The Écoles du Monde Pan-african school: Sustainable training and skills transfer in astronomy

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Observatory presentation

- First robotic/remote astronomical observatory in Madagascar built in may 2022
- Hosted by **Besely Campus** run by **NGO Ecoles du Monde Madagascar**,
- Managed by **Haikintana Astronomy** association, **Société Astronomique de France** et **Uranoscope Ile de France**.
- Since **June 2022**, we have an **asteroid** called **Besely**.

Observatory collaboration

Madagascar Ecoles du Monde

SAF

Haikintana
Astronomy Association

université
PARIS-SACLAY

L'URANOSCOPE DE L'ILE DE FRANCE
L'ASTRONOMIE POUR TOUS
IAU
n° A07
M. C. L
GRETZ ARMAINVILLIERS 77220

AFIPS

Observatory facility

Automated slide roof

Internet by optic fiber

Power supply using solar panels

Observatory equipments

Celestron C14 Telescope :

Starizona SCT Corrector IV - 0.63X Reducer

Equatorial Mount - SW EQ 8 Pro

CMOS ZWO ASI2600MM DUO CAMERA

Pro-Am Network for Scientific Alerts (RAPAS) Filters

Automatic focuser

Computer

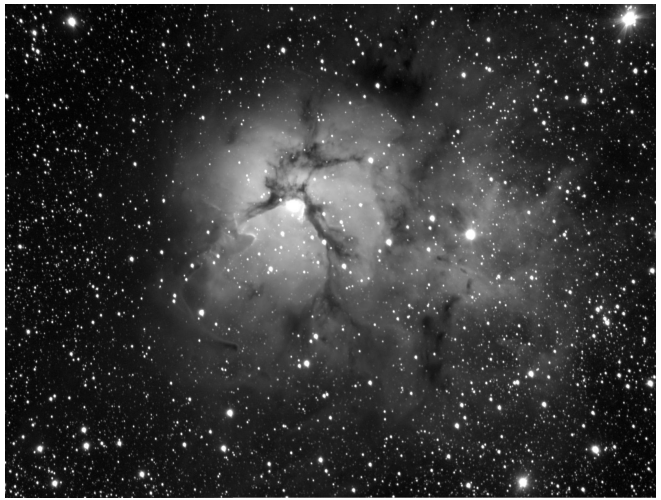
Observatory Characteristics:

Exposure time : up to 120s (single shot)

Magnitude max : 19

Declination limitation : +47° to -90°

Aims to deliver data in the Gaia photometric system for astrophysical alerts



Trifid nebula - Arnaud Leroy

Observatory of Ecoles du Monde de Madagascar

Access to the telescope

To access to the computer :

AnyDesk

Chrome Remote Desktop

To control the telescope :

Prism v11

To control the roof :

