

The VO @ IAC: the path from virtual to actual contributors

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Canarian Observatories and IAC as astronomical data producers

ORM

Gran Telescopio Canarias

WHT & INT

TNG

SST & DOT

MAGIC

OT

IAC80 & TCS

Gregor, VTT, Themis, Solar Lab

Several small (<0,5 m) telescopes

IAC at La Laguna

About 150 researchers

More than 30 research projects

Telescopes on Canarian Observatories provides 20% observing time for the Spanish community

Some telescopes provide must part of the observing time to the Spanish community: GTC, TCS, IAC80, Solar Lab...

Actual data from Canarian Observatories at the VO

GTC data (on SVO at CAB)

- Data from Mar/2009 to Feb/2013
- Spectroscopy: OSIRIS Long Slit
- Imaging: OSIRIS Broad Band Photometry
- Imaging: OSIRIS Tunable Filters

Proper telescope archives

ING data archive (VO compatible?)

NOT Telescope (raw data and sparse observations)

TNG: Weave spectrograph for WHT

Teide Observatory

IAC80 & TCS (at IAC)

Mark I solar spectrophotometer (on SVO at CAB) (data since 1976!)

Data from specific research projects:
Planetary Nebulae Catalog, Stripe 82
Legacy, IACOB...

The IAC80 telescope at Teide Observatory

- In operation on OT since 1991
- 82 cm diameter
- Instruments: CAMELOT CCD, TCP photometer, MELIN Spectrograph (near future)

CAMELOT CCD camera

Back-illuminated 2148x2048 (10.4x10.4" FoV)

12 Filter wheel positions. 60+ filters available

Produce ~30000 images and 510 GB per year

Data is published routinely on the VO since 2009, after one year of data property

