TÜBİTAK National Observatory (TUG)



OBSERVATIONS, CONTRIBUTIONS AND A NEW FOLLOW-UP SOFTWARE AT TUG



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Outline



- Site Location
- Telescopes and Instruments
- Observations
- A New long-term project
- A New Follow-Up Software
- Discussion
- Conclusions

Site Location



[A84]





30°19'59.9"E, 36°49'31.0"N

<u>Seeing</u>: 1.57 "±0.39 <u>Elev.</u>: 2500 m. <u>210 Clear Nights/Year</u>





The three TUG telescopes have been dedicated to Gaia target of opportunity (ToO) observations in a limited observing time since the first test stages.

The used observational quota status of Gaia alerts with TUG telescopes during 10 months in 2015 are the follows: 10% of RTT150, 16% of T100 and 0% of T60. The rest time will be used until the end of the year.



•RTT150, Russian - Turkish Telescope



PROTOCOL: TÜBİTAK, Kazan Federal University, Russian Space Research Institute

- 150 cm aperture, RC telescope
- f/7.7 and f/48

CCD Cameras

TFOSC CCD (2048x2048, 15 μ)

Time allocation to follow-up Gaia ToO 5 days/year

Andor DW436 (2048x2048, 13.5 μ)

Andor iXon EM CCD (1024x1024, 13 μ)

Spectrographs

TFOSC Coude DEFPOS



•T100 Fully Automatic & Remote Control Telescope



- 100 cm aperture, f/10, RC telescope.
- SI 4Kx4K, `Cryo-cooling` CCD
- large FOV (21.5'x21.5')
- 0.31"/pixel
- UBVRI, SDSS and narrow band filters
- Installed in Sep. 2009



Time allocation to follow-up Gaia ToO 80 hours/year





•T60 Fully Robotic Telescope



- 60 cm aperture, f/10, RC, robotic telescope.
- FLI Proline 2Kx2K CCD, UBVRI, SDSS and narrow band filters
- FOV: 17.5'x17.5'

- 0.51"/pixel
- Installed in Sep., 2010.
- Mount Speed: RA: 11.1 deg/sec, Dec: 8 deg/sec.









•ROTSE – IIID Fully Robotic Telescope



- 45 cm aperture, f/1.80
- 2Kx2K CCD, no filter
- large FOV (2.5° x 2.5°)
- Four telescopes in ROTSE network. (Australia, Africa, Turkey, USA)
- Dedicated to observations transients in optical window.

PROTOCOL: TÜBİTAK, Michigan University The pilot observations will begin in 2016.





Observations so far





http://gsaweb.ast.cam.ac.uk/followup/observatories

ASASSN-14ae

2014J

Observations so far



It has been taken the total photometric observations of 181 frames (the ratio of about 1% of all Gaia images) at TUG since the first observation was Asassn13dd in Oct. 2013.

It was observed the total number of 17 objects.

Projects in TUG



An aim of a project newly proposed to T100 telescope is time-resolved observations of Cataclismic Variables (CVs) detected from Gaia alerts ToO observations.

This project is a scheduled project totally independent of reserved time of Gaia ToO observations.

Projects in TUG



Time-resolved observations of cataclysmic variables of Gaia objects

Determining the orbital and superhump periods of selected Gaia objects

There are initially 4 candidate cataclysmic variables of Gaia alerts 15aeo, 15adf, 14aat and 14adk according to the object visibility

Project was proposed by Hasan H. Esenoglu for T100 telescope and the link for cooperation

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One of the most important developments in TUG is a new follow-up software.

The software has been used officially at T60 telescope since June, 2014.

It listens NASA's Atlas server where GRB alerts are collected. Alerts are automatically taken from this server and prepared for observation appropriately by the new software in a relatively short time.

This software can be easily adapted to a server running for Gaia alerts if there is a similar server and format for listening of them.

A New GRB Follow-Up Software



• Software Architecture: TCS-TALON, formerly OCAAS.

The missing part in TALON: No modul (daemon) for Follow-Up.

Dindar et al, "A new software on TUG-T60 autonomous telescope for astronomical transient events", Experimental Astronomy, 2015.



A New GRB Follow-Up Software



• Samples: DSS image T60 image GRB

GRB	Publication	T-GRB	Magnitude	Comments
*141225A	GCN17240	129 s	17.04	Succeeded
V404 Cygni	-	88s	-	Succeeded
150626B	-	90 s	> 17.5	Out of limits of magnitude
150619A	-	125 s	-	Bad weather conditions: Cloudiness

*E. Sonbas et al, "GRB 141225A: very early T60 observations", http://gcn.gsfc.nasa.gov/gcn3/17240.gcn3

First GRB 141225A*

Future Works



- The software is ready for Gaia alerts if it is required.
- Publishing the alerts to other telescopes at TUG Site.
- The software can be run optional at RTT150 and T100 telescopes.



Conclusions



- A new long-term project accepted
- Test observations are starting in 2016 for ROTSEIIId
- A New Follow-Up System for TUG telescopes
- The software can run for Gaia alerts of all TUG telescopes



TUG



THANK YOU

