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ATA50 TELESCOPE: HARDWARE

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RESUMEN

El telescopio ATA50 es un nuevo telescopio de 50cm de diámetro con óptica RC. Fue apoyado por el Proyecto de Investigación Científica de la Universidad de Atatürk (2010) y establecido a 2000 m.s.n.m. en Erzurum, Turquía en 2012. Las observaciones empezaron en 2013 bajo la dirección y control de el centro de aplicaciones e investigaciónes astrofísicas de la Universidad de Atatürk (ATASAM). Las propiedades técnicas e infraestructuras del Telescopio ATA50 son presentadas y al igual que el trabajo en la automatización robótica del telescopio tanto en hardware como software para ser un candidato disponible para redes de telescopios nacionales e internacionales.

ABSTRACT

ATA50 Telescope is a new telescope with RC optics and 50 cm diameter. It was supported by Atatürk University Scientific Research Project (2010) and established at about 2000 meters altitude in city of Erzurum in Turkey last year. The observations were started a few months ago under the direction and control of Atatürk University Astrophysics Research and Application Center (ATASAM). The technical properties and infrastructures of ATA50 Telescope are presented and we have been working on the robotic automation of the telescope as hardware and software in order to be a ready-on-demand candidate for both national and international telescope networks.

Key Words: instrumentation: miscellaneous — telescopes

1. ATA50 TELESCOPE:

Alluna RC 20 (Germany):

- Ritchey-Chretien 20 Inch
- Mirror Diameter M1: 510 mm
- Focal Length: 4175 mm - f8.1
- Photographic Field: 65 mm = 54”
- Total Weight: OTA with optics 79 kg
- CNC Carbon Truss - Material: Carbon - Glass: Pyrex
- Fan: 3 pieces
- Output Port: M100
- Secondary mirror focusing
- Aperture M1: f3 concave hyperbolic
- Standard Coating: Aluminum 94%
- Second Mirror Diameter: 185 mm - convex hyperbolic
- M2 Standard coating: Aluminum 94%
- 4” Field Flattener Corrector AFFC

ASA Direct Drive Mount DDM160 (Austuria):

- Software: Autoslew (Philipp Keller)
- Diameter of the axis RA/DEC 160 mm hollow axle
- Weight without counterweight-shaft: 220 kg
- Loading capacity (only instrument): 300 kg
- Drive High torque motors in RA and DEC
- Direct Drive without gear
- Operating voltage 24 V $<$ 40 A (1-3 A/Tracking)
- Pointing: $<$ 8” RMS with pointing file
- Tracking precision: $<$ 0.25” RMS in 5 minutes
- Encoder resolution: 0.007” on the axis
- Moving speed: 13°/sec USB Ports, power and data link sockets on the mount plate, GPS
- Homing Parking position, re-positioning after power outage
- Manual specifiable safety limits
- Tested interfaces to Maxim DL, Auto-focus, The Sky, ASCOM, ACP, Autopilot

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2. LOCATION:

N: 39 54 11.01 - E: 41 14 38.00 - Altitude: 1856 m Atatürk University, Astrophysics Research and Application Center (ATASAM), Campus, 25240 Erzurum, Turkey. `http://ata50.atauni.edu.tr/`

3. ENCLOSURE AND METEO SYSTEM:



Fig. 1. Movable Enclosure

- Opening time: 35sec
- Remote control
- Total Weight: 300 kg (without balance weights)
- Steel Profile - polycarbone coating
- Motor: 1.1 kW (3-phase)
- Designed by Ast. Yaşar Yildiran, 2010 (Fig. 1)
- Meteo: DAVIS Vantage Pro2 and Meteosat

4. ELECTRICITY - NETWORK - COMPUTER:

- UPS: Inform 20 kVA (3-Phase)
- Network Switch: H3C S5120-24P-EI
- 10/100/1,000 M electrical ports
- (4 Gigabit SFP Combo ports)
- Speed: 200 Mbits (Wlan) - 70 Mbits (Wireless)
- Network Connection 1 Gbits Fiber and 70 Mbits Wireless
- Remote control (Teamviewer, VNC, etc.)
- Computer: Dell Optiplex 990 - i7, 500 GB HD, 4 GB Ram
- Data Storage: Synology DS1812, 24 TB, RAID1
- 194.48 MB/sec Writing, 202.20 MB/sec Reading
- SuperSpeed USB 3.0

5. CCD AND FILTER WHEEL:

Apogee Alta U230:

- 2048x2048 array, 15x15 micron pixels
- 16-bit digitization at 700kHz - 12 bits at 2 MHz
- 32 Mbyte camera memory
- USB 2.0 interface: no plug in cards
- Programmable cooling: 65-70°C below ambient
- Binning up to 8 Horizontal x 2048 Vertical
- Sub-array readout and fast sequencing modes
- Programmable fan speed for low/zero vibration
- Two serial port outputs for control of peripheral devices
- External triggering and strobe controls
- ActiveX drivers included with every system
- Field upgradeable firmware and fused silica windows
- Single 12 V supply with input voltage monitor

FLI CFW-3-12:

- Twelve position color filter wheel
- Camera Coupling Pocket: 2.930”
- Telescope Coupling: 2.005”
- Filter Cup Depth: 205” - Filter Cup Diameter: 2.005”
- Internal Wheel Material: Aluminum, O-Ring Thickness: 0.10”
- Standard Cable Length: 15’ - Path Increase: 0.610”
- Power Supply Output: 12 V DC, 1000 mA
- Weight: 6.8 Ibs.
- PC Interface: USB
- Filter diameter: 50 mm, Thickness range: 3 mm - 5 mm
- Filter wheels software controlled
- Hall Effect motor - Drive type: chain
- Path increase with FLI Camera 0.5345

6. TEST OBSERVATION:

We obtained test observation with ATA50 as shown in Figure 2.

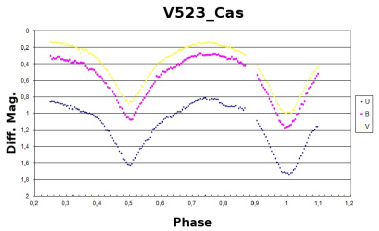

Fig. 2. Sample Observation with ATA50

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