RECENT DEVELOPMENTS AT ISTANBUL UNIVERSITY OBSERVATORY

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Istanbul University Observatory and Science Faculty, Astronomy and Space Sciences Department has been making important renovations to existing capabilities. Specifically, thanks to funding from the Turkish Republic Ministry of Development and Istanbul University we are in the process of establishing a focal plane instrumentation laboratory, in which it will be possible to test and characterize camera and related filter systems in the UV-Optical and NIR wavelength regime. Here we introduce the planned projects in collaboration with the Istanbul University Physics Department Nano-Optoeletronics laboratory. With funding from Istanbul University, we have also made a significant improvement to the 40 cm and 60 cm telescopes located in Beyazıt Istanbul and Ulupinar Observatory, Canakkale, respectively. We present the results of first light test observations of the new Andor iXon 888 CCD camera and its characteristics. We also introduce the effort to robotize the telescope and related possible science topics.

IST60 Telescope

IST60 is the 60 cm telescope of Istanbul University located at Canakkale Onsekiz Mart University Ulupınar Observatory. Combined support from Istanbul University and the Ministry of Development allowed us to undertake a major project involving the robotization of IST60 telescope and significantly improving its observing capability.

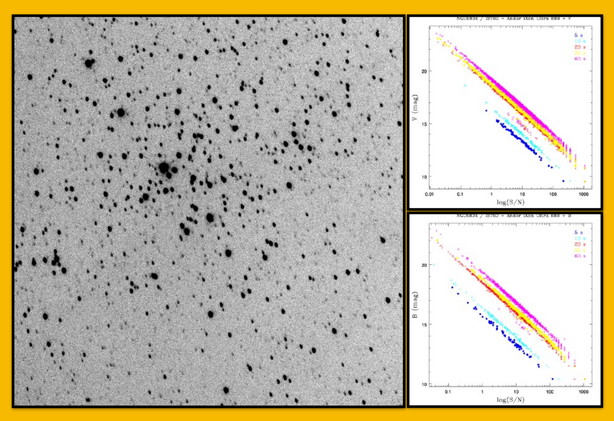
As a first attempt we setup a completely in-house developed system, which allowed us to remotely control the dome, the telescope and all the related accessories in a way that it became possible to perform observations in Canakkale from Istanbul.

Furthermore we were able to obtain a state-of-the-art Andor iXon Ultra 888 EMCCD which is expected to significantly increase the scientific capability of the telescope a lot. Initial observational results with this CCD are given below.



Further cleaning of the mirrors, refinement of the focusing system and a new pointing model will be done in a few weeks. These additional efforts are expected to further increase the

We are also now working on completely robotizing the telescope, dome and data acquisition system. These works are expected to end by the end of this year. The final system will allow us to perform observations locally and manually from Canakkale or manually from Istanbul or in a completely autonomous way.



A V band image of Galactic open cluster NGC 6834 obtained with ANDOR iXon Ultra 888 EMCCD with a 30s exposure time. The panels to the right show the reached signal to noise ratio for a range of magnitudes as a function of different exposure times.

IST40 & IST8 Telescopes



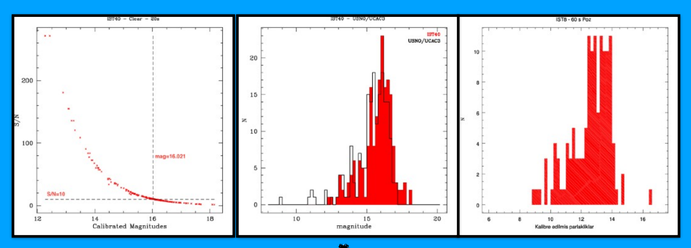
Support from an Istanbul University project allowed us to equip the 40 cm telescope located at the Department of Astronomy and Space Sciences building in Beyazıt İstanbul, with modern CCDs and a new smaller but wide field reflector.





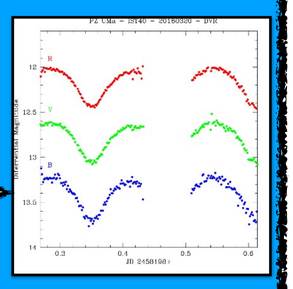
With these new instruments and a full upgrade of the dome automation system it is now possible to perform remote observations with IST40 and even perform scientific grade observations within the center of Istanbul.

This telescope has been started to be used in all sorts of public events that the Istanbul University Observatory and/or Astronomy and Space Sciences Department is organizing. It is now also possible to use these equipments for undergraduate and graduate classes.



New instruments allow us to reach up to 16th magnitudes, without filter, with the 40 cm and roughly 13th magnitude with the 8 cm telescope.

Optical lightcurves of PZ UMa obtained with IST40 in B, V, and R filters, which is an eclipsing binary. Eclipses can be easily seen in all the plots showing the stability of the atmospheric conditions.

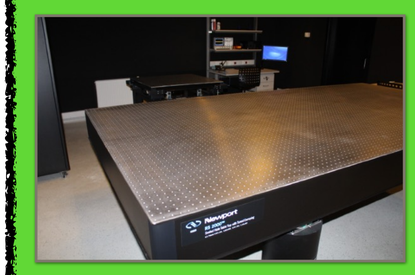


DAG-ODA Project Focal Plane Instrumentation Characterization Laboratory

In 2016, we started a project funded by the Republic of Turkey Ministry of Development, with a total budget of 2.190.000 TL, to establish a laboratory for astronomical and general purpose camera, detector systems and other optical elements characterization.

So far, optical tables, full set of electronics equipment, a 3D printer, an Andor iXon EMCCD, and oscilloscope and several other items have been bought, setup and ready to be used. A special pressurized air conditioning system for the optical part of the lab. has been established. In addition to these, through Istanbul University Observatory, Istanbul University Rectorate provided all the furniture, office computers and all the other necessary infrastructure.

By the end of 2018, all the necessary optical equipments will be purchased which will allow us to scan through 300 - 2500 nm for efficiency, characterization tests of various kinds of detectors as well as optical elements like filters,





lenses etc. as a function of wavelength. This will be the first time that the Istanbul University Astronomy and Space Sciences department will have a fully professional laboratory for such purposes.

In 2019, we will make another purchase to establish a data archive and processing unit including a 48 core processor and 2 Tesla GPUs and roughly 20 TB of storage, which will be added to our existing 25 TB of storage.

Some of our projects :

- Preparation of a camera for astronomical use in the J band, via a collaboration with Istanbul University Physics Department Nano-Opto Electronics Laboratory.
- Preparation of a microwave kinetic inductance detector based instrument to DAG 4m telescope in collaboration with University of California Santa Barbara and Durham University.
- Robotization and automation of all Istanbul University Telescopes including IST60 located in Canakkale.

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