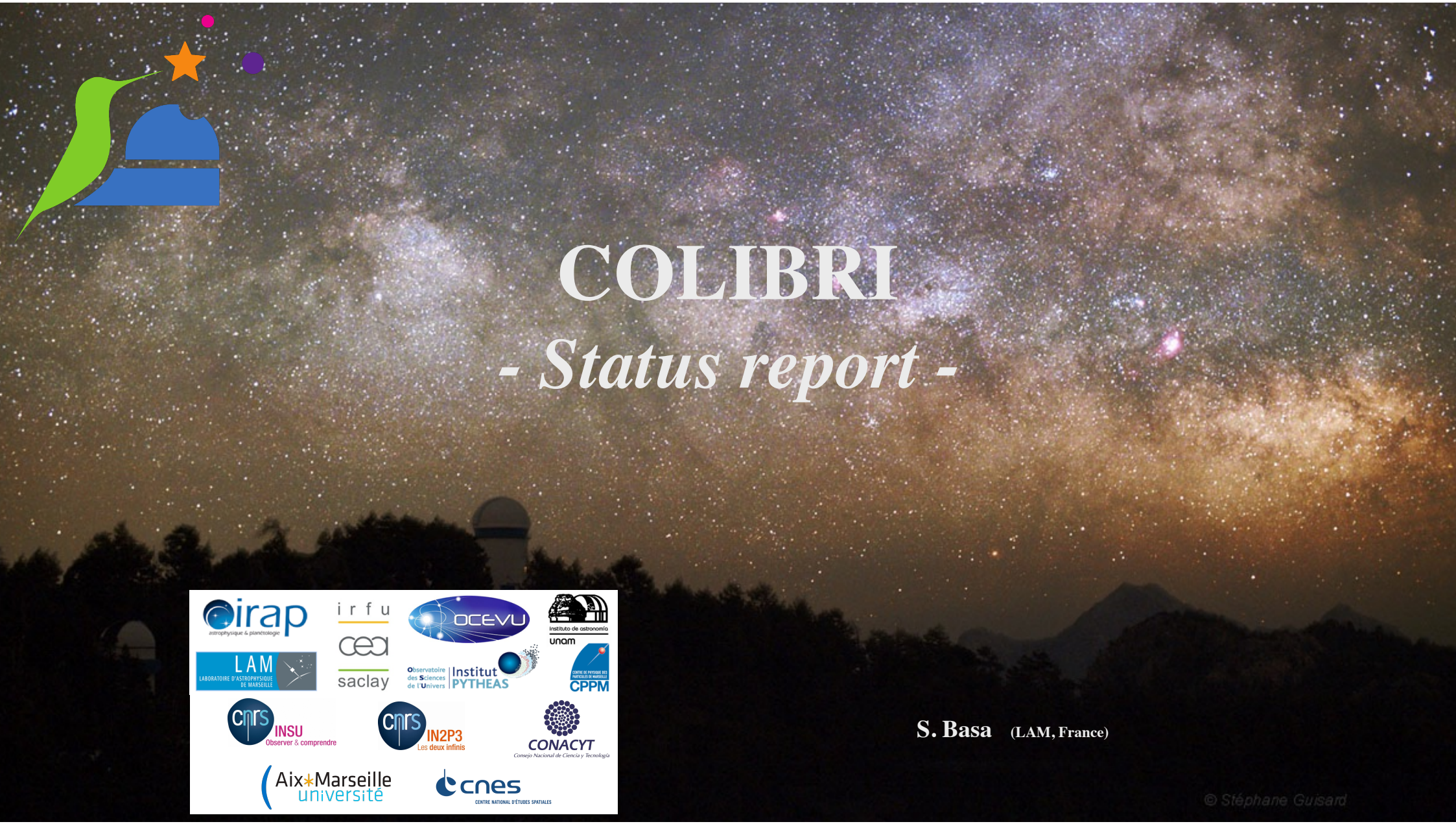


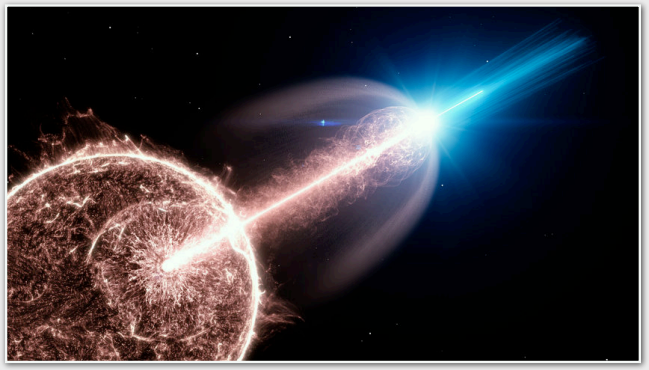
# COLIBRI

## *- Status report -*

**S. Basa** (LAM, France)

# A transient universe

**We are now entering the new era of Time Domain Astronomy!**



## Many scientific questions to be addressed:

- Understanding Progenitors of Gamma-Ray Bursts.
- Probing the High-z Universe with Gamma-Ray Bursts.
- Studying Tidal Disruption Events and SMBH.
- Identifying the Schock Breakout of Core-Collapse Supernovae.
- Identification and Investigation of Gravitational-Wave Sources.
- Time Domain Studies of AGN and Blazar Variability.
- Etc.

## Main difficulties:

- All these observations are panchromatic: from high-energy to visible/IR and radio domains.
- ***Time response is the key: one have to go very fast!***

# Motivation of COLIBRI

**Born from the desire of France and Mexico to jointly develop and operate a new telescope dedicated to the transient sky, SVOM in particular, from an excellent astronomical site.**

**But an ambition going far beyond by addressing many other scientific questions associated the transient sky:**

- Identification of the GWs and neutrinos alerts.
- Study of the TDEs and the AGNs,
- Etc.

***All this is done in a very pleasant and fruitful collaborative spirit.***

# The core of the system

**Telescope:**

- Alt-azimuth mount with two Nasmyth foci equipped with two derotators.
- Two main mirrors, M1 and M2, polished by AstroOptique Cardoen and WinLight in France.
- Characterized by a high pointing speed: on target in less than 30 sec.

**The instruments:**

- DDRAGO provides optical imaging with two channels: gri and zy.
- CAGIRE provides optical imaging with one channel: JH:
