

Double Star Measures Using the Video Drift Method - IX

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Abstract: Position angles and separations for 232 multiple star systems are presented using the video drift method. Two new systems not in the WDS catalog are measured and discussed.

Introduction

This is paper IX in our continuing series on double star measurements using the video drift method first proposed by Nugent and Iverson 2011. We continue our practice of preferentially measuring multiple star systems listed in the Washington Double Star Catalog (WDS) that have not been measured for a minimum of 10 - 15 years and have less than 10 measurements. This practice sometimes has us evaluating systems that have not been measured since the late 1800's to mid-1900's.

Methodology

The methods used in this paper are the same as the methods used in our previous paper (Nugent and Iverson 2016). All measurements were made with two Meade 14-inch LX-200 telescopes (focal length 3556 mm at f/10, scale factor 0.6"/pixel). Astronomical video data collection systems require a onetime aspect ratio calibration. The reader is referred to our previous discussion of the problem and the calibration procedure (Nugent and Iverson 2014).

For systems in which either the primary and/or sec-

ondary star is faint, image enhancement techniques were employed. Co-author Iverson used a variation of the drift method employing an integrating video camera (Iverson and Nugent 2015) while co-author Nugent used a Collins I³ image intensifier with a non-integrating camera. The faintest system measured in Table 1 had primary/secondary magnitudes of +11.48, +14.8. Ten systems had WDS magnitudes greater than +14.0.

Two double star systems not in the WDS catalog were measured and the results are in Table 2. A request to measure these was made in the Society of Astronomical Sciences (SAS) November 2016 newsletter (Buchheim 2016) from their original mention in Sky and Telescope magazine for November 2015 (Whitman 2015). These systems are identified by the primary stars, TYC 1212:301-1 and TYC 1212:409-1 whose coordinates are given in the captions of Figures 1 and 2. Magnitudes were taken from the UCAC4 catalog (Zacharias 2012). Their POSS-II images along with the UCAC4 proper motion vectors are shown in Figures

(Text continues on page 614)

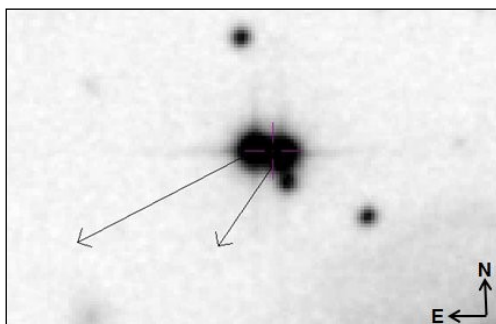


Figure 1. TYC 1212-301-1: POSS-II image from 9 Sep 1986. Proper motion vectors from UCAC4 catalog using Aladin Sky Atlas. RA = 1h 50m 47.31s, DEC = +21° 46' 40.4"

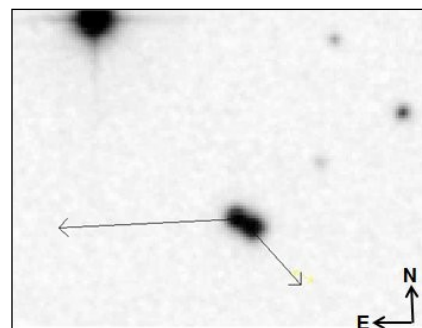


Figure 2. TYC 1212-409-1: POSS-II image from 9 Sep 1986. Proper motion vectors from UCAC4 catalog using Aladin Sky Atlas. RA = 1h 49m 59.05s, DEC = +21° 57' 22.6".

Double Star Measures Using the Video Drift Method - IX

Table 1. Results of 230 Double Stars Using the Video Drift Method.

