positions, 8 short term contractors,

6 trainees/an

M/W ratio : 10%

Organisation (6 poles):

Pipeline :	P.Y. Chabaud
Project infrastructure :	T. Fenouillet
Simulation and optimisation :	J.C. Lambert
Software and Virtual Obs. :	J.C. Meunier
Information system :	C. Moreau
Image –signal processing :	D. Vibert

Software → Pipeline → Image processing → Numerical simulation → Infrastructure → Information System → Software
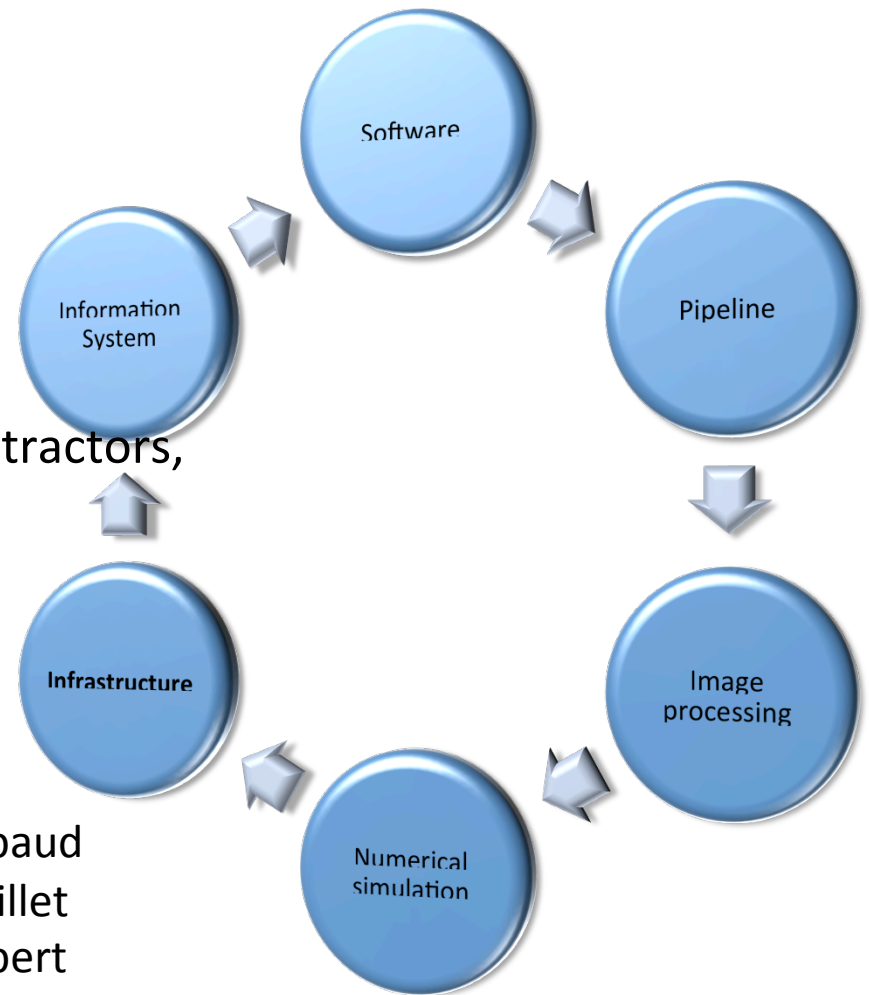
CeSAM − Expertise and labels

- **Technical expertise**

  – Expertise in Project infrastructure development

  – Responsible for spectroscopic data and time series processing pipeline (SPE PF - EUCLID, PFS, CoRoT, CHEOPS)

  – Expertise in disseminating astrophysical data

  – Big data 3D visualisation (GLNEMO2)

  – Responsible of the "Service d'Observation" ANO-5 GAZPAR/ASPIC

- **Labels :**

  – **Centre de Traitement Automatique de l'Information (CTAI)**

  – **Centre d'Expertise Régionale en spectroscopie (CER)**

    - **Label ANO-5 − Service d'Observation (Hosting ASPIC, GAZPAR)**

Tech pole : Pipeline

Missions

•Pipeline development for space or earth based astronomical projects

Activities :

•Software engineering : development, testing, deployment. Quality and test driven approach.