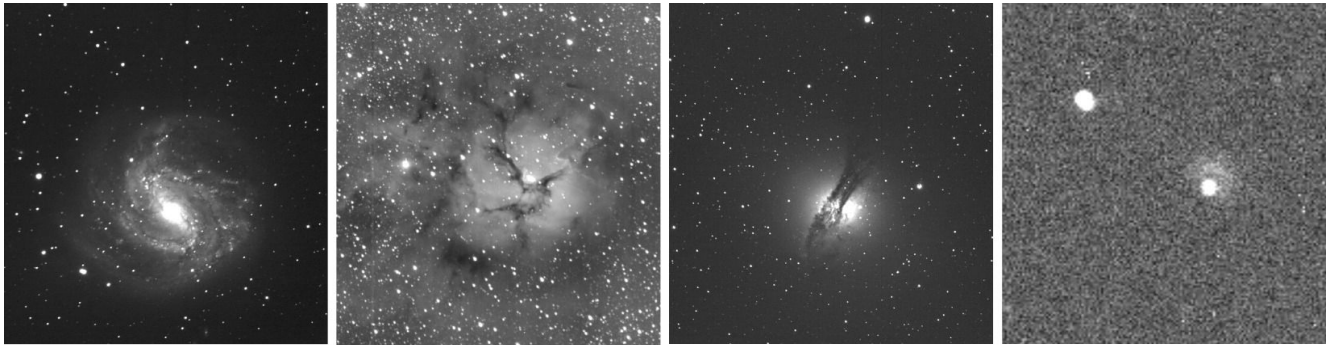
AstroMeccaRoof Tools

Astromecca
Mecanique Et Construction
Cailleau Antoine

Observatory of Ecoles du Monde de Madagascar

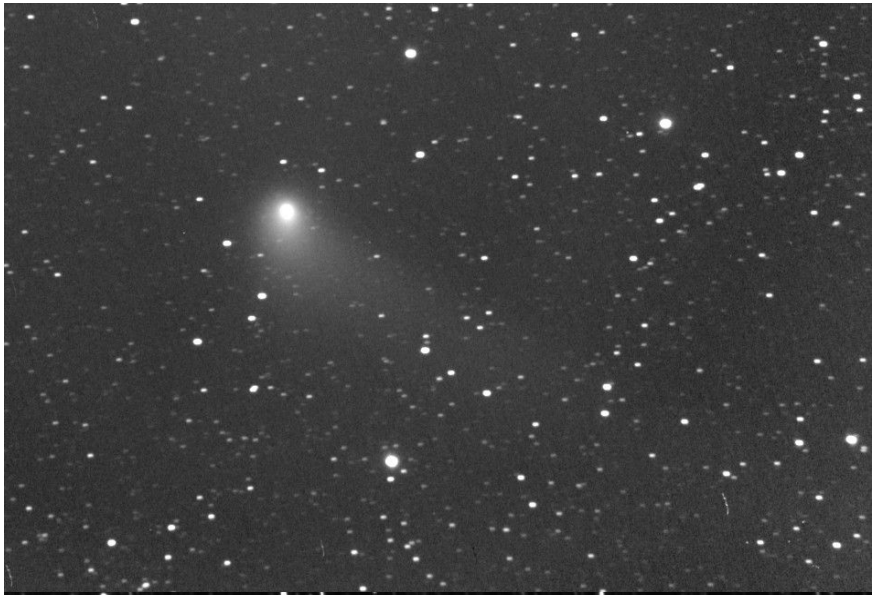
Observation activities:

- **Astrophotography :** Deep sky objects and planets
- **Astrometry and photometry of asteroids and comets**
- **Occultations**



A. Cailleaux, A. Leroy, A. Rajaonarivelo

Astrometry of comets



C/2017 K2 (PANSTARRS) - 2022 Oct 07, A. Leroy
https://lesia.obspm.fr/comets/lib/display-obs1.php?Num=26089

MPC Report

COD XXX

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CON [arnaudastro@yahoo.fr]

