Three Neglected Double Stars

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Abstract: Three Neglected Double Star systems were imaged using a relatively small, 4.25 inch telescope and stock DSLR camera for the purpose of identification and measurement. Two were not found at the locations provided in the Washington Double Star (WDS) Catalog. Their positions may have been misplaced or these doubles were superseded by other WDS Catalog entries. A faint "C" component was found near the third neglected double.

Introduction

Three Neglected Doubles Stars were selected for identification and measurement.

Only one was a good match for the double star listed in the Washington Double Star (WDS) neglected double star category.

Two did not match the doubles previously observed during the late 1800's at the locations listed. However, the doubles found were well matched with other doubles stars already identified within the WDS catalog. It appears these two doubles, last observed during the late 1800's, have been either listed at the wrong coordinates or were rediscovered at the same location listed and assigned to a different Discoverer.

Observing List

The WDS neglected double star list was sorted, first by "last" date measured. All doubles that had been measured since 1900 were deleted. The reduced list was sorted again by separation (ρ). All doubles with a listed ρ of less than 4 arc seconds were deleted.

Deep Sky Survey (DSS) images were examined at each "short listed" location using Skytools. Approximately 65% of the "short listed" doubles had stars at the listed locations in the DDS images. Three "positive" DSS finds were selected for imaging based on their position in the sky during the imaging session.

Equipment and Software

XS Canon DSLR Camera

A "stock" un-altered XS Canon DSLR was used to image the three double stars selected. The camera was controlled using Backyard EOS and a laptop Each pair was imaged ten times. Each exposure was for two minutes and was captured at ISO 1600. Images were stacked with ten dark frames recorded the same night at the same camera setting to eliminated "hot" pixels. Imaging stacking was done using Deepskystacker software.

In addition, a "drift" image was recorded for 30 seconds with the equatorial mount stopped and not tracking. This produced star trails in the image that were used to establish the image angle for the camera, telescope and mount configuration.

REDUC

Both the stacked and "drift" images were converted into a Bitmap file format. REDUC was used to measure each star's Position Angle (THETA) and Separation (RHO) using these Bitmap files.

uniMAP

uniMAP was used to "plate solve" each of the three imaged star fields to confirm that the telescope was pointed at the correct location during each imaging session. An example of the plate solving performed by uniMap is provided in Figure 1.

