CD Double Star Measures: Jack Jones Memorial Observatory Report #3

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Abstract: This paper submits 114 CCD measurements of 92 multiple star systems for inclusion in the WDS. Observations were made during the calendar year 2007. Measurements were obtained using either an SBIG ST-7 CCD camera or an SBIG ST-8 CCD camera and an 11-inch SCT. Selected double stars are discussed. Negative findings are included for certain stars.

This paper reports on double star observations and measurements made at the Jack Jones Memorial Observatory during 2007.

Observations were made using a Celestron 11-inch (28 cm) f/10 SCT with a Meade f/6.3 focal reducer/field flattener. This combination yields a pixel scale of approximately 0.95 arcsec/pixel. Prior to 2007.690 an SBIG-ST7 camera with a Kodak KAF-401E non anti-blooming (NAB) sensor was used for all observations. From 2007.690 onward an SBIG-ST8XME camera with a KAF-1603ME Kodak NAB sensor was used.

Multiple images of each target were solved using "Astrometrica". Position Angle and Separation and their associated standard deviations were then computed from the RA and Dec of the primary and secondary using a VB Script written by the author.

The UCAC-2 catalog was used in most cases for image solution. Where UCAC-2 was unavailable or didn't provide adequate reference stars, USNO-B1.0 was used. The precision of each observation was quantified and reported by calculating the standard deviation of the image set.

More detailed information regarding method can be found in Jones, 2008.

Results and Discussion

Position Angle (θ) and Separation (ρ) measurements are reported in columns θ and ρ respectively in Table 1. The precision of θ and ρ is reported in columns σ(ρ) and σ(θ) and refers to the standard deviation of θ and ρ for the image set. Column N indicates the number of nights that contributed to the measurement. NAME, RA DEC, and MAGS columns are taken from the WDS.

18579+2409 POU3618

(Theta = 97, Rho = 13.6, mag 12.05, 12.8) lies in a crowded field and was discovered by M. A. Pourteau in 1906. It has been observed three times since its discovery, the last observation being in 1950. The precise coordinate is listed in the WDS as 185748.17+240849.7.

UCAC 3 places an 11th magnitude star at 185748.175+240849.75. There are 3 potential companion stars within 50 arcsec of this star. However the brightest is mag 14.6 and is over 25 arcsec away.

There is a pair at 185751.23+240856.09 (author's measurement) that has a separation 13.74" and PA of 90.4 degrees. This pair corresponds to 185751.230+240856.12 and 185752.242+240855.77 (UCAC3). I believe that this is the pair that is being measured as POU3618.

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It should be noted that UCAC3 gives the proper motion for this pair as -20.6 pmRA, -18.7 pmDe and –93.7 pmRA, 105.2 pmDe. Consequently, this pair is probably not a physical pair.

19098+4433 HJ1374AB

(Theta = 115, Rho = 14.3, mag 8.9, 12.6) and ***HJ 1374AC*** (Theta = 6, Rho = 31.3, mag 8.9, 14.4) were discovered in 1901 and not observed since their discovery. The WDS lists the precise coordinate as 190949.51+443326.9. While there is a Vmag 8.979 (TASS) star at that coordinate, there are no companions near the position angles given.

The author believes that the primary component of this system is a Vmag 7.383 (TASS) star situated approximately 4 minutes to the east at UCAC3 coordinates 191011.958+443335.92, with the companions at (Theta = 119, Rho = 13.34) and (Theta = 2.5, Rho = 30.26).

19337+2936 SLE 630AC

(Theta = 96, Rho = 14.8, mag 10.3, 11.6) was discovered by G. Soulie in 1984 and has not been observed since. The author measured this pair as Theta = 59.6, Rho = 16.68. An image of the SLE 630 system is shown in Figure 1. Even a cursory examination of this image will confirm that the C component is much closer to 60 degrees than 96 degrees. Could the numbers for Theta have been transposed?

Figure 1: SLE 630AB and SLE 630 AC. North up. East left

Negative Findings

17128+2433 POU3264

(Theta = 299, Rho = 15.8, mag 11.58, 11.9) was discovered by M. A. Pourteau in 1892. The WDS lists the precise coordinate as 171246.57+243240.8.

There is an 11.524 Vmag (TASS) star at those coordinates. However, there are no stars near 11 magnitude within 1.7 minutes of this star. There is a 13 mag pair about 3 minutes to the NW with close to the proper orientation but they are 2 magnitudes too dim and twice the separation.

17112+2317 POU3259

(Theta = 035, Rho = 15.7, mag 9.9, 12.8) was discovered by M. A. Pourteau in 1902 and not observed since. The WDS lists the precise coordinate as 171110+231700.