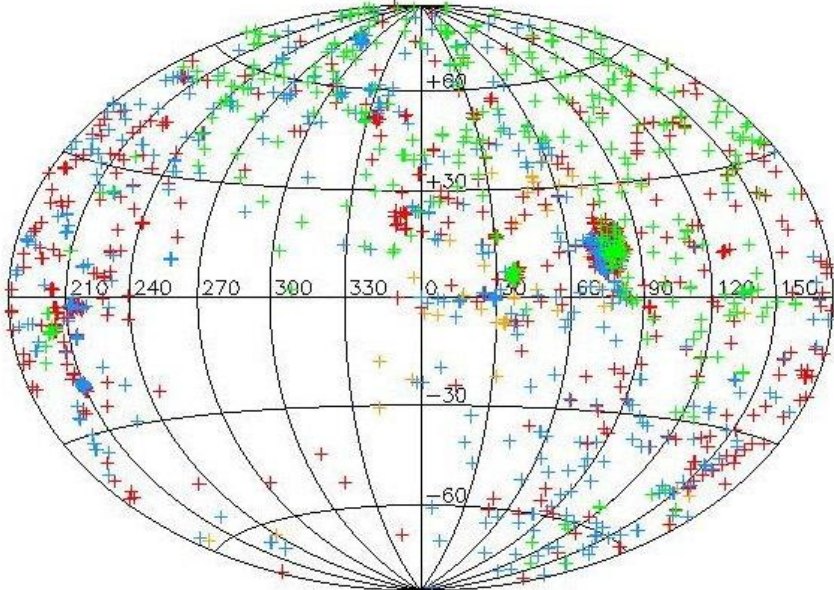


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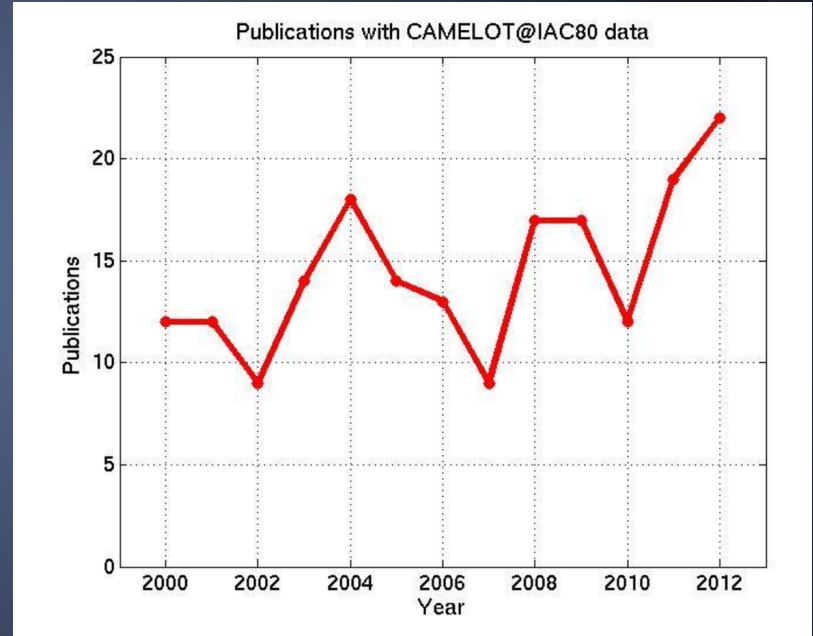
Selected observing programs with IAC80

- Photometric follow-up of planet candidates from COROT mission.
- Observation of stellar occultations by Trans-neptunian dwarf planet candidates.
- Monitoring of blazars and quasars.
- R-band photometry of M dwarfs in the CARMENES input catalogue.
- Optical/NIR Observations of Newly Discovered X-Ray/Gamma-ray Sources.
- Gamma-ray burst ToO observations.
- Outreach programs: Astronomy students, astrophotography...

