Observations of Gaia Alerts by using Serbian-Bulgarian mini-network telescopes during 2016

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Introduction

- At Sept.2016 the Gaia DR1 appeared, 2.5 years after starting of the ESA space astrometry mission or Gaia satellite (at December 2013).

- ~1.14 billon stars and 2 057 050 with 5-parameters data. Gaia celestial reference frame - Gaia CRF in the future (QSOs based one).

- About 1000 Gaia Alerts (by the Gaia Science Alerts group) during 2.5 years. Serbian-Bulgarian Mini-network telescopes was established and ~30 objects were observed.

Mini-network (now 6 telescopes):

- 60cm and 1.4m tel. of Astronomical Station Vidojevica - ASV of Astronomical Observatory in Belgrade - AOB (Serbia),
- 2m, 60cm and 50/70cm Schmidt-camera at Rozhen Obs., National Astronomical Observatory (NAO) of Bulgarian Academy of Sciences (BAS),
- 60cm Belogradchik AO (Bulgaria).

+ 1.31m ARIES (Aryabhatta Research Institute of observational sciencES, India) tel.

- Johnson UBV and Cousins RI filters.

The instruments:

1) 60 cm Cassegrain (long.=21.5º, lat.=43.1º, h=1136m), CCD Apogee Alta U42, ASV (Serbia),
2) 1.4m (21.6, 43.1, 1143m), CCD Apogee Alta U42, ASV(Serbia),
3) 2m Ritchey-Chrétien (24.7º, 41.7º, 1730m),
CCD VersArray 1300B, Rozhen Obs. (Bulgaria),
4) 60cm Cassegrain (24.7º, 41.7º, 1759m),
CCD FLI PL09000, Rozhen Obs. (Bulgaria),
5) 50/70cm Schmidt-camera (24.7º, 41.7º, 1759m),
CCD FLI PL16803, Rozhen Obs. (Bulgaria),
6) 60cm Cassegrain (22.7º, 43.6º, 650m),
CCD FLI PL09000, Belogradchik (Bulgaria).

1.4m ASV (Serbia), since mid 2016

BELISSIMA project, Ritchey-Chrétien, Nasmyth

Optical observations of Gaia Alerts, Gaia-FUN-TO

2m Rozhen telescope

1) The ASV (D/F=0.6/6m) tel. The CCD Apogee Alta U42: 2048x2048 pixels, pixel size is 13.5x13.5 μm, scale is 0.″465/pixel, FoV=15.8x15.8′.

2) The R.C. (D/F=2/16m) tel. of Rozhen National Astronomical Observatory (NAO) of Bulgarian Academy of Sciences (BAS). The CCD VersArray 1300B: 1340x1300, 20x20μm, 0.″261/px, 5.6x5.6′.