Composition

- P.Y. Chabaud (IE2)
- J. Penguen (IE2)
- F. Fauchier (IE CDD
- P. Guterman (IR – DT INSU)

Projects

CHEOPS (launch en 2018),
PFS (first light : 2018)
EUCLID (launch: 2021)

Highlights

- AMAZED : Automatic redshift computation library for big data for PFS and EUCLID projects
- CHEOPS-DRP: Lightcurve extraction pipeline

Tech pole : Infrastructure

Missions

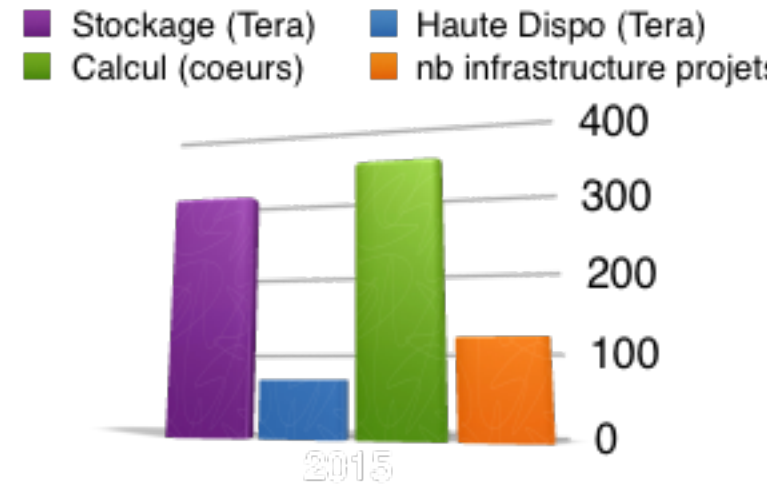•Define, deploy and maintain the projects computing infrastructure

Activities :

•Expertise on scientific computing infrastructure

•Building infrastructure w/r to scientific requirements

•Deployment and maintenance of infrastructure

Composition

- Thomas Fenouillet
- Jean Charles Lambert

Projects

• Cluster LAM

•Docker cloud

•Projects information system (redmine/git/jenkins)

•System team EUCLID/SVOM/ANO5

Legend:
- Stockage (Tera)
- Haute Dispo (Tera)
- Calcul (coeurs)
- nb infrastructure projets

400
300
200
100
0

2015

Highlights

- LAM Cluster setup
    - 438 cores / 2To RAM
    - InfiniBand
- Docker virtualisation of applications system (registry and servers)

Tech pole : Software/Virtual Observatory

Missions

•Development, deployment of stand-alone VO compliant software, VO services and Control-Command software
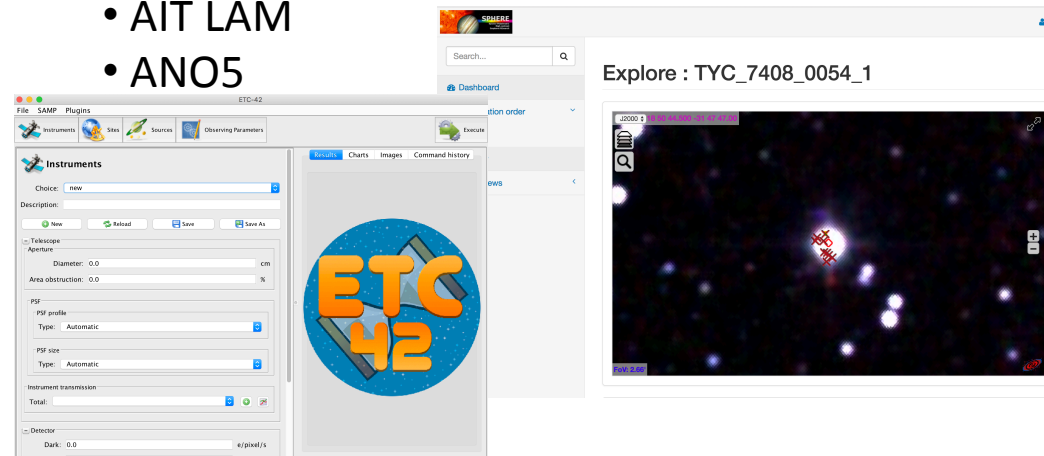
Activities :

•Design, development and deployment of software.

