

Calar Alto Observatory and its Zeiss 0.8 m Schmidt telescope



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Resident Astronomer at Calar Alto

Outline



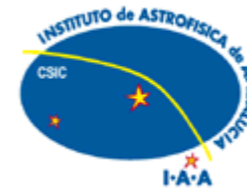
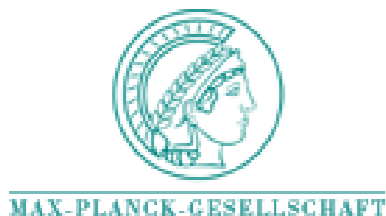
Observatorio de Calar Alto – Calar Alto Sternwarte
Centro Astronómico Hispano Alemán (CAHA)

Max-Planck-Gesellschaft (MPG)

Max-Planck Institut für Astronomie, MPIA, Heidelberg

Consejo Superior de Investigaciones Científicas (CSIC)

Instituto de Astrofísica de Andalucía, IAA, Granada





Spain:



19 autonomous communities (16 in Europe, 3 in Africa)

Surface: 504 600 km²

Population: 47 300 000

**Andalusia: Southernmost
extreme of Europe**



Surface: 87 300 km²

Population: 8 500 000

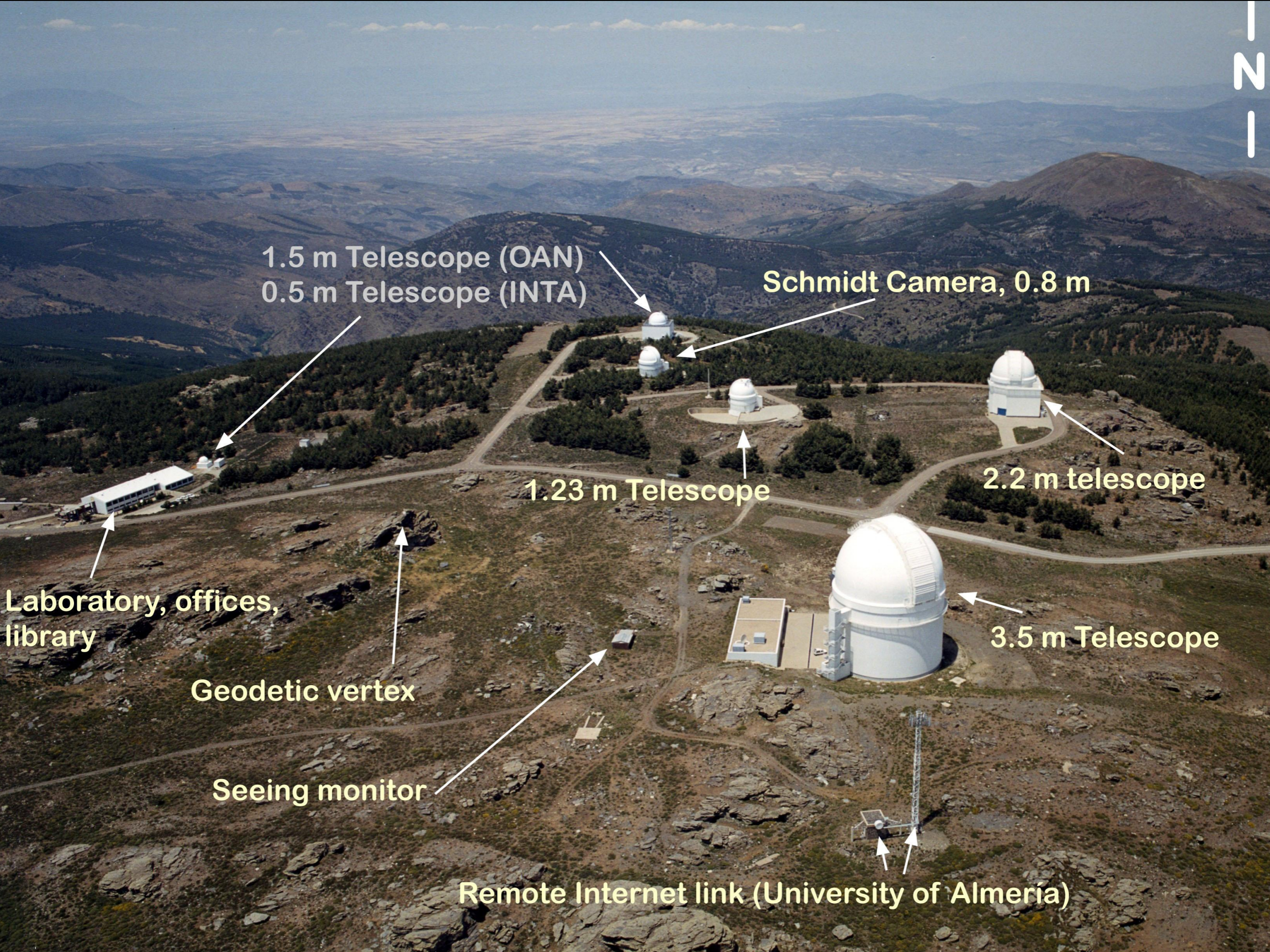
Off. Lang: Spanish











1.5 m Telescope (OAN)
0.5 m Telescope (INTA)

Schmidt Camera, 0.8 m

1.23 m Telescope

2.2 m telescope

Laboratory, offices,
library

Geodetic vertex

3.5 m Telescope

Seeing monitor