A search of Tycho (i/259/tyc2) within 60 arcmin of the precise coordinate only yielded one possibility 40 min NE at 171242.383+235222.05 and 171242.656+235241.07 (Theta = 11.1, Rho=19.39, Vt = 9.557, 11.196). USNOB1.0 proper motions of this pair are pmRA = 16mas/yr and pmDE = -14mas/yr for the primary and zero for the secondary. So there is no reason to conclude that this is the lost double.

22467+3226 CHE 430

(Theta = 285, Rho = 13.8, mag 10.19, 11.01) was discovered by P.S. Chevalier in 1910 and not observed since. The WDS lists the precise coordinate as 224641.14+322539.6.

There is an 11 magnitude star located at 224641.148+322539.65 (UCAC3). However there are no stars bright enough to be a potential companion. Examination of DSS and UMASS imagery didn't yield any potential candidates.

Acknowledgements

This research made use of the Washington Double Star Catalog maintained at the U.S. Naval Observatory and the VizieR catalogue access tool, CDS, Strasbourg, France.

References

Jones, James L., 2008, "CCD Double Star Measures: Jack Jones Memorial Observatory Report #1", *Journal of Double Star Observations*, **4**, 20-23.

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NAME	RA DEC	MAGS	PA	σ(θ)	SEP	σ(ρ)	DATE	N	NOTES
HJ 1097	01561+3745	10.00 11.21	40.0	0.08	14.80	0.02	2007.089	1	3
ALI 263	02133+3648	10.93 11.45	318.3	0.10	12.83	0.01	2007.089	1	
AG 311AB	04459+1911	8.90 9.32	112.3	0.02	33.04	0.008	2007.038	1	1
CTT 8AC	04459+1911	8.9 9.7	172.5	0.02	54.31	0.02	2007.038	1	1
POU 516	05036+2343	13.4 13.7	199.5	0.25	4.91	0.01	2007.038	1	2
POU 517	05037+2343	12.42 12.50	17.0	0.11	14.08	0.02	2007.038	1	2
POU 518	05040+2345	10.90 12.5	86.6	0.09	14.77	0.02	2007.038	1	2
POU 521	05043+2341	11.15 14.0	73.0	0.25	13.51	0.03	2007.038	1	2
POU 529	05048+2340	12.58 13.71	265.9	0.14	14.36	0.07	2007.038	1	2
POU 532	05049+2329	11.92 13.0	167.5	0.17	14.63	0.07	2007.038	2	
POU 540	05064+2339	12.8 13.6	282.6	0.11	13.39	0.08	2007.038	1	
HJ 430	07525+3357	10.66 11.7	183.0	0.06	13.77	0.02	2007.041	1	
LDS 912	09499+2157	9.20 12.7	134.8	0.02	95.31	0.03	2007.234	1	
HJ 493	11037+3253	10.66 12.09	327.5	0.04	17.33	0.006	2007.306	1	
KZA 5AB	11089+3459	12.4 12.9	288.1	0.03	51.00	0.09	2007.306	1	
KZA 5AC	11089+3459	12.4 12.4	166.6	0.03	92.36	0.05	2007.306	1	
KZA 44AB	13104+3744	12.32 12.3	208.7	0.03	76.80	0.02	2007.380	1	
KZA 44AC	13104+3744	12.32 11.38	4.5	0.02	93.24	0.03	2007.380	1	
KZA 68	13335+3827	12.0 12.3	104.1	0.02	34.93	0.02	2007.380	1	
KZA 69	13335+3846	12.0 12.5	186.1	0.04	17.47	0.09	2007.380	1	
KZA 71AB	13363+3514	9.5 10.0	147.7	0.009	62.47	0.01	2007.380	1	
KZA 71AC	13363+3514	9.5 11.0	185.8	0.01	78.84	0.02	2007.380	1	
POU3152	13497+2328	12.25 12.30	180.9	0.03	13.82	0.01	2007.200	1	
HJ 2688	13510+2346	9.87 11.51	292.1	0.03	29.77	0.01	2007.200	1	
HJ 238AB	14310+1344	11.46 13.0	72.4	0.04	27.02	0.05	2007.360	1	
HJ 238AC	14310+1344	11.46 11.7	92.1	0.08	52.44	0.05	2007.360	1	
ABH 82AD	14310+1344	11.46 14.4	232.3	0.03	113.73	0.10	2007.360	1	
HJ 2776AB	15194+4550	11.30 13.72	311.1	0.08	14.60	0.03	2007.375	1	
KZA 78	15195+2952	9.5 10.0	17.2	0.02	42.42	0.03	2007.375	1	
STF1936	15211+2702	9.92 10.09	230.6	0.03	19.80	0.02	2007.306	1	
KZA 82	15212+3049	10.5 11.5	93.3	0.19	12.99	0.03	2007.375	1	
KZA 83	15216+3059	14.0 14.9	44.2	0.07	12.22	0.007	2007.375	1	
GIC 127AB	15219+2807	11.56 15.86	255.1	0.03	212.62	0.09	2007.359	2	
LMP 10AC	15219+2807	10.86 12.67	240.3	0.02	87.92	0.01	2007.359	1	
LMP 10AD	15219+2807	10.86 14.2	262.2	0.01	132.87	0.04	2007.359	2	
KZA 92AB	15309+4145	13.5 14.0	278.2	0.07	14.84	0.02	2007.375	1	
KZA 92AC	15309+4145	13.5 14.5	332.6	0.04	25.57	0.01	2007.375	1	
KZA 99	15322+4005	10.38 14.75	337.9	0.06	27.00	0.02	2007.375	1	
KZA 100AB	15323+4003	11.8 14.4	45.8	0.07	19.69	0.02	2007.375	1	
TOB 133AC	15323+4003	11.8 15.8	287.2	0.10	16.47	0.03	2007.375	1	