•VO standards unification

Composition

•JC. Meunier (IR1 - CNRS, resp. pôle)

•A. Le Fur (CDD IE PFS)

•D. Lupo (CDD IE ANR)

•A. Sapone (CLD AI – AMU)

Projects

• SPHERE ((E. LeCoroller)

•Exposure Time Calculator

• AIT LAM

• ANO5

Explore : TYC_7408_0054_1

Highlights :

* ETC-42: (https://projets.lam.fr/projects/etc)
* SPHERE analysis tools (http://cesam.lam.fr/spheretools/)
* ASPIC-VO : services SSA (http://cesam.lam.fr/aspic-vo)

Tech pole : Image - signal Processing

Missions

• development of modules and libraries using mathematical methods and image processing algorithms for observational data.

Activities :

•Design, development and deployment of signal processing algorithms (segmentation, filtering, deconvolution, 3D reconstruction)
•Instrument Simulation and inverse problems

Projects
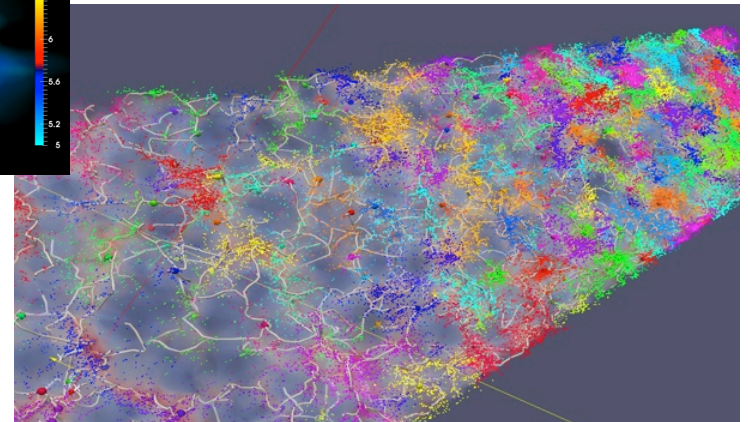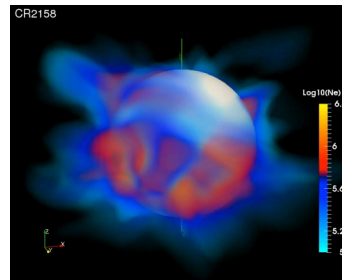
• AMAZED (EUCLID, PFS)
•LASCO
•FIREBALL

Composition

•D. Vibert (IR1 – CNRS)
•M. Gray (IR – EN)
•A. Schmitt (CDD IR EUCLID)
•Y. Poulin (CDD IE AMU)

Highlights

•EmPhot : photometry with priors
•Solar tomography of solar corona
•Cosmic web skeleton with VIPERS Data

Tech pole : Simulation / optimisation

Missions
• production mode, parallelisation - optimisation

Activities :
• Develop and optimize simulation codes
• Visualisation tools

Composition
• Jean-Charles Lambert (IR1)
• Sergey Rodionov (IE2)

Projects
• Gadget3 (L. Athanassoula – Galaxy simulations)
• Ramses (E. Nezri – cosmological simulations)
• Lenstools (E. Jullo - gravitational lenses)
• Cosmic Rays (E. Nezri – dark matter)
• Planet Formation(P. Barge)

Highlights
• GLNEMO2 (interactive visualisation of simulation data)
• UNSIO (generic library to access simulation)
• FIREBALL (Visualisation)
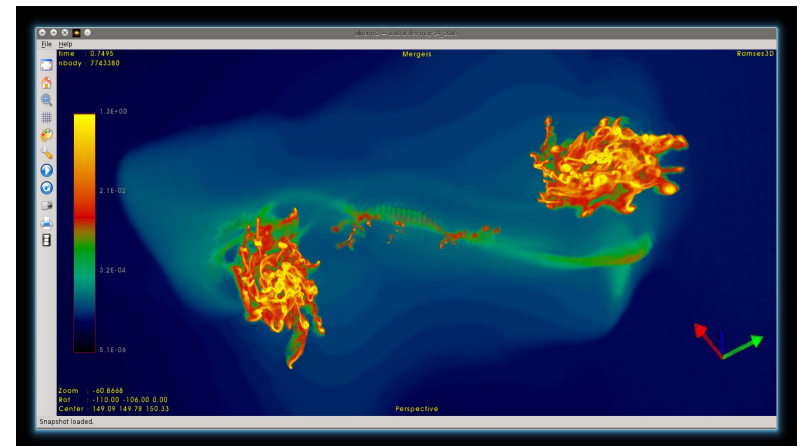
Tech pole : Information Systems