Remote Internet link (University of Almería)

Calar Alto Instruments:

1.23 m telescope:

- CCD camera for direct imaging

2.2 m telescope:

- BUSCA, 4-detector camera (4-band simultaneous imaging in visible light)
- CAFOS, focal reducer camera and spectrograph with polarimetric capability
- CAFÉ, échelle fiber-fed spectrograph (R 60 000)
- AstraLux, lucky imager in the near-infra-red
- PANIC, panoramic infra-red camera for surveys (FOV 30 arcmin)

3.5 m telescope:

- LAICA, 64 Mpix large area imager in visible light, 1 deg FOV
- MOSCA, focal reducer camera and spectrograph with polarimetric capability
- Omega-2000, second generation, high-performance IR camera
- PMAS, the world's largest FOV integral field spectrograph (1 arcmin)
- TWIN, long-slit, two-arm spectrograph (R up to 15 000)
- CARMENES, hi-res (85 000) two-arm (VIS & NIR) échelle spectrograph

Calar Alto Schmidt telescope:

Hamburg University 1955:

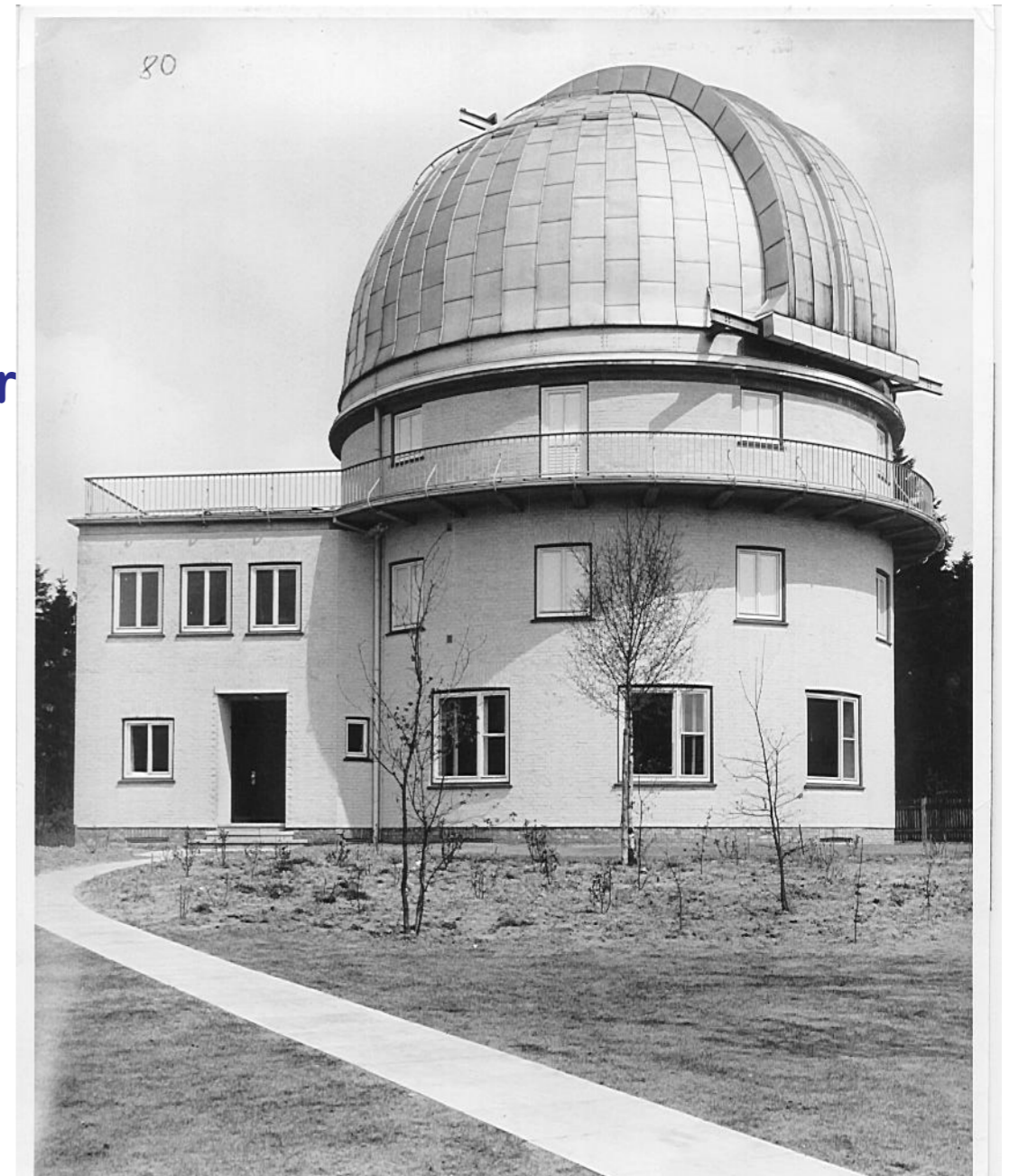
- Carl Zeiss Jena (Democratic Republic of Ger
- Bernhart Schmidt design

