



The Antola Public Observatory: a newborn European facility

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Abstract. Since this summer the Natural Park of Antola hosts an Astronomical Observatory. The Observatory hosts a meeting room for 50 people, a 6-mt dome digital planetarium and an 80 cm RC alt-az telescope. The telescope is equipped with a full set of eyepieces, a SBIG 11 Mpixel CCD camera and a fiber-fed high resolution FLECHAS spectrograph. We describe in this paper the main characteristics on this newborn Observatory as well as its plan for operations.

Keywords : telescope: robotic – outreach: education

1. Introduction

In the last decade the local authorities governing the “Parco Naturale Regionale dell'Antola” have been nursing the idea of adding an additional cultural offer for the visitors of the area, beside the already consolidated offers in the areas of sports, trekking, naturalistic sciences and gastronomy.

The Area of the Park, due to the low level of human settlements, is known to have very dark spots, used by amateur astronomers for star gazing camps and observing meetings. Among these spots the site called “Casa del Romano” has the additional advantages of a paved road connection to major roads and of the on-site lodging possibility in the form of small rural hotels.

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Although the first “white papers” and the first Memoranda of understanding dates back to the early 2000, it is in 2005 when the first important financial support was made available to start the construction activities. Since 2005 further funding, up to about 2 M, allowed to complete the building, purchase the instrumentation and finally start the Observatory operation.

The Observatory has been officially inaugurated by the President of Regione Liguria Mr. Claudio Burlando on September 10, 2011 and is since then in operation.



Figure 1. The Antola Observatory.

2. The building

The Observatory building has been built in a natural protected area and it has been given all possible ecological considerations during all phases of design and realization.

The building is embedded in the mountain with a grass roof ideally continuing the original mountain profile. It is characterized by curved lines and smooth colors in harmony with the landscape. Environment friendly solutions, such as the collection and piping of rain water into the waste water system, have been implemented in order to reduce to a minimum the environmental and aesthetical impact of the construction.

Inside such a natural shell the Observatory provides an ultimate high-tech environment with fast Internet radio-link, multimedia screens, and anything of possible interest for the modern professional or amateur astronomer.

The internal configuration of Antola Observatory is shown in Fig. 2. On the left-hand side we find the offices, the Optics Laboratory and the employees rooms and facilities. On the right-hand side we find the conference room and the planetarium. The area of the Telescope (lower part of the figure) is a multi-storey area occupied

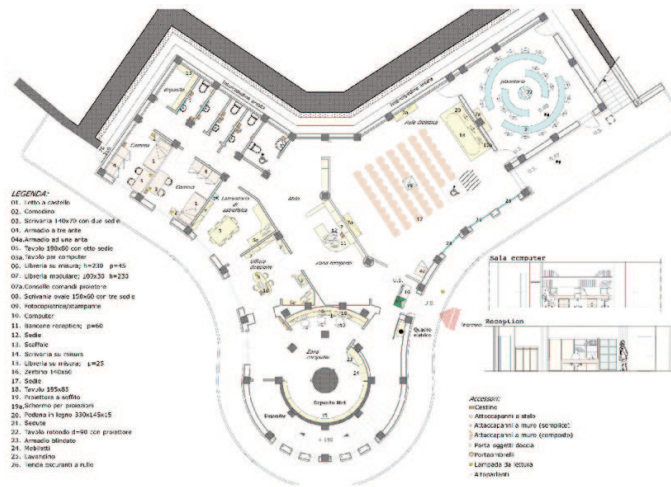


Figure 2. Internal configuration of the Antola Observatory and Planetarium area.



Figure 3. The Antola Observatory Conference Hall.

below by a multimedia library and in the upper levels by the telescope and the control room.

The Observatory areas are decorated with full-size images of celestial bodies and an embedded multimedia touch-screen for a full-immersion experience in astronomy. A few snapshots of the building interiors are shown in Fig.3.

3. The planetarium

The Observatory building hosts a Planetarium. The Planetarium hall has a projection dome of 6-mt and 20 seats capacity. The environment is decorated with full-size

images of nebulae and other deep sky objects. This is in order to create a convenient atmosphere for the lectures that are given using the instrument.

The instrument, procured from Columbia Optics, is a digital projecting Planetarium Vplanistar VP3 HR 1080 with 5 arcmin resolution. Vplanistar proprietary software and Stellarium are installed in the system allowing customization of the multimedia content to the specific need of the lecturer or operator.

4. The telescope

The Telescope Installed at Antola Observatory is an ASTELCO T0800-01 (Fig.4). It is a 80-cm diameter Ritchey-Chrétien telescope in alt-az mount with 2 active Nasmyth foci. This type of telescope is rooted in the very positive experience of Bootes-IR installed at Observatorio de Sierra Nevada (Castro-Tirado et al. 2006), and in its ancestors REM in la Silla (Zerbi et al. 2004) and TROBAR in Aras de los Olmos (Fabregat et al. 2005).