Missions

Collect, organise and disseminate added value data

Activities :

- Conception, and database administration (PostgreSQL)
- DB server and application server configuration (pgpool)
- Development of web based interfaces for data access (ANIS : HTML5/CSS3, JS, jQuery, Angular2, PHP)
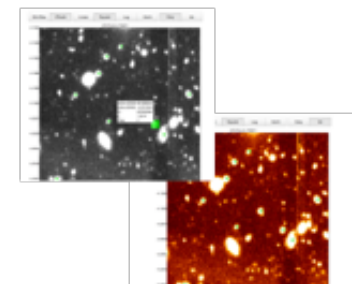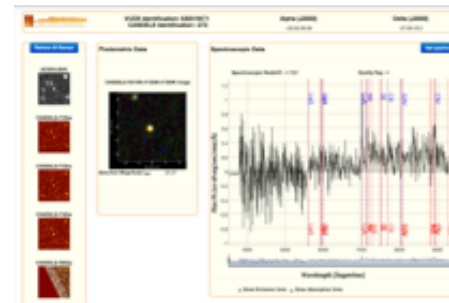
Projects :

20 Information system (http://cesam.lam.fr/cesamdata/)
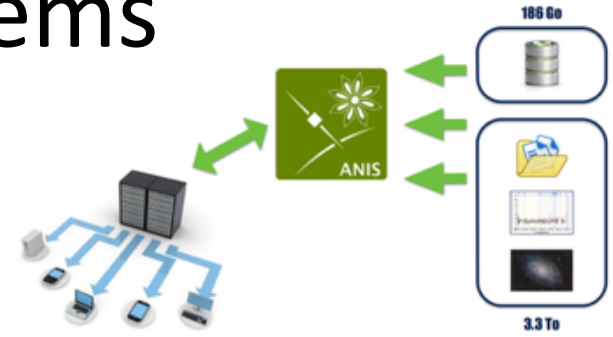
Composition

- C. Moreau (IR1 – CNRS)
- F. Agneray (IE – CNRS)
- T. Guillas (CDD IE INSU)

Highlights :

- Information system
  - VUDS, HST COSMOS, HeDAM
- Framework ANIS (http://cesam.lam.fr/anis/)

Instrumental Projects

Next Space missions

- **PLATO****** Mission M3 (Satellite - launch 2024)
- **ATHENA*** Mission L2 (satellite launch 2028)

On going Balloon missions

- **FIREBALL 2**** (projet Ballon US/CNES - L : 2017)

On going space missions

- **EUCLID****** Mission M2 (satellite launch 2021)
- **SVOM***** (Satellite CNES – Launch : 2021)
- **CHEOPS***** Mission S1 (Satellite - launch 2018)

