esa space situational awareness European Space Agency

European Asteroid Observers Meeting

Sormano Astronomical Observatory

IAU code 587

Presentation: Francesco Manca

WWW: http://www.brera.mi.astro.it/sormano/
e-mail: obs.sormano@alice.it

Sormano Astronomical Observatory

Osservatorio Astronomico Sormano

IAU code 587

Sormano (CO) Italy

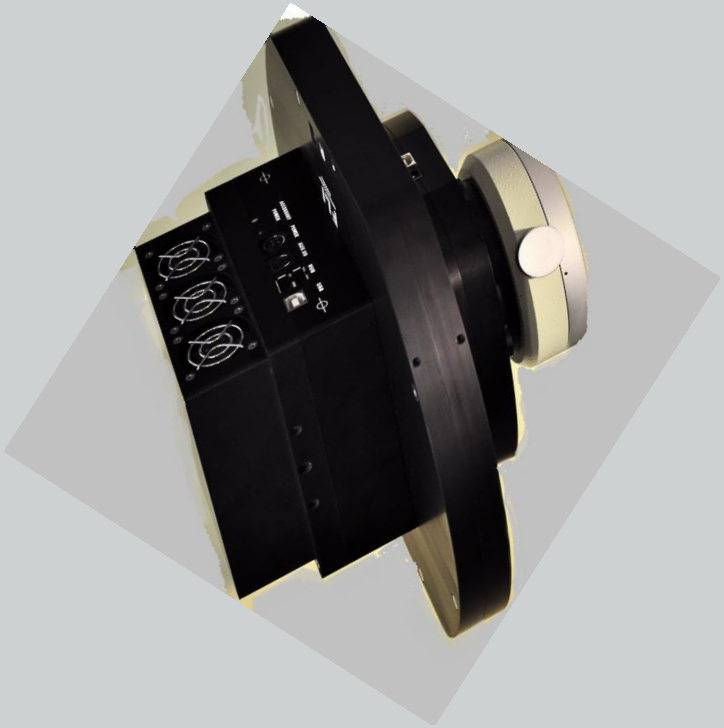
Geographic coordinates ED50:
Longitude: 9° 13' 48".9 East
Latitude: 45° 53' 1".9 North
Height: 1128 m

E-mail: obs.sormano@alice.it

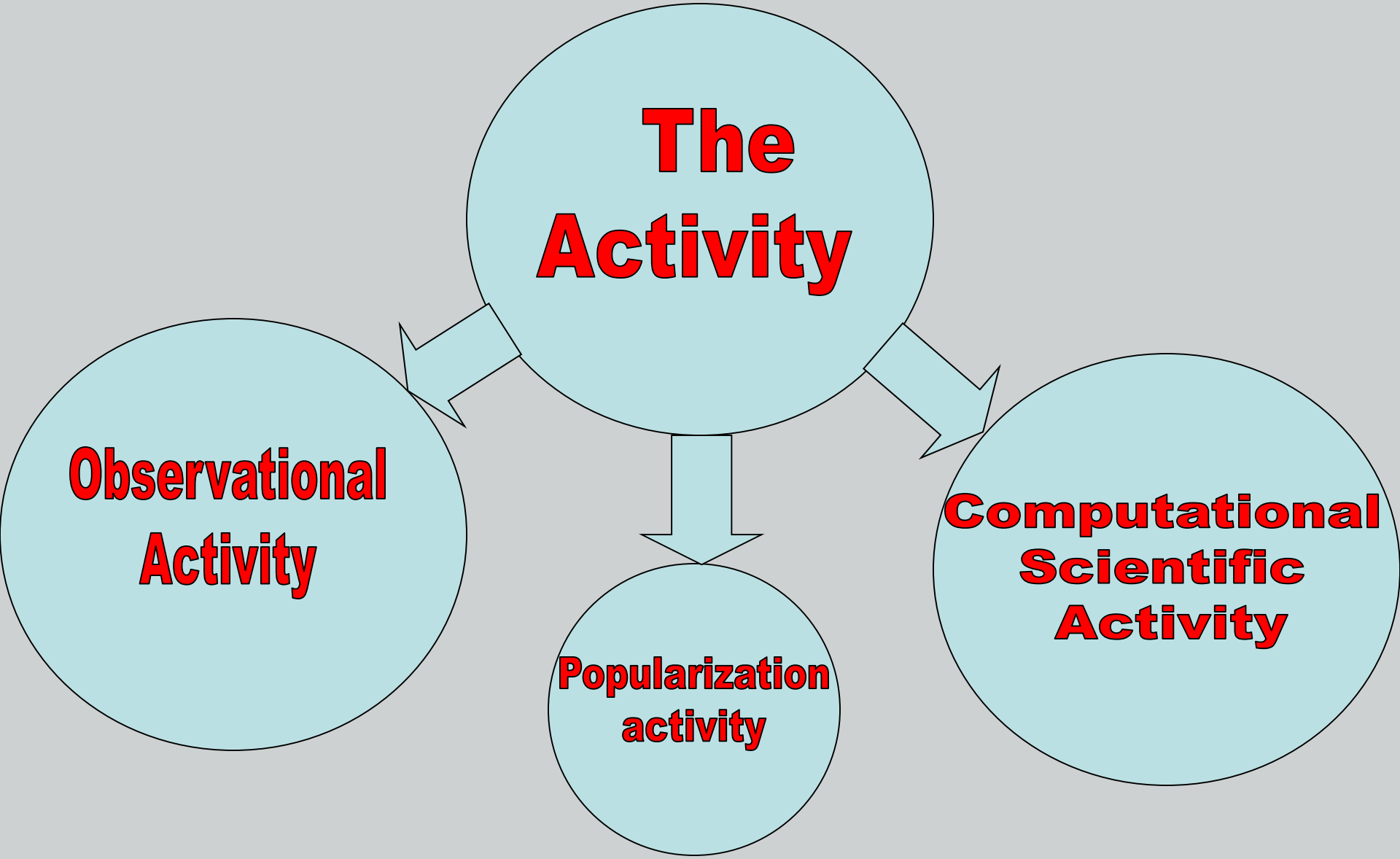
WWW: http://www.brera.mi.astro.it/sormano