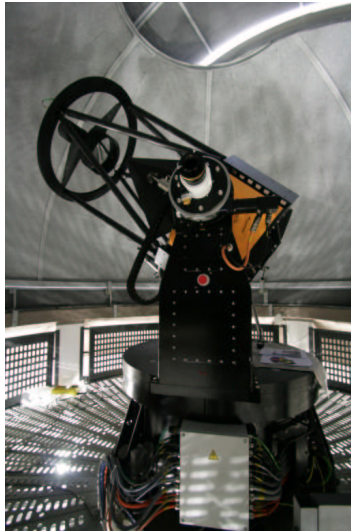


Figure 4. The Antola T0800-01 installed in the dome.

The telescope has an F/2.5 primary mirror made of Shott Zerodur (85 mm height) and is coated with Al + MgF₂; the reflectivity is R>95%. The system aperture is F/8 and the corrected unvignetted field of view is 45 arcmin diameter.

The telescope structure is very compact and light. The use of modern materials such as carbon fiber allows to obtain the required stiffness, also in fast motion, without increasing the weight.



Figure 5. The full moon easily fits in the corrected FoV of Antola Telescope (Courtesy M. Dietzel).



Figure 6. The Antola Observatory instrumentation. On the left the set of eyepieces, in the center the SBIG camera and the filters, on the right the FLECHAS fiber-fed spectrograph.

The telescope slews with speeds up to $20^\circ/\text{sec}$ and accelerations up to $2^\circ/\text{sec}^2$. The pointing accuracy (with a pointing model established) is <10 arcsec RMS. The tracking accuracy is <1 arcsec over 30 min. The focus is done with secondary mirror axial movement.

The toggling between Nasmyth A and Nasmyth B is obtained operating manually the rotation of the tertiary mirror. The mechanism is actuated from behind the primary mirror. One of Nasmyth foci is equipped with a motorized field de-rotator. This additional axis is governed by the Telescope Software and is considered in the pointing model construction.

The electronic cabinet of the T0800-1 is based on standard commercial components and is controlled by ASTELCO proprietary low-level control software running on a Linux-based industrial PC. The high level control software is the renowned AsTe-

IOS software from Tau-Tech running on a dedicated Linux-based workstation. The Observatory dome is also governed by AsTelIOS.

5. Instrumentation

The First Light Instrumentation for the Antola Telescope responds to the goals of the observatory, i.e. outreach, education and limited science. The telescope is equipped with a SBIG 11 Mpx camera Peltier cooled with 2 inches eyepiece interface. The camera is operated locally or remotely using the commercial software MAXIM-DL. The Camera has 2 5-positions filter wheels, one used for astrophotography (RGB-Luminescence) and the second for photometry (UBVR Johnson filters).

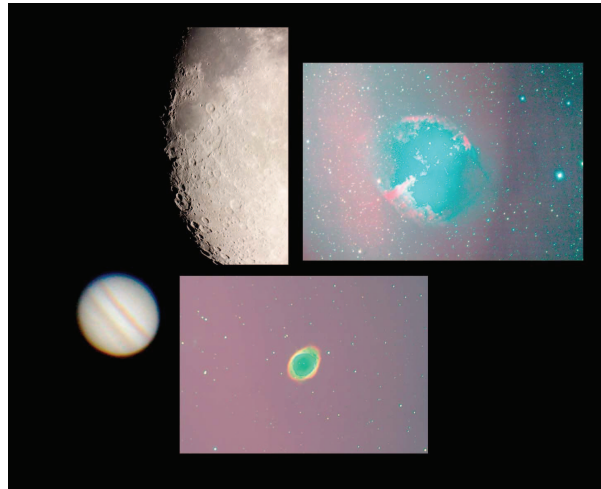


Figure 7. A few First-light Images of the Antola Telescope.

The Observatory is also equipped with a fiber-fed FLECHAS Spectrograph. FLECHAS is a simple echelle cross-dispersed high resolution ($R=30000$) spectrograph. The spectrograph consists in a standalone unit, located in the telescope control room and connected via 15 mt of optical fiber with the injection head on the telescope. The injection head interfaces with the telescope through the 2-inches eyepiece interface. The Head carries onboard a small adapted webcam for focusing and star centering. It also carries onboard a ThAr lamp that can be switched on to collect wavelength calibration spectra.

Last but not least the Telescope is equipped with a complete set of eyepieces from 10 to 56-mm focal length for direct observation at the eyepiece stand of the telescope. The instrumentation set of Antola Telescope is shown in Fig. 6.

6. Observatory current operation plan

The Observatory is currently undergoing a phase of certification to allow public access to the building. This phase is expected to last a few weeks. Soon after having obtained the green light from the authorities the Antola Observatory will enter the operation phase.

The Observatory is conceived to serve as a public observatory for outreach, education, science and amusement. The Antola Park authorities are currently setting up the required committees to optimize the distribution of telescope time between the above categories according to proposal merits.

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