On going ground based projects

- **SPHERE**** (ESO-VLT)
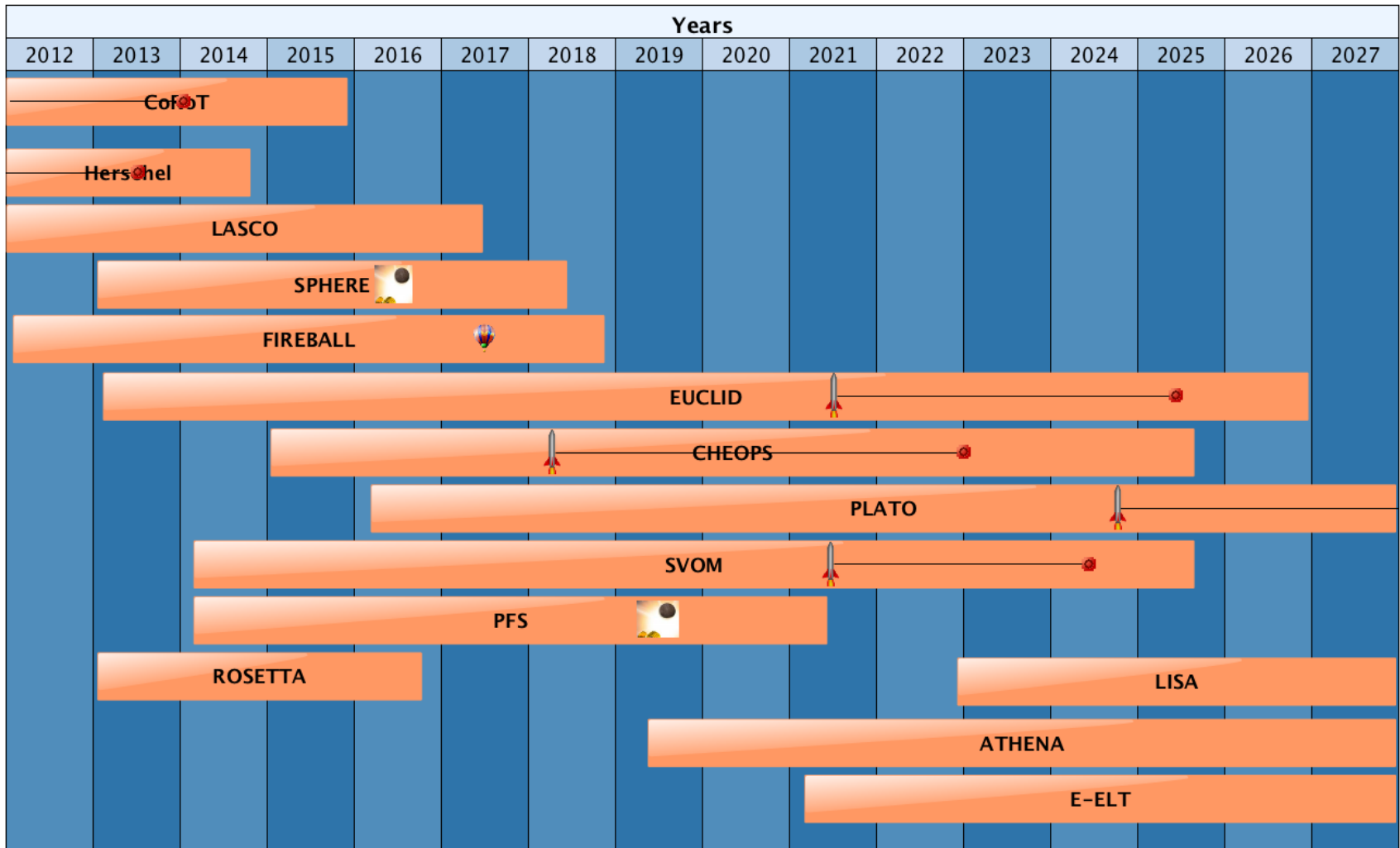- **PFS***** (Projet Sol instrument SUBARU - PL: 2018)

Past space missions

- CoRoT****** (Satellite (2006-2013))
- Herschel***** (Satellite(2009- 2013))
- LASCO - SOHO***** (Satellite launch1995)
- ROSETTA*** (Satellite launch 2004)
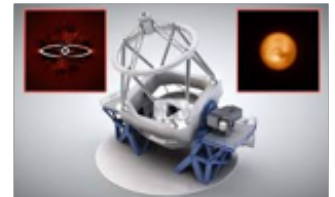
Planning of instrumental projects

Involvement

- Despite very limited knowledge in Gravitational Wave processing

- Possible Involvement
  - Project Management (if science responsibilities @LAM)
    - Based on expertise in ESA programmes
  - Simulation support
  - WP 2.2.1 – 2.2.2 : Development Infrastructure and production infrastructure
    - Based on the development of Service Oriented and distributed data and programmes
  - WP 2.2.2 Pipeline Development
    - Based on expertise in ESA programs
    - Follow up
  - WP 2.2.3 : Information System and data dissemination using VO standards
    - Based on the ANO5 Infrastructure
    - Follow-up