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STF1961AB	15346+4331	10.07 10.17	20.7	0.04	28.11	0.01	2007.375	1	
STF1961AC	15346+4331	10.07 13.3	326.4	0.03	55.29	0.03	2007.375	1	
FOX 190AC	15364+3723	8.7 12.2	271.6	0.05	59.58	0.04	2007.375	1	
KZA 105AB	15367+3954	12.22 13.7	73.3	0.03	87.98	0.007	2007.375	1	
KZA 105AC	15367+3954	12.22 13.7	118.4	0.07	133.21	0.02	2007.375	1	
KZA 105AD	15367+3954	12.22 11.87	156.7	0.04	164.13	0.04	2007.375	1	
KZA 105AE	15367+3954	12.22 13.2	132.3	0.02	267.65	0.09	2007.375	1	
KZA 105AF	15367+3954	12.22 12.7	178.0	0.006	356.87	0.04	2007.375	1	
KU 112	16273+3626	10.06 10.98	276.8	0.06	57.44	0.02	2007.416	1	
POU3256	17078+2308	12.15 13.7	169.8	0.10	11.76	0.05	2007.410	1	
POU3257	17079+2301	12.89 13.4	334.0	0.05	18.12	0.01	2007.410	1	
POU3258	17093+2304	11.82 12.3	58.5	0.25	10.80	0.16	2007.410	1	
POU3266	17150+2443	12.5 13.3	89.7	0.13	11.03	0.02	2007.395	1	
POU3267	17152+2443	12.3 13.6	151.4	0.13	12.15	0.02	2007.395	1	
POU3269	17153+2423	13.0 13.5	131.7	0.08	11.51	0.02	2007.380	1	
POU3279	17172+2421	12.10 12.3	169.3	0.08	13.23	0.005	2007.395	1	
SLE 30	17195+2511	12.07 13.0	286.0	0.05	14.47	0.10	2007.395	1	
FOX 228	18241+1241	11.64 11.68	110.3	0.07	24.14	0.03	2007.467	1	
HJ 1328	18310+4154	9.05 12.13	115.3	0.04	21.38	0.02	2007.525	1	
POU3569	18513+2450	13.06 14.1	255.4	0.05	16.22	0.007	2007.360	1	
POU3595AB	18554+2436	12.6 13.6	38.0	0.05	17.27	0.02	2007.360	1	
POU3594AC	18554+2436	12.6 13.6	15.7	0.02	20.56	0.02	2007.360	1	
HJ 1356	18564+4530	8.39 9.35	341.9	0.04	29.35	0.02	2007.483	1	
POU3604	18568+2421	10.26 11.32	60.7	0.07	11.33	0.03	2007.375	1	
POU3605	18568+2456	12.63 12.8	118.4	0.09	11.22	0.02	2007.360	1	
HJ 1357	18571+4551	7.41 11.27	209.8	0.06	29.53	0.02	2007.483	1	
POU3618	18579+2409	12.05 12.8	90.4	0.12	13.74	0.05	2007.375	1	4
GYL 12AB	18582+3216	10.55 11.21	146.3	0.09	19.98	0.02	2007.416	1	
BKO 56AC	18582+3216	10.55 13.6	19.4	0.04	11.16	0.05	2007.416	1	
POU3623	18582+2455	12.3 12.7	83.0	0.01	10.45	0.007	2007.368	2	
POU3625	18583+2459	13.9 13.9	86.5	0.09	10.89	0.03	2007.368	2	
POU3627	18585+2456	13.75 13.34	139.9	0.09	11.32	0.01	2007.368	2	
ARG 83AB	19091+4502	11.28 12.57	236.1	0.01	16.54	0.009	2007.624	2	
ARG 83AC	19091+4502	11.28 11.94	332.1	0.03	24.48	0.01	2007.481	1	
HJ 1374AB	19098+4433	8.9 12.6	119.0	0.19	13.34	0.15	2007.483	1	4
HJ 1374AC	19098+4433	8.9 14.4	2.5	0.19	30.26	0.06	2007.483	1	4
SMA 86	19330+3030	10.54 11.8	37.4	0.06	15.65	0.02	2007.487	1	
SLE 630AB	19337+2936	10.3 11.6	22.9	0.08	19.96	0.04	2007.487	1	
SLE 630AC	19337+2936	10.3 11.6	59.6	0.13	16.68	0.11	2007.487	1	4
SLE 633	19342+3008	12.24 12.7	8.3	0.10	13.70	0.06	2007.487	1	