  - ➡ *First scientific application on the new ALFA infrared sensor developed in Europe (ESA, Labex FOCUS and CEA-LETI).*

| | DDRAGO | CAGIRE |
|---|---|---|
| Sensor | e2v | Lynred |
| Wavelength coverage | 400-1000 nm | 1000-1800 nm |
| Number of pixels | 4096x4096 | 2048x2048 |
| Pixel size | 15 $\mu$m | 15 $\mu$m |
| Well capacity | 350000 $e^-$ | >80000 $e^-$ |
| Readout noise | 8 $e^-$ | <40 $e^-$ |
| Operating temperature | 163 K | 100 K |
| Dark current | <0.001 $e^-$/pix/s | <1.0 $e^-$/pix/s |
| Pixel scale | 0.38 arcsec/pix | 0.63 arcsec/pix |
| Field of View | 26 arcmin | 21.7 arcmin |

# Project organization

## - Newcomers -

- ***Simona LOMBARDO:***
  - Postdoc@LAM funded by CNES.
  - Play the key role of Project Scientist.

- ***Ny-Avo Rakotondrainibe:***
  - PhD@LAM and CPPM (IPhU-CNES funding).
  - Began her thesis in the fall of 2022.

- ***Margarita Pereyra:***
  - Research staff at IA-UNAM, Ensenada.

- ***Diego Gonzalez:***
  - Research staff at IA-UNAM, Ensenada.

# Status of the project

**Project officially started mid-2015 in order to be fully operational for the launch of SVOM :**

- Major impact  of the international pandemic on the SVOM and COLIBRI development.
- Many administrative issues for the infrastructure in Mexico: more than 2 years of delay on this activity.
- Launch date for SVOM now fixed to end-2023: COLIBRI must be fully operational at the date.

**But unless a new event independent of the project, project ready in time:**

- End of the AITs/AIVs at OHP: February 2023.
- Telescope dismantling and shipping to Mexico: March to June 2023.
- Infrastructure in Mexico ready: June 2023.
- Start of the scientific observations in September 2023.