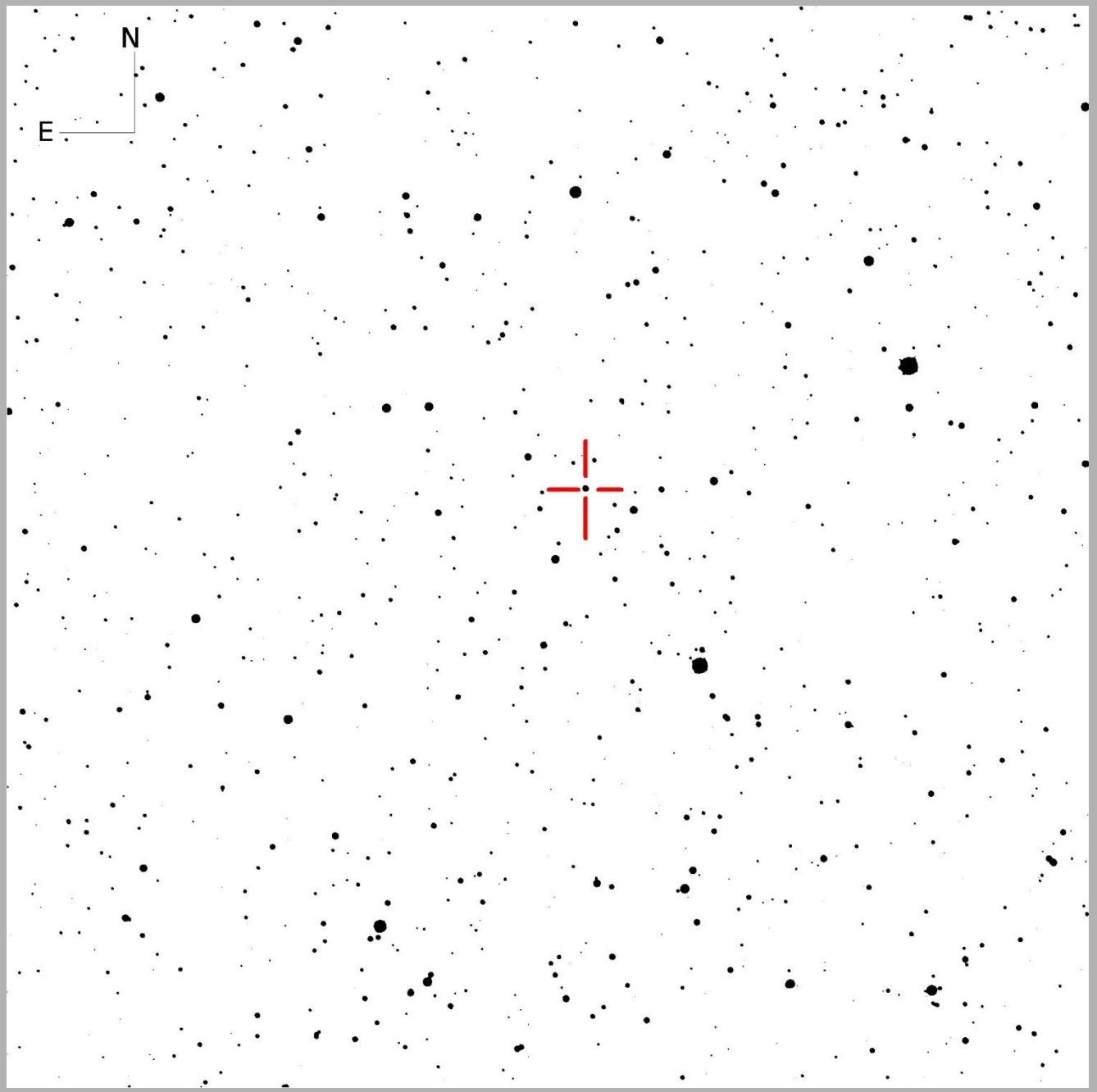
3) The 60cm Rozhen (F=7.5m) tel.
The CCD FLI PL09000: 3056x3056, 12x12µm, 0.″33/pixel, 16.8x16.8‘; under reconstruction.
4) The 50/70cm Schmidt (F=1.72m), Rozhen.
The CCD FLI PL16803: 4096x4096, 9x9µm, 1.″08/pixel, 73.7x73.7' .
5) The 60cm Belogradchik (F=7.5m) tel.
The CCD FLI PL09000: 3056x3056, 12x12µm, 0.″335/pixel, 16.8x16.8'.
6) The 1.4m ASV (F=11.42m) tel.
The CCD Apogee Alta U42: 2048x2048, 13.5x13.5 µm, 0.″243/pixel, 8.3x8.3’, since mid 2016.

1.31m ARIES (Manora Peak, Nainital, India)

ARIES - **A**ryabhatta **R**esearch **I**nstitute of observational scienc**ES**

R.C. Cassegrain (long.=79.6ºE, lat.=29.35ºN, h=2420m), central Himalayan region.
CCD: 2048x2048 pixels, pixel size is 13.5x13.5 μm,
scale is 0.″541/pixel,
FoV=18.5x18.5′.

Gaia16aye, R-filter(Exp.=30s), Nov.1st 2016, 1.4m ASV.



Observed objects (14) during 2016:

- **1.4m ASV**: Gaia16aye(10 times), Gaia16bjf(1), Gaia16bjg(2), Gaia16bjh(1).
- **60cm ASV**: Gaia1ael(1), Gaia16alz(2), Gaia16alf(2), Gaia16aps(1).
- **60cm Belogradchik and 60cm Rozhen**: - .
- **2m Rozhen (FoReRo2):** Gaia16ajq(2), Gaia16aax(1), Gaia16aye(1), Gaia16avf(1), Gaia16avn(1), Gaia16avm(2).
- **50/70cm Schmidt-camera (Rozhen):** Gaia16ael(2), Gaia16aax(1), Gaia16aye(1).

+ 1.31m ARIES (India): Gaia16aye(6); from 21st to 25th Nov.

During 25thOct.2016, Gaia16aye was observed with 3 tel.: 2m Rozhen, Schmidt-camera (Rozhen), and 1.4m ASV.

Conclusions

- The observations of Gaia-FUN-TO in optical domain (with BVRI filters) by using mentioned telescopes and good CCD detectors; the seeing=1.″0 to 3.″5 (~1.″2 at ASV site).
- These telescopes are useful for the photometric observations of Gaia Alerts objects. During 2014-2016 there are: 839 points using 60cm ASV tel., 157 ones with 1.4m ASV (Serbia), 59 at 2m Rozhen, 0 at 60cm Rozhen, 36 at Schmidt-camera (Rozhen), and 19 at 60cm Belogradchik (Bulgaria). Also, 23 points at 1.31m ARIES tel. (India). ~1150
- With calibration (dark, bias, flat, hot/dead pixels, etc.) and stacking of data, it is possible to catch ~20Vmag target by using 2m Rozhen, 1.4m ASV, and 1.31m ARIES tel.,
or until ~19mag with other mentioned instruments.
The exp.time until ~5min.
- Belissima project, 1.4m telescope at ASV site (mid 2016).

Thank you!