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LDS1026	19376+3030	11.15 12.01	138.2	0.08	17.91	0.06	2007.487	1	
SLE 669AB	19414+3023	10.70 10.5	291.7	0.13	10.69	0.07	2007.487	1	
ES 2681AB	19458+4622	9.53 12.8	164.7	0.16	27.08	0.06	2007.525	1	
ES 2674AC	19458+4622	9.53 11.46	312.4	0.14	26.68	0.08	2007.525	1	
HJ 1441AC	19502+3027	9.88 11.2	192.1	0.04	28.66	0.07	2007.487	1	
SMA 100	19504+4446	10.78 12.61	331.5	0.06	10.61	0.03	2007.525	1	
SMA 101	19509+4444	11.40 11.9	49.4	0.11	9.45	0.03	2007.525	1	
SMA 105	19521+4548	12.4 12.7	322.1	0.09	12.53	0.02	2007.525	1	
SMA 106	19522+4518	11.18 14.2	253.6	0.06	14.31	0.04	2007.638	1	
SMA 109	19538+4436	10.61 10.65	111.8	0.03	21.77	0.03	2007.638	1	
HJ 1472AB	20038+4359	11.27 10.78	222.2	0.06	15.39	0.0003	2007.525	1	
CTT 9AC	20038+4359	11.27 10.83	128.6	0.03	59.19	0.03	2007.525	1	
CHE 284	20180+1544	9.45 10.13	339.0	0.01	30.28	0.009	2007.684	1	
ES 2699	20433+4456	8.64 9.51	296.8	0.03	40.09	0.02	2007.684	1	
SEI1306	20544+3648	11.32 12.2	305.6	0.02	17.01	0.01	2007.738	1	
SEI1329	20575+3643	12.24 12.7	30.5	0.02	24.79	0.009	2007.738	1	
SEI1335	20579+3641	10.0 10.6	28.5	0.04	18.14	0.01	2007.738	1	
SEI1452	21130+3648	11.56 12.6	336.4	0.05	26.31	0.007	2007.736	1	
SEI1453	21135+3658	10.41 11.29	270.6	0.10	28.33	0.01	2007.736	1	
SEI1457	21140+3755	11.35 11.6	207.1	0.07	10.68	0.01	2007.736	1	
SEI1462	21145+3635	10.0 11.0	232.3	0.38	11.11	0.15	2007.695	1	
SEI1468	21148+3631	10.90 11.4	245.2	0.09	19.03	0.01	2007.695	1	
SEI1472	21151+3716	11.05 11.6	96.6	0.03	23.04	0.01	2007.697	1	
CHE 364	22416+3224	12.5 12.7	83.6	0.09	31.56	0.04	2007.736	1	
CHE 367	22417+3226	10.87 12.5	47.1	0.03	32.10	0.01	2007.736	1	
CHE 373	22420+3203	10.72 11.39	314.4	0.06	33.19	0.02	2007.736	1	
CHE 377	22423+3211	12.5 13.5	231.0	0.07	26.10	0.03	2007.736	1	
CHE 381AB	22425+3230	10.69 11.5	8.3	0.03	32.74	0.02	2007.736	1	
CHE 383	22426+3232	9.82 11.18	183.2	0.02	33.03	0.02	2007.736	1	
CHE 388	22429+3206	11.94 13.46	347.7	0.02	26.09	0.02	2007.736	1	
CHE 389	22429+3205	13.31 13.81	282.3	0.05	13.52	0.03	2007.736	1	
CHE 408	22444+3252	11.78 12.27	21.7	0.01	35.03	0.01	2007.737	2	
CHE 411	22449+3245	10.23 14.0	251.5	0.05	33.07	0.02	2007.737	2	
CHE 413	22450+3250	13.0 13.5	306.8	0.08	30.34	0.03	2007.738	1	

Notes:

1. Apparently in NGC 1647
2. Apparently in NGC 1746
3. Apparently in NGC 752
4. See Discussion