Three Neglected Double Stars

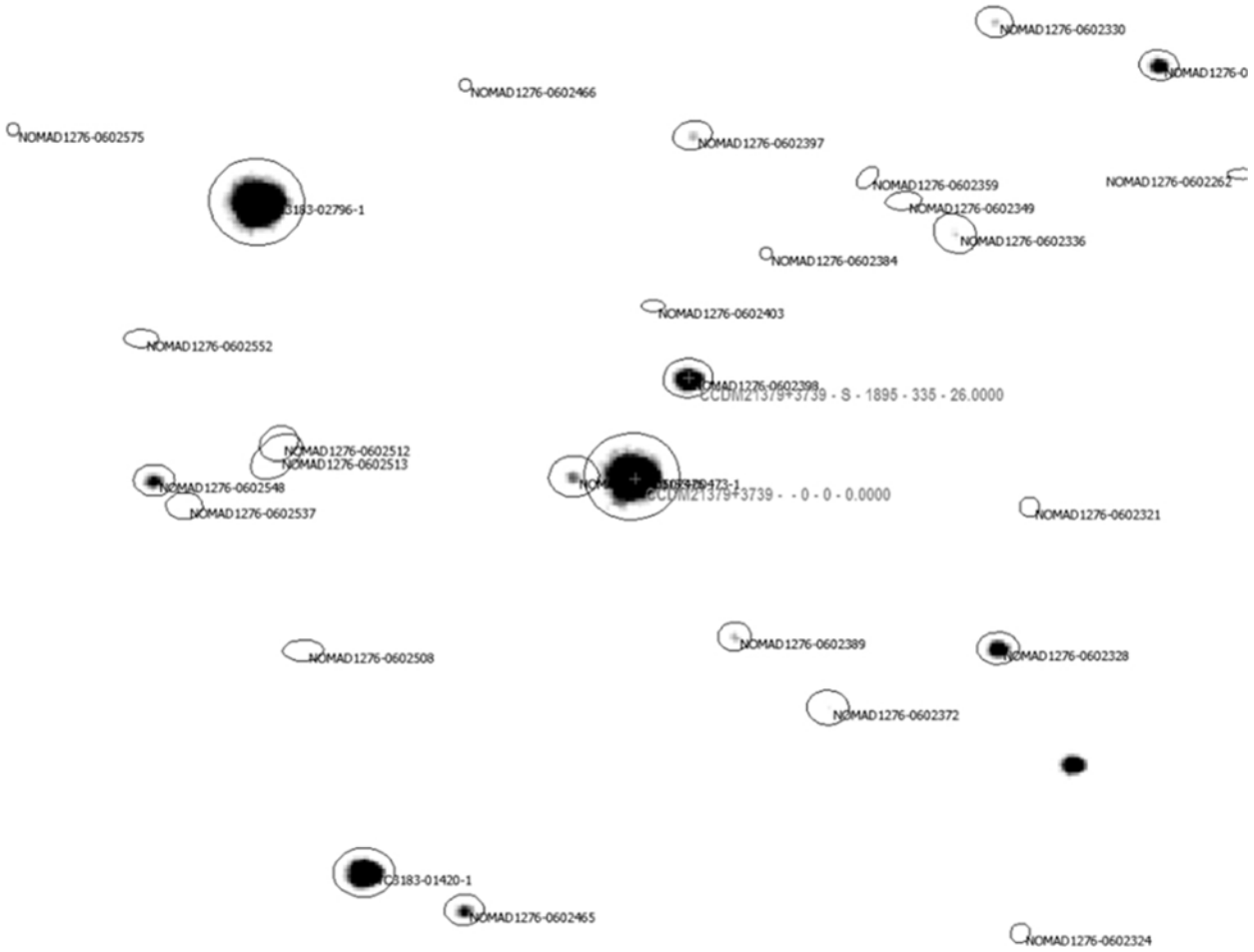

Figure 1. Example of plate solving - inverted black on white screen shot.

4.25" f/28 Schiefspiegler

A relatively small homemade telescope was used, a 4.25" f/28 Schiefspiegler. This telescope was mounted atop an Orion Sirius German Equatorial Mount (GEM) that was control by a laptop using Skytools and ASCOM with an EQMOD software interface.

Guide Scope

A small 50mm guide telescope and an Imaging Source camera were used to guide the mount with PHD software.

Findings and Final Data Records

Lost or Superseded Neglected Double Stars

As mentioned above, two neglected double stars, 20066+3302 SEI879 and 20296+4041 STN 50, were <u>not</u> found at their listed locations.

20066+3302 SEI 879

WDS 20065+3302 GYL 23 was found at the location listed for 20066+3302 SEI879 as shown in Figure 2. SEI879 must have been misplaced or was superseded by GYL 23.

20296+4041 STN 50

WDS 20299+4022 HJ 1525 was found at the location listed for 20296+4041 STN 50 as shown in Figure 3. STN 50 must have been misplaced or was superseded by HJ 1525.

21378+3739 SEI 1527

Even though the Neglected Double Star list shows SEI 1527 was last measured in 1895, the main WDS catalog shows it was re-measured 2007. Our measurements are consistent with the 2007 measurements as shown in Figure 4.

As seen in Figure 4, the minor "B" component of this multiple star system is clearly not within 0.5 magnitude of the major "A" component as estimated in the 1895. It is our opinion that the 2007 listed magnitude is

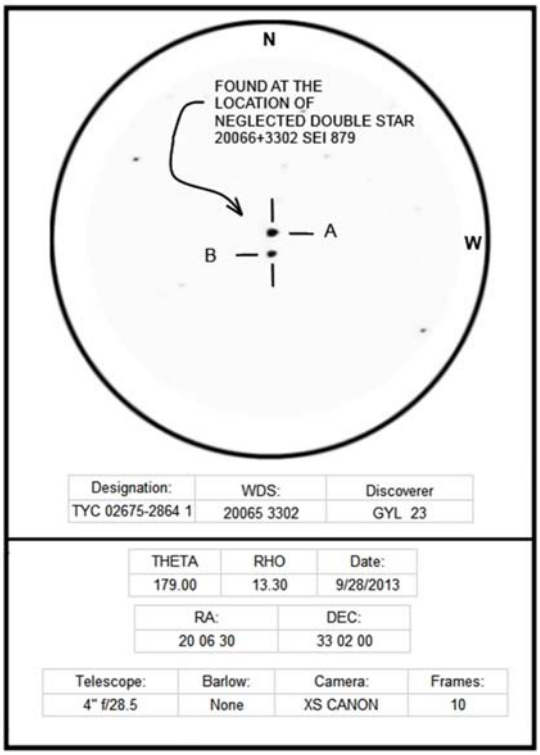

Figure 2. Measurements of WDS 20065+3302.