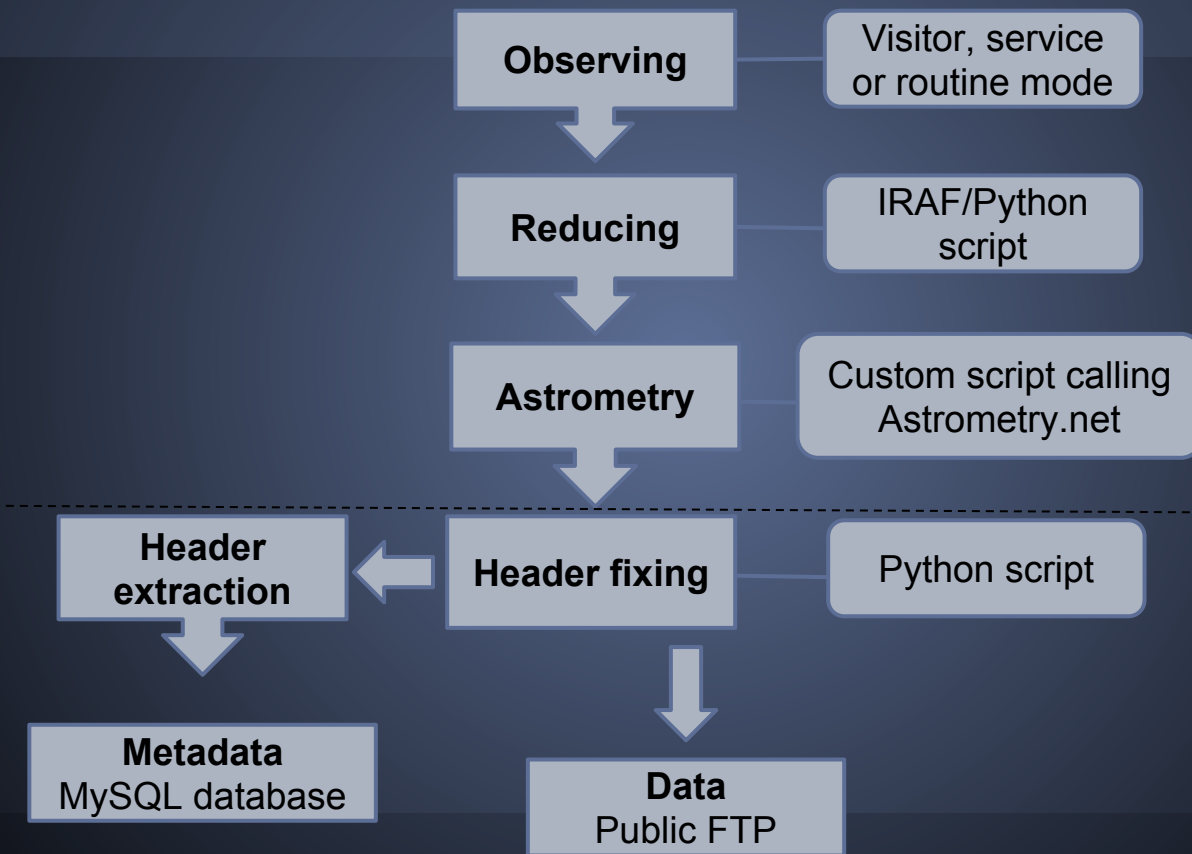
Selected observing programs with IAC80



Pointings in 2009, 2010, 2011 and 2012



Processing and publishing the CAMELOT/IAC80 data



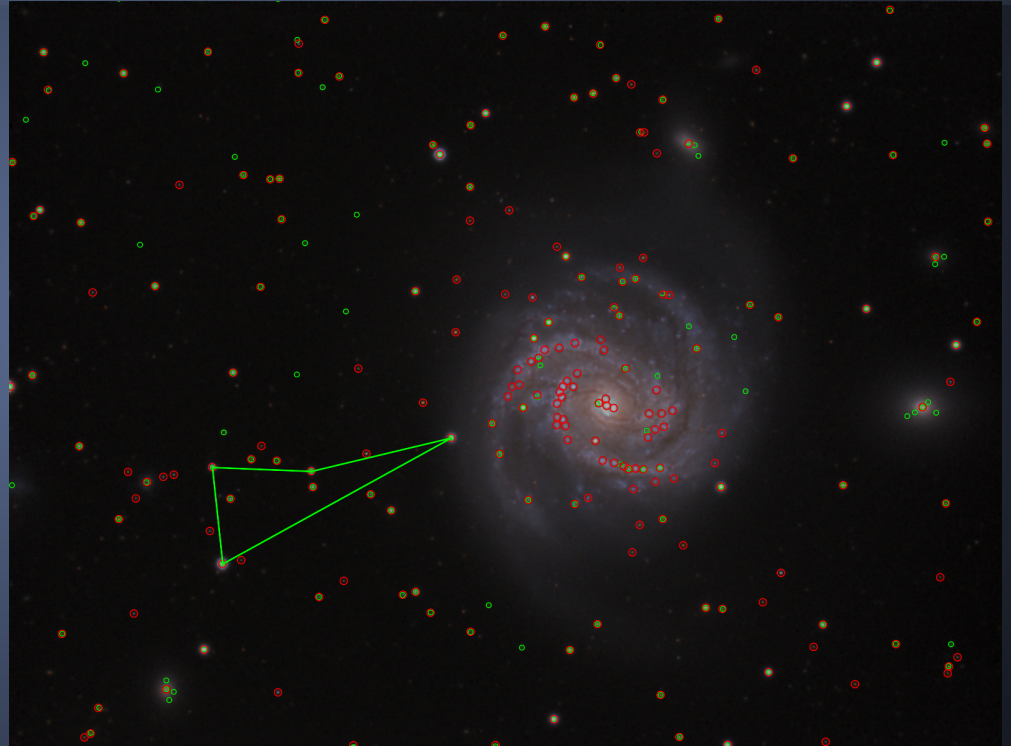
Automatic astrometric calibration with Astrometry.net

Astrometry.net search for matches to patterns of a two-dimensional set of points.