# AITs/AIVs @ OHP

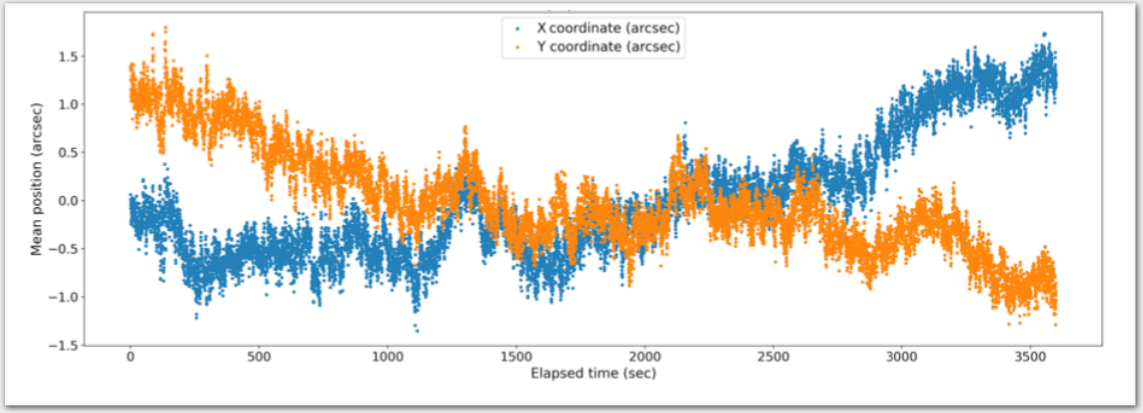
# AITs/AIVs @ OHP

**COLIBRI under very intensive tests at the Observatoire de Haute-Provence (OHP), France, before its shipping to Mexico:**

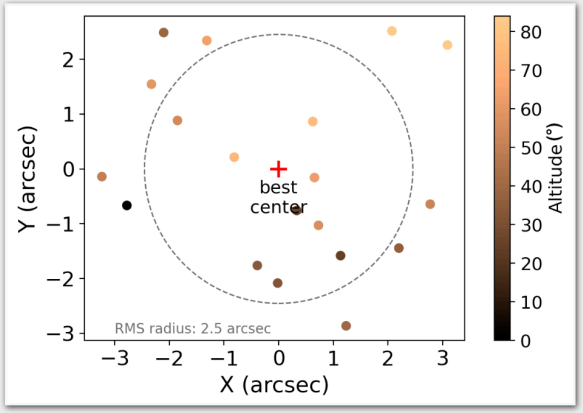
- Approach decided by the consortium given that both the mirror polisher and the telescope manufacturers are in Europe.

**Most of the performances obtained currently in line with expectations, but still some image quality issues (residual astigmatism).**