CON BESELY

OBS Arnaud Leroy , Andoniaina Rajaonarivelo

MEA A.Leroy

TEL 0.355-m f/7.2 SC + STL6303E -

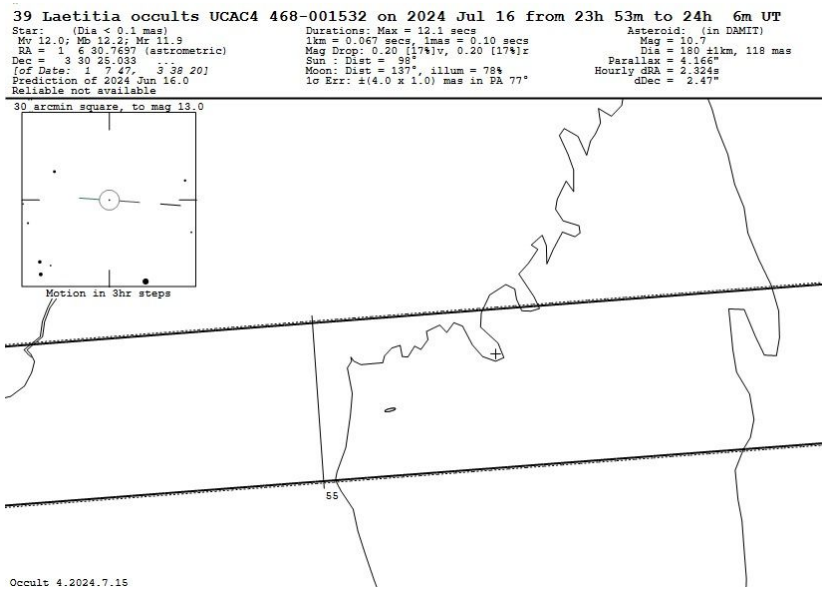
NET UCAC 4

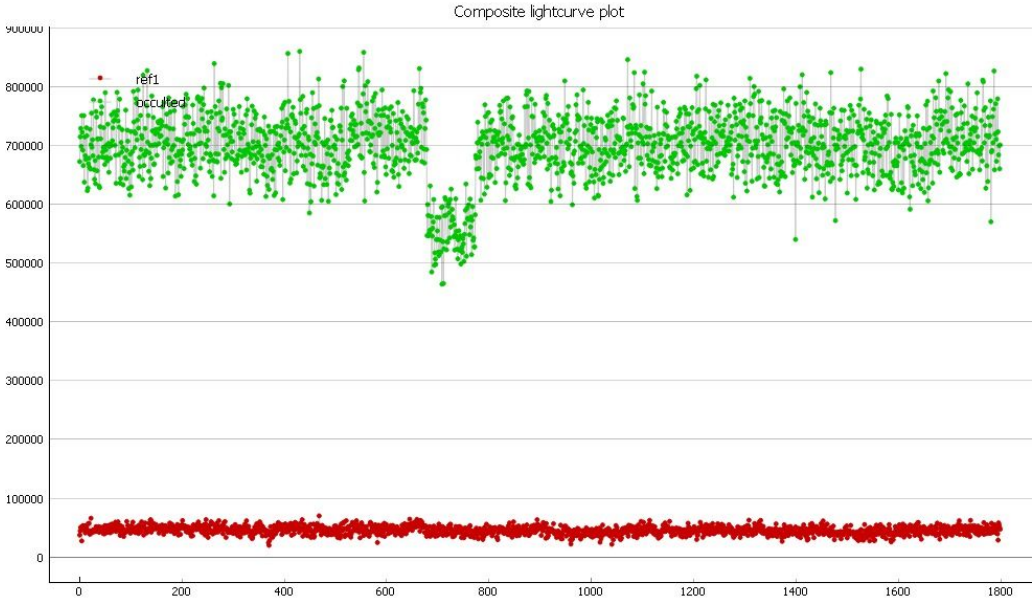
CK17K020 C2022 10 03.69767 15 59 04.10 -33 39 49.2 13.1 N XXX

CK17K020 C2022 10 03.69976 15 59 04.15 -33 39 51.6 12.9 N XXX

CK17K020 C2022 10 03.70208 15 59 04.21 -33 39 54.5 13.1 N XXX

Occultation of UCAC4 by 39 Laetitia on July 16, 2024



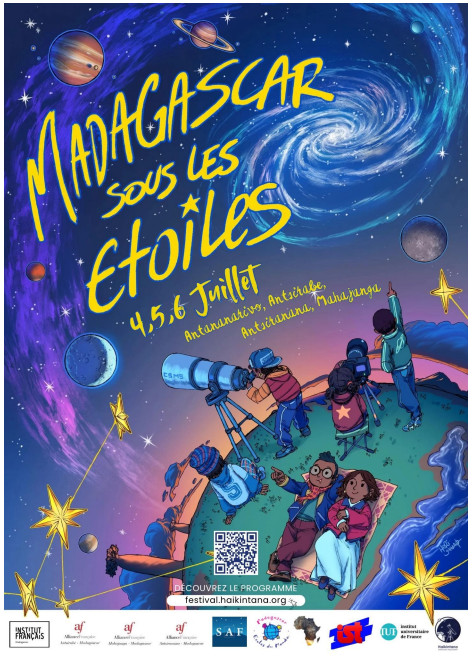


DART Impact


Didymos - 26 09 2022 - 23h 21m 35s TU
(c) Observatoire de Besely - Madagascar - Arnaud Leroy - Sylvain Bouley

Observatory of Ecoles du Monde de Madagascar

Outreach activities :