Calar Alto 1980:

- New mount by Grubb (UK)

Features:

- Corrector plate: 80 cm
- Mirror: 120 cm
- Focal length: 240 cm (f/3)
- Photo plate holder field of view: 5.5 deg x 5.5 deg (8 x 8 should be possible)
- Scale: 86.2 arcsec/mm
- Two objective-prisms, many large format filters



Calar Alto Schmidt telescope:

Hamburg University 1955:

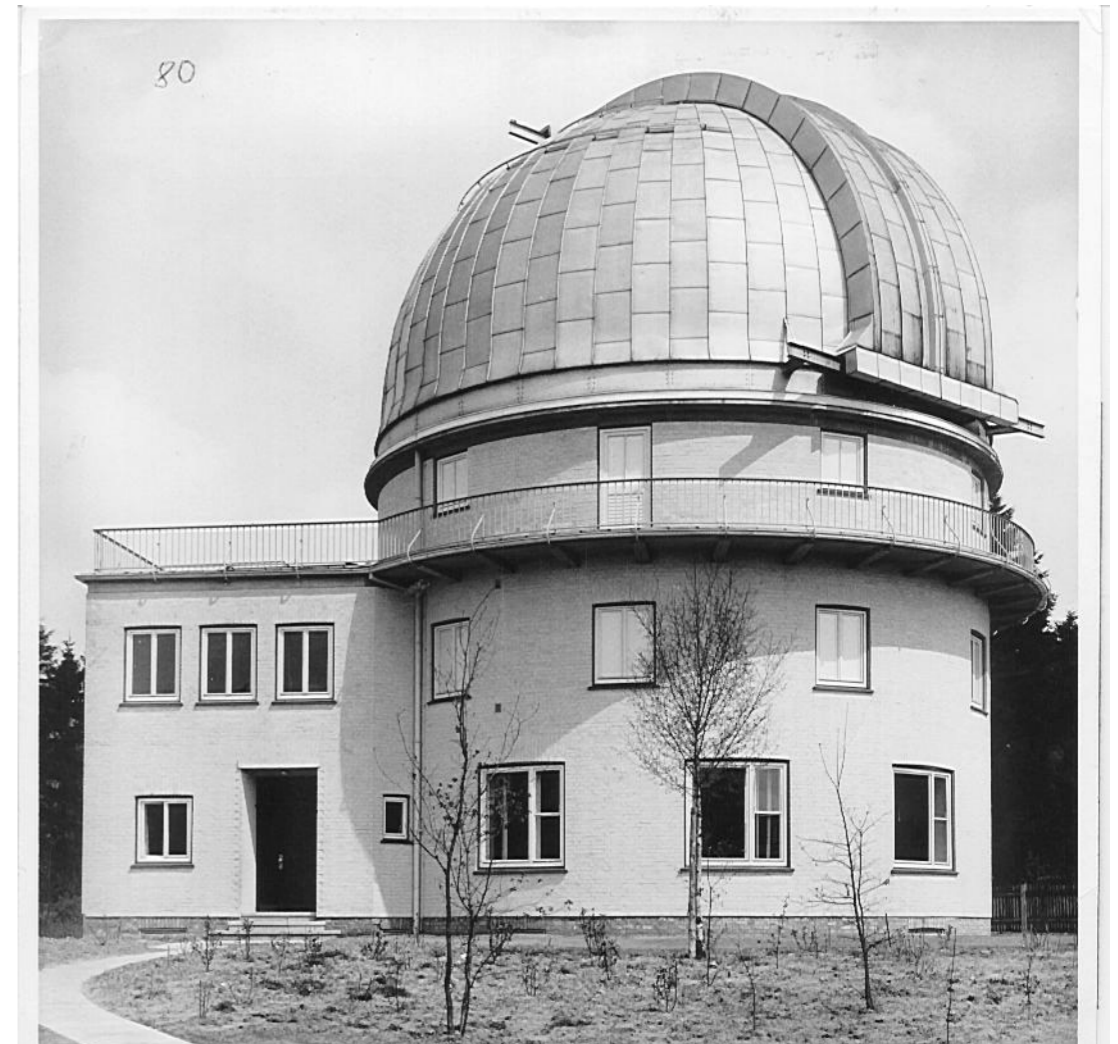
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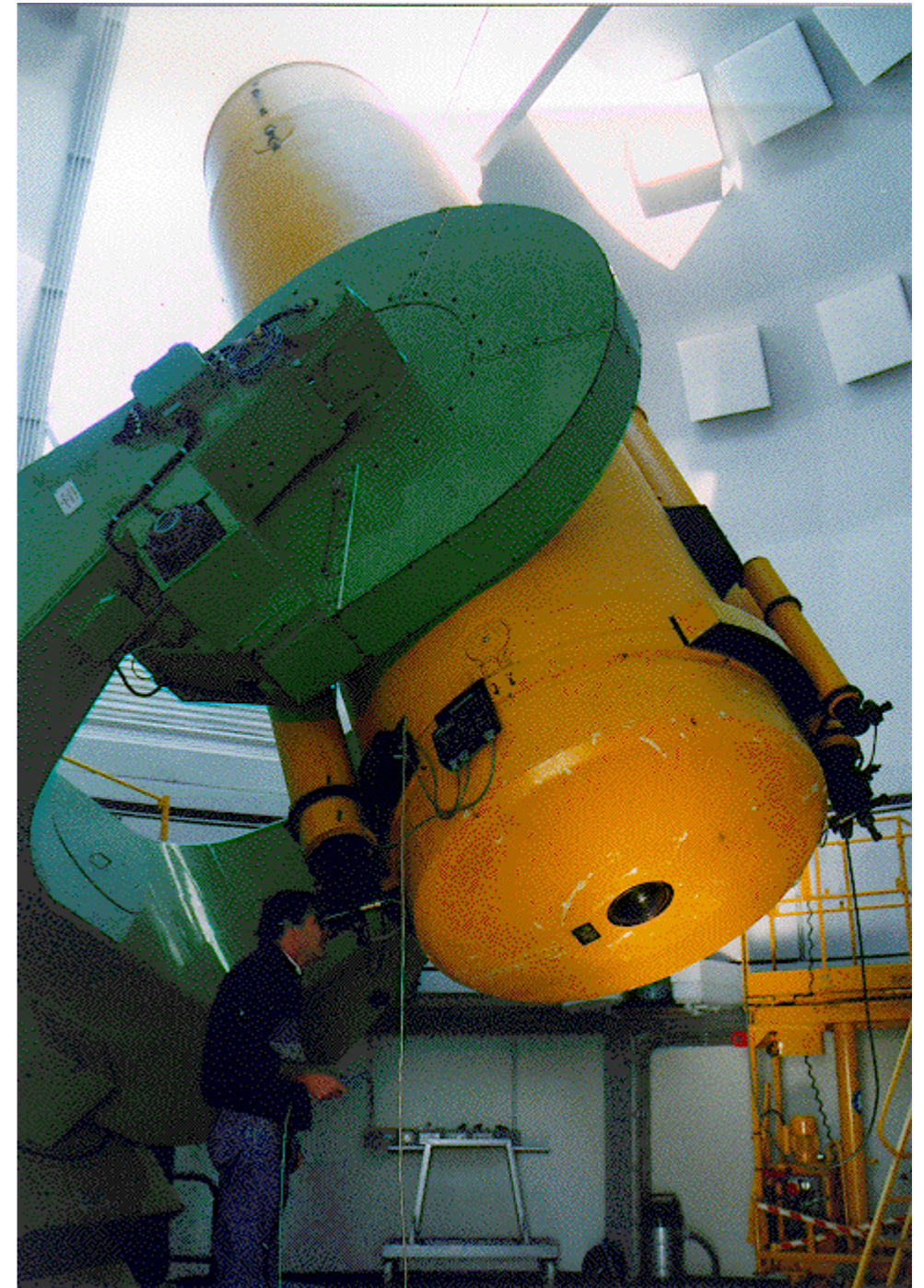