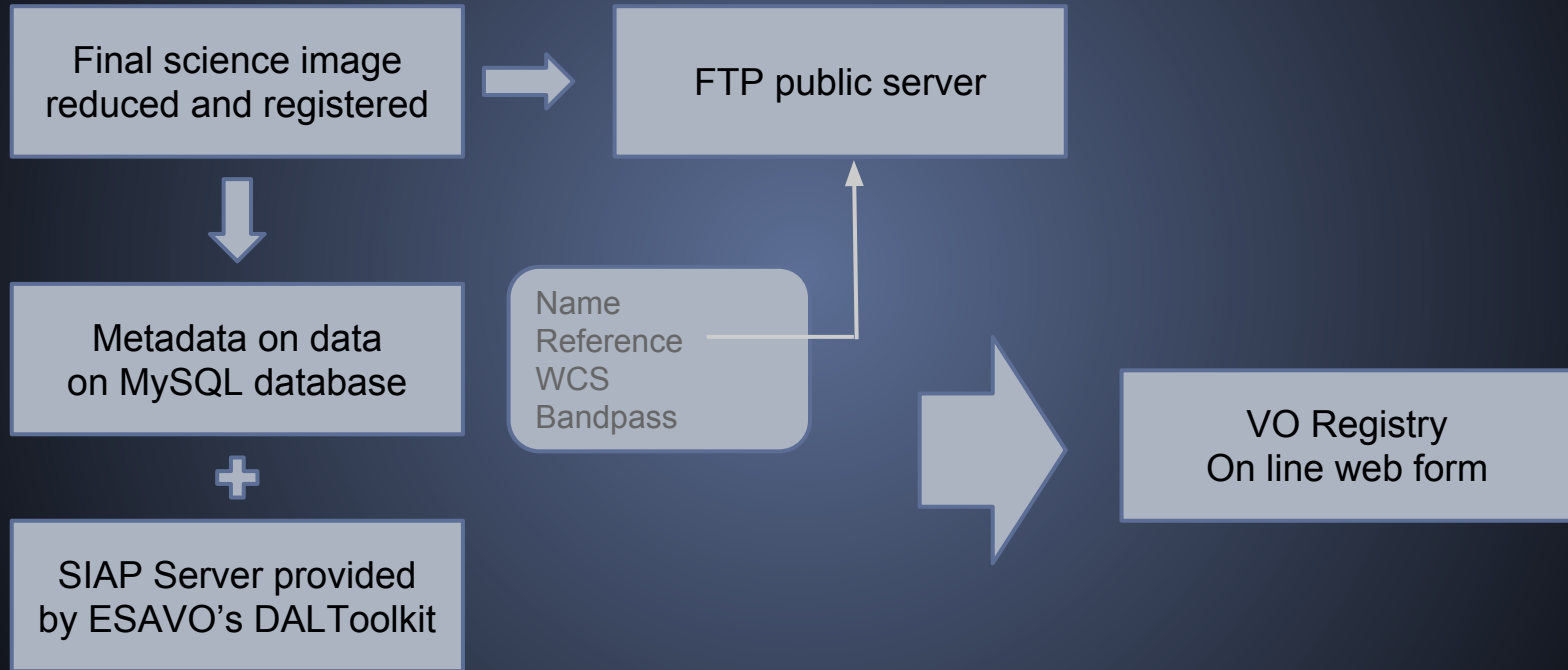
Although completely blind solution can be found, pointing and scale parameters can be given for faster results.

The tool works in 90+% of the images. Fails usually occur on narrow band and/or short exposure images (few stars)

The red circles are stars automatically detected by the algorithm in the image; green circles are stars from *Astrometry.net* catalog



Processing and publishing the CAMELOT/IAC80 data




CAMELOT/IAC80 data on VO

DALToolKit (ESAVO) publishing software is used to publish these data in the VO following the Data Access Layer (DAL) protocol specifications.

Server Query Form

SIMPLE QUERY

POS	<input type="text" value="113.5, +67.0"/>	{ Search position in the form "RA,Dec"
SIZE	<input type="text" value="1"/>	{ Size of the search region
FORMAT	<input type="text" value="fits"/>	{ MIME type of image
TIME	<input type="text"/>	{ Time interval of observation

 Powered by ESAVO DALToolKit

Incoming standard DAL requests into database specific SQL queries and then serialize the database result into VOTable responses according to the VO standard.

Carlos Sánchez Infrared Telescope data, soon at VO

Operating since 1972, 1.5m
Fully infrared dedication, prototipe for UKIRT
Infrared Camera (CAIN) 256x256 HgCdTe
photoelectric elements with sensibility in the
1-2.5 microns installed 90% of the time

An automatic reduction pipeline has been
developed, now in testing phase.

Automatic registration with Astrometry.net
with adequate input parameters works 80% of
the time.