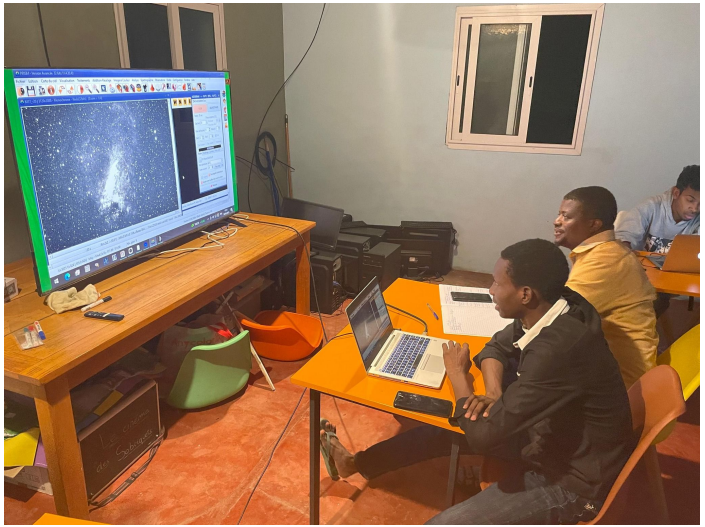


Pan African Astronomy School of Ecoles du Monde Madagascar:

- **1 week of training : Including theoretical and practical sessions**
- **11 participants from african french speaker countries**
- **6 Speakers and trainers from France**

School objectives and model

- **Hands-on Training**
  - Direct experience with professional tools and data analysis.
- **Cascade Model**
  - Train trainers who return to their home institutions.
- **Real Research**
  - Enable active participation in authentic scientific observations.



Cascade Model

School program

- **Curriculum**
  - Theoretical lectures
  - Intensive practical sessions
  - Remote observing training
- **Hands-on activities**
  - Telescope operation
  - Data acquisition
  - Data reduction
  - Scientific collaboration

IMPACT & FUTURE

- **Short-Term:** A cohort of trained students actively participating in global research networks.
- **Long-Term:** Autonomous astronomy communities across Africa, supported by international partnerships.

(6690) MESSICK
V. Benishek, Belgrade Astronomical Observatory; P. Pravec, Ondrejov Observatory; A. Leroy, Uranoscope de l'Ile de France, Gretz-Armainvilliers, France; C. Bhibah, Societe Astronomique de Tunisie, Tunisia; S. Sylla, Universite Cheikh Anta Diop, Dakar, Senegal; N. Tovolahy and M. Avotra, Haikintana Astronomy Association, Madagascar; F. Vachier, Observatoire de Paris; J. Oey, Blue Mountains Observatory, Leura, NSW, Australia; R. Durkee, Shed of Science South Observatory, Pontotoc, TX, U.S.A.; D. Augustin, Anglet, France; and A. Klotz, J. Berthier, and P. Thierry, Observatoire des Makes, Reunion, report that photometric observations taken with a 0.35-m telescope at the Sopot Observatory in Serbia, a 0.36-m telescope at Ecole du Monde Besely in Madagascar, a 0.6-m telescope at the Observatoire des Makes, a 0.35-m telescope at the Blue Mountains Observatory, a 0.50-m telescope at the Shed of Science South Observatory, and a 0.35-m telescope at e-EyE Observatory in Spain during Aug. 14-Sept. 24 reveal that minor planet (6690) is a binary system with an orbital period of 29.75 +/- 0.02 hr. The primary shows a period of 3.0248 +/- 0.0001 hr and has a light=curve amplitude of 0.24 magnitude at solar phases 2-12 degrees. Mutual eclipse/occultation events that are 0.12 magnitude deep indicate a secondary-to-primary mean-diameter ratio of 0.34 +/- 0.02.

Asteroid discovery by the school participant

Training organized by the school participant

In Benin

Conclusion

Access to astronomy should not depend on geography

The problem	Our response
• Unequal access to infrastructure across Africa • Limited hands-on training opportunities • Dependence on external institutions for research	• A shared robotic observatory accessible remotely • A training-of-trainers model • Direct participation in real scientific research

From isolated learners -> to self-sustaining scientific communities

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