Tracking performances

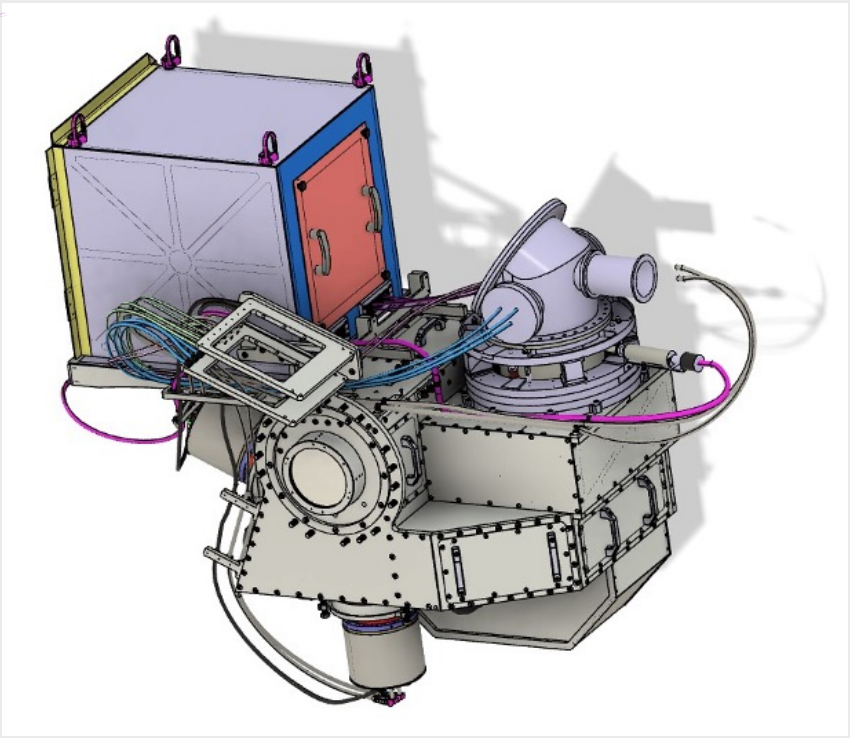



Pointing accuracy



# Infrastructure @ OAN, Mexico

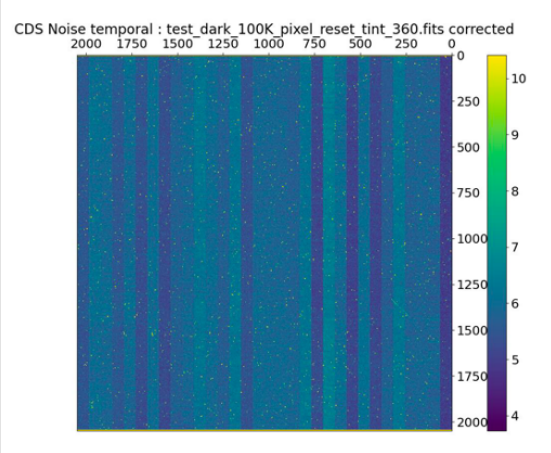
# DDRAGITO & DDRAGO



# CAGIRE

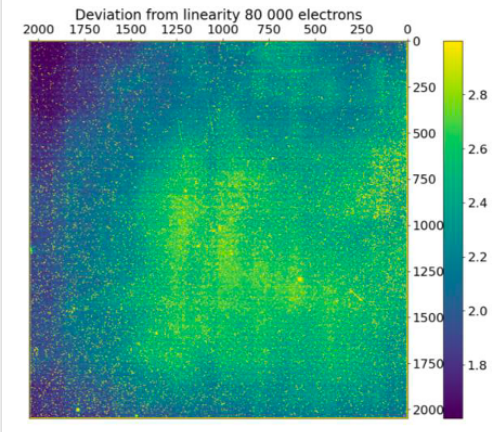
CDS noise

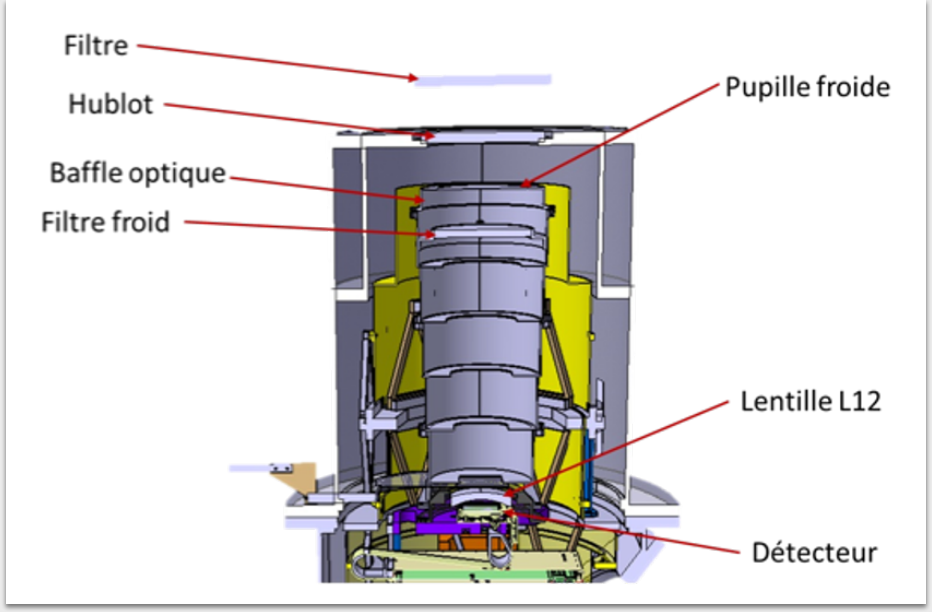
median = 43 e-




Deviation from Linearity at 80 ke-

median = 2.3%



# Preparing the scientific exploitation

**CNRS and UNAM have set-up a LIA between France and Mexico in 2018 :**

- Its motivation: foster the collaborations between the two countries at large and prepare the scientific exploitation of COLIBRI.

**As been renewed in 2023 for 5 years:**

- Next workshop: May 2023 in Fréjus, France.
- ***Everybody is of course welcome!***