The instrument

The "*Cavagna Telescope*" is the main instrument of the Observatory. It is a Ritchey-Chrétien Astrograph with a structure in Carbon Fiber produced by RCOS (Ritchey-Chrétien Optical System) and a primary mirror of 20 inch (f/6.8) installed on a robotic german mount.



A FLI CCD camera, model ProLine PL09000 3056 x 3056 pixel Front-Illuminated with sensor ON Semi KAF-09000 - pixel size:12 µm ,USB 2.0 is connected to the *RCOS* telescope at direct focus


The Activity
Observational Activity
Popularization activity
Computational Scientific Activity

Observational Activity

The observational activity concern:

- **Follow up and confirmation of objects from NEO Confirmation Page**
- **Follow up of know NEA in order to increase their observational arc (more of them in reference to our Observable Lists).**
- **Recovery of minor planets at second opposition**
- **Search of minor planets in selected area**

(**N. 96** designation attributed to Sormano Observatory)

Field of View

Focal length: 3455 mm

Pixel scale:

Binning x1: 0.71”

Binning x2: 1.42”

CCD camera used at binning x 2 (pixel size:12 μm)

Field of View= 36’ x 36’

Magnitude limit: 21.5 V (sum of images)

Follow-up of fast moving objects is usually performed moving the mount on the object’s motion (checking a star of reference) in order to compensate the atmospheric turbulence.

Scientific Activity (Computation) 1/2

- **Development of software for internal use**
- **Computation of orbital elements, partly sent to the *Minor Planet Center* for publication on the *Minor Planet Circulars***
- **Development of shareware software as:**

  Orbital Computation ,

  MOID (Minimum Orbital Intersection Distance)

  Guide (tracking on object's motion)

  Ephemeris

Database for orbit identifications

(monthly updated from MPC data)

Internal Database of Orbits and Obervations Update December 25, 2015	
Number of Asteroids Observations	140,472,924
Number of Comets Observations	819,104
Orbital Elements of Numbered Asteroids	455,144
Orbital Elements of Unnumbered Asteroids *Perturbed and Unperturbed solutions*	246,530
Orbital Elements of Comets	3,845

Scientific Activity (Computation)) 2/2

- **Identification of asteroids and comets (orbital computations)**

Update to January 31, 2016 - N. 1177 (COMET, PHA, NEA, MARS CROSSER,TNO, ,..)

- **Since 1998**

Computations of attention lists of asteroids and comets having a low MOID value with the Earth, internal planets, Moon (linked at JPL-NASA NEO office)

For all of them ("U" par) the orbital elements and close encounters are computed at any observational update in order to identify possible dangerous objects.

MBPL - Minor Body Priority List	H <= 22.0	up to MOID value: 0.060 AU
SAEL - Small Asteroids Encounters List	H > 22.0	up to MOID value: 0.015 AU
PCEL - List of Planetary Close Encounters		up to MOID value: 0.010 AU

TAM . Table of Asteroids Next Closest Approaches to the Moon

OBSERVABLE LIST with ephemeris script from MPC (object from above priority lists)

Lists available at http://www.brera.mi.astro.it/sormano

Popularization Activity

The team of the Observatory is also involved in a popularization activity promoting visit, conference and so on.
A web page in italian language has been create just to involve people around the Observatory area.

URL address:
http://www.osservatoriosormano.it/

Questions?...

…Thank you for the attention