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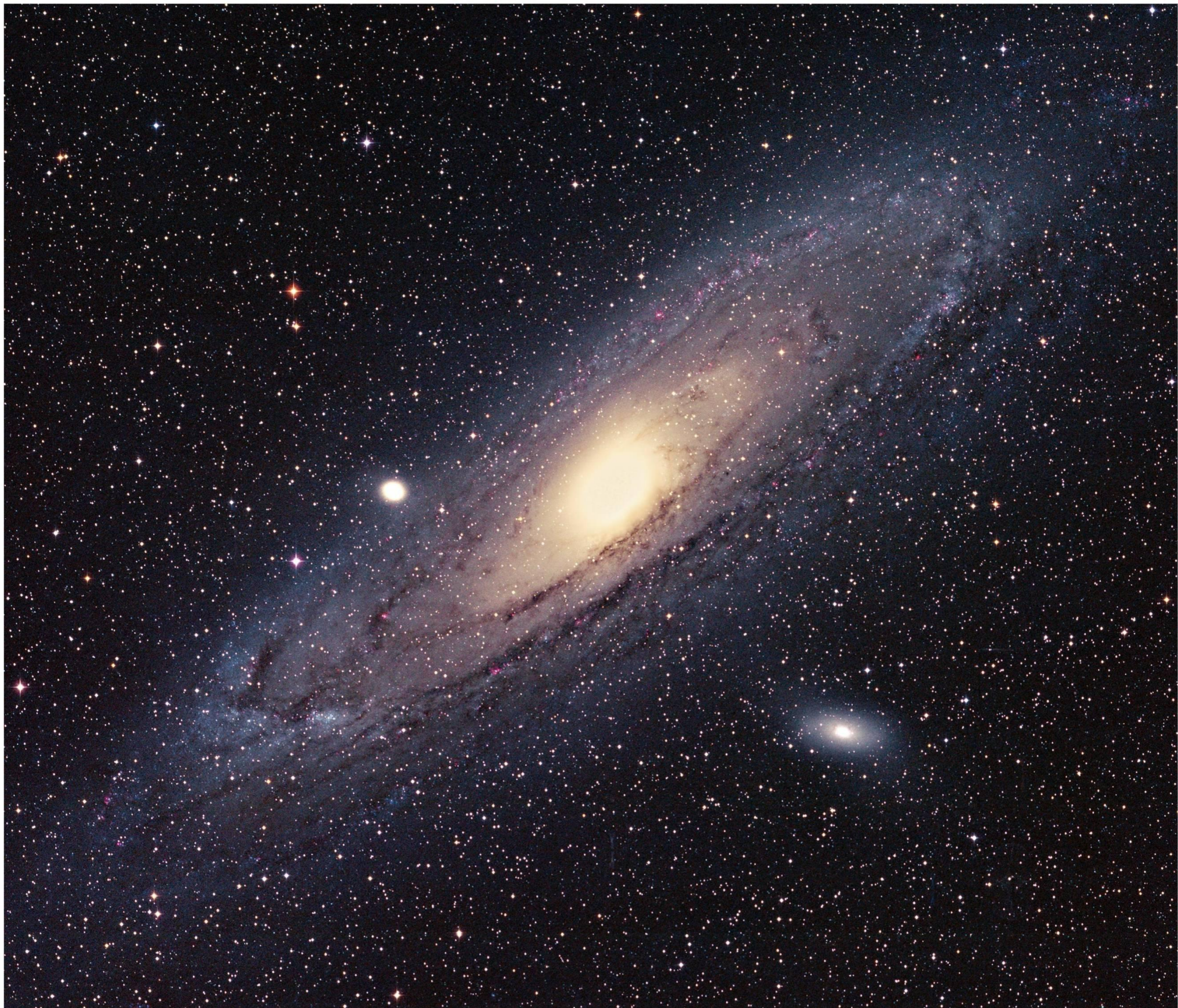
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CAHA Zeiss 0.8 m Schmidt telescope: Current status