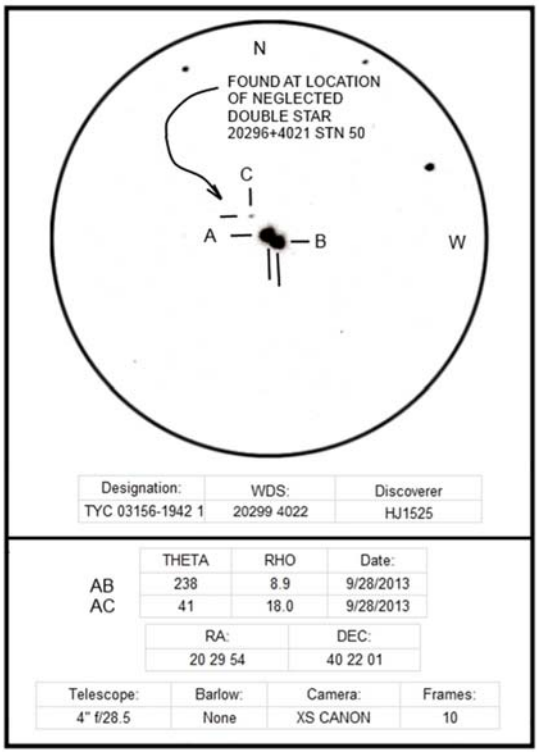

Figure 3. Measurements of WDS 20299+4022.

a better estimate of its brightness. Our measurements of THETA and RHO are very similar to those documented in 2007.

We found a third faint, "C" component, not previously listed in the WDS Catalog. This faint component is not as bright as the 12.7 magnitude "B" component measured in 2007, however, it is clearly visible in the image we captured. The plate solving software labeled this faint star NOMAD 1276060246. The NOMAD data for this star lists it as 13.8 magnitude. It has been labeled "C" in Figure 4. Component "C" THETA and RHO measurements are also provided in Figure 4.

Tabular Summary

Table 1 (following page) provides a summary of the measurements made related to the three (3) Neglected Doubles discussed above.

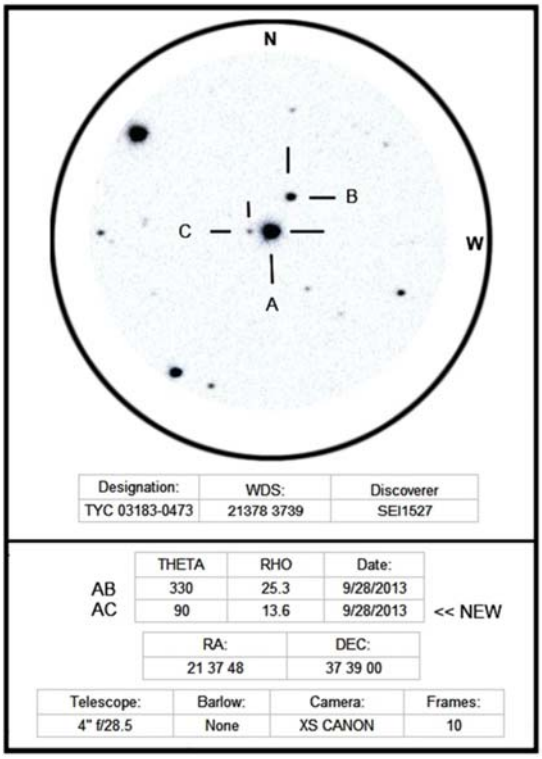

Figure 4. Measurements of WDS 21378+3739.

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Table 1 - Summary of Three (3) Neglected Double Stars Observations

RA+DEC	Discoverer	THETA	RHO	Date	RA	DEC	N	Remarks
20065+3302	GYL 23	179	13.3	2013.741	20 06 30	33 02 00	1	NOT SEI879
20299+4022	HJ1525AB	238	8.9	2013.741	20 29 54	40 22 01	1	NOT STN 50
20299+4022	HJ1525AC	41	18.0	2013.741	20 29 54	40 22 01	1	NOT STN 50
21378+3739	SEI1527	330	25.3	2013.741	21 37 48	37 39 00	1	AB COMPONENTS
21378+3739	<NEW>	90	13.6	2013.741	21 37 48	37 39 00	1	NEW COMPONENT