First data will be published this summer; we
expect archive images since ~2009 or before

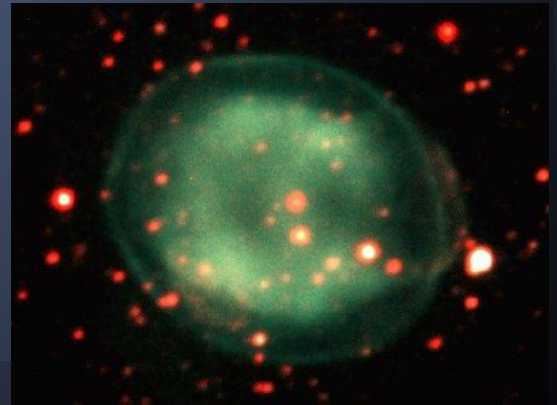


Data from specific research projects

The IAC Morphological Catalog of Northern Galactic Planetary Nebulae

A. Manchado, M.A. Guerrero, L. Stanghellini, M. Serra-Ricart, 1996, ed. IAC

- CCD imaging catalog composed of 607 images of 243 Northern planetary nebulae larger than 4 arcsec
- Narrowband [O III] 5007 Å, H-alpha 6563 Å, and [N II] 6584 Å images form NOT (ORM) and IAC80 (OT)



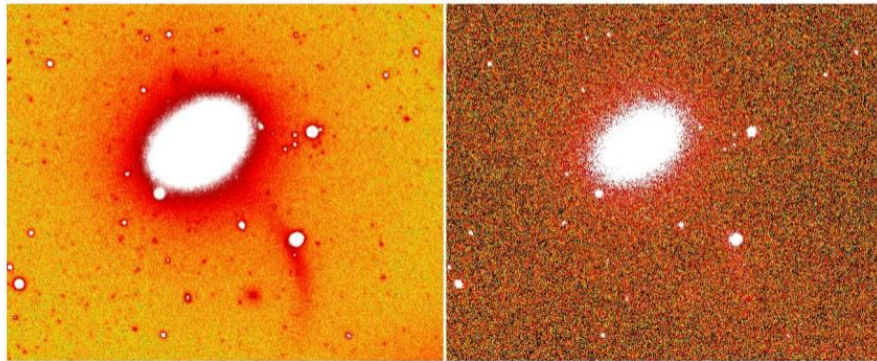
Data from specific research projects

SDSS Stripe 82 (*J. Fliri & I. Trujillo, 2014*)

- Region between $-1.25^\circ < \text{DEC} < 1.25^\circ$ and $-59^\circ < \text{RA} < 50^\circ$, total area ~ 270 square degrees
- Observed up to 80 times as part of the SDSS Supernova Legacy Survey
- Deep coadds produced by a fully automated reduction pipeline
- Typically 1200 images per band and 0.25 square degree field of the final data product: coadds, weight maps, PSFs, catalogs
- 3 sigma SB limit ~ 27.7 mag (r-band), ~ 1.7 mag deeper than SDSS DR7
- 6600 coadded images and 6600 weight images (~ 1.5 Tb). Part already public.

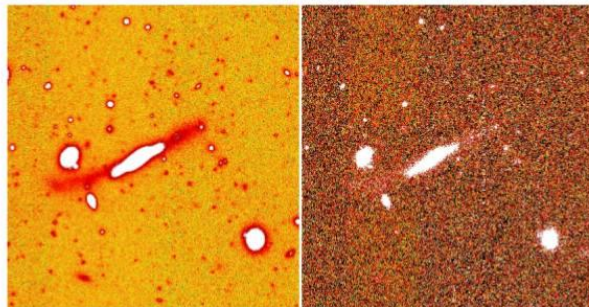
SDSS Stripe 82 legacy project

NGC 0426 & SDSS J011430.38+001310.9



S82 - g

DR7 - g



Near future plans to publish data from research projects

Data compilation campaign for processed (selected) data from research projects

CAT Large Programs: data must publicly release its final high-level products. Up to 66% of the time distributed by the CAT-IAC on the Liverpool, Mercator, STELLA and INT, up to 33% of the time on NOT and TNG, and up to 15% of the time on the WHT.

Solar telescopes data: Tenerife Infrared Polarimeter-II (TIP-II) at GREGOR and TIP-I at VTT. Just studying the how-to.

QUIJOTE Legacy data: CMB survey with an angular resolution of 1° at 11, 13, 17, 19, 30 and 40 GHz

Some current and future **small (less than 1 m) telescopes** at OT and ORM: Earthshine, TAD (outreach)