- Contract signed with the European Space Agency for research on near-Earth objects**
- ESA contract: 2016, may be extended; and most probably it will be**
- Basic refurbishment for remote/robotic use already done**
- Coarse pointing (arcmins), no fine acquisition procedure, no auto-guiding capabilities**

CAHA Zeiss 0.8 m Schmidt telescope: Current status

- Funds requested for new CCD camera**
- The new camera would imply a complete refurbishment of the focal plane**
- Not compatible with other instruments
(instrument change not possible)**

Remote operation: ESA scripting standard (TSM) already implemented

The image shows two overlapping browser windows. The left window is the login page for ScadaBR, featuring a menu bar (Archivo, Editar, Ver, Historial, Marcadores, Herramientas, Ayuda), a browser tab, and a URL bar pointing to schmidt2.caha.es:8080/ScadaBR/login.htm. The main content area includes the 'SCaDaBR' logo, the text 'powered by Serotonin's Mango M2M', and a login form with fields for 'ID de Usuario' and 'Contraseña', an 'Iniciar Sesión' button, and a Firefox 38 compatibility warning.

The right window displays the 'Schmidt telescope control' interface. It has a browser tab and a URL bar pointing to schmidt2.caha.es:8080/ScadaBR/views.shtm. The interface includes a search bar, a 'Vistas gráficas' dropdown menu, and a main control area with a light green background. This area is divided into several sections:

- Time and Position Data:** A grid of six digital displays showing ST: 07:23:15, UT: 15:41:32, RA: 07:22:38, DEC: 90:13:03, HA: 00:00:38, T. Az: 195, T. Elv: 37, and DOME Az: 357.9.
- Control Buttons:** A row of seven control elements: 'Hydraulic', 'Drivers', 'Handset', 'Tracking', 'DOME Auto', 'DOME Slit', and 'DOME Light'. Each has a green indicator light and an 'ON' button. 'DOME Slit' has 'OPEN' and 'CLOSE' buttons. 'DOME Light' has 'FAINER' and 'BRIGHTER' buttons.

Current CCD versus next model

	Current CCD ST-8 (provisional)	Proposed: IKON-LBV (Andor)
Field of view	20 x 13 arcmin (0.78 arcsec/px)	40 x 40 arcmin (1.16 arcsec/px)
Readout noise	15 e-	2.9 e-
Quantum efficacy	65 %	95 %
Readout time	20 sec	Less than 1 second
Cooling	Peltier to -20 °C	Peltier to -100 °C
Fringing supression technology	No	Yes
Dark current	1 e/s	0.0004 e/s

CAHA Zeiss 0.8 m Schmidt telescope availability

- ESA commitment to be renewed (or not) towards the end of 2016
- Cost: 440 €/night (VAT included): 126 000 €/yr (some 80 nights reserved for maintenance tasks)
- That includes technical support, but not astronomical support (operation): observers should be provided, or payed for
- Control system refurbishment, if needed, should be funded, too