WDS	Discoverer	PA°	σ -PA	Sep "	σ -Sep	Date	No. of (x,y) pairs	Mag Pri	Mag Sec	Drifts	Nights
00003+1642	HJ 318	60.8	0.66	25.9	0.31	2016.814	1503	9.56	12.88	2	1
00011+2502	POU5882	43.0	3.29	8.0	0.43	2016.814	1657	13.51	13.53	2	1
00011-2326	LDS2070	262.9	0.32	66.2	0.38	2016.814	1384	9.50	9.71	2	1
00017+0147	GRV 1	350.2	0.24	73.3	0.29	2016.814	1515	11.33	11.84	2	1
00023+3257	HO 209AC	139.9	1.28	12.5	0.23	2016.814	1786	9.07	13.0	2	1
00028+0208	HJ 998AC	329.2	0.37	46.3	0.31	2016.814	1416	7.40	12.38	2	1
00030-0054	HJ 999	75.6	1.19	26.0	0.61	2016.814	1434	8.0	13.4	2	1
00032+2234	GRV 3	195.8	0.65	68.3	0.72	2016.814	1579	11.03	13.52	2	1
00050+0835	GWP 11	184.6	2.44	8.0	0.43	2016.814	1538	12.5	12.9	2	1
00069+0702	PLQ 1	292.5	1.72	21.0	0.65	2016.814	1465	12.94	13.96	2	1
00079+0047	BAL 942	299.0	2.69	7.2	0.39	2016.814	1505	9.60	12.1	2	1
00085-0018	SLE 249	278.8	2.75	12.5	0.71	2016.814	1458	12.7	13.6	2	1
00088+0801	HDO 2	131.4	0.94	18.6	0.30	2016.814	1440	7.3	12.3	2	1
00090+2738	GIC 1AB	319.8	0.58	68.2	0.71	2016.814	1528	11.68	13.51	2	1
00403-0855	GAL 304	323.3	0.32	16.5	0.09	2016.742	6009	9.61	9.88	10	2
01144-0755	STFA 3AB	330.6	0.12	48.8	0.11	2016.742	5799	5.19	7.85	10	2
01173+0150	HDO 46AC	176.0	1.48	47.1	1.17	2017.008	706	7.71	11.55	1	1
01182-0817	UC 542	241.6	0.78	37.6	0.56	2017.066	1395	12.3	12.94	2	1
01241-1244	GAL 308	16.7	0.24	24.7	0.11	2016.742	5340	10.30	10.79	8	2
01487+0741	FOX9042AD	123.4	0.30	77.4	0.35	2017.008	1207	7.18	11.60	2	1
01588-2212	HJ 2103	41.8	0.66	59.0	0.79	2017.008	1328	9.43	9.86	2	1
02024+1923	BU 1369	129.7	0.67	61.3	0.77	2017.008	1405	8.42	11.44	2	1
02053-2803	LDS 67	14.4	0.79	57.0	0.75	2017.008	1539	10.88	11.87	2	1
02123-0908	GWP 268	136.0	0.59	111.3	1.35	2017.008	1193	10.97	11.59	2	1
02138-1933	RSS 54	172.2	1.58	27.8	0.75	2017.008	1540	9.25	11.52	2	1
02193-0259	H 6 1AC	68.8	0.13	123.4	0.32	2016.814	1058	6.64	9.65	2	1
02198-2352	HJ 2130	287.1	0.94	41.8	0.78	2017.008	1481	8.58	8.88	2	1
02205+2007	HJL1016	94.8	0.55	84.2	1.11	2017.008	1280	9.41	10.53	2	1
02222+2116	GRV 124	231.4	0.87	63.4	0.91	2017.008	1440	9.75	11.74	2	1
02228+2406	HJL1017	255.5	0.44	114.3	0.94	2017.008	1189	9.09	10.27	2	1
02247-2002	FAL 76AC	204.1	1.70	18.0	0.45	2017.008	1384	8.93	11.14	2	1
02257-2119	HJ 3500	165.2	2.23	15.0	0.58	2017.008	1613	9.24	9.37	2	1
02360-2124	HJ 3511	98.6	1.39	13.4	0.39	2017.008	1594	7.17	8.66	2	1
02361-2444	HJ 3512	222.1	2.44	11.7	0.67	2017.066	1606	12.22	11.76	2	1
02363-2447	HJ 3515	117.1	1.90	17.6	0.56	2017.066	1610	11.5	13.0	2	1
02385+0058	BAL 959	33.1	1.00	19.0	0.36	2017.066	1480	10.68	11.89	2	1
02481-1244	GAL 326	33.5	1.59	29.9	0.81	2017.008	1417	11.50	11.59	2	1
02493+1728	STF 311BC	110.1	0.80	23.8	0.34	2017.066	1479	7.95	10.72	2	1
02535-0330	BVD 28	338.5	0.58	104.6	1.22	2017.008	1375	9.94	10.49	2	1
02568+0330	PLQ 37	145.0	0.44	14.3	0.11	2017.074	5889	8.71	10.97	10	2
03017+0233	BAL1629	297.4	0.51	11.5	0.10	2017.074	5905	10.73	10.66	10	2
03066+1145	GRV 160	146.6	0.85	76.5	1.12	2017.008	1371	10.68	11.92	2	1
03084-2410	LDS 87	218.4	2.47	25.0	1.02	2017.008	1577	10.21	10.86	2	1
03092+0728	STFA 6	163.2	0.08	81.0	0.12	2017.074	5818	7.66	7.84	10	2
03332-1003	BU 532AC	311.0	0.09	80.2	0.13	2017.066	5246	8.61	7.37	10	2

Table 1 continues on next page.

Double Star Measures Using the Video Drift Method - IX

Table 1 (continued). Results of 230 Double Stars Using the Video Drift Method.

WDS	Discoverer	PA°	σ -PA	Sep "	σ -Sep	Date	No. of (x,y) pairs	Mag Pri	Mag Sec	Drifts	Nights
03351-1841	ARA 525	240.9	2.18	7.5	0.28	2017.068	1585	10.45	12.1	2	1
03365-2038	CLL 3	206.2	0.67	42.5	0.48	2017.068	1556	10.57	11.23	2	1
03372-1753	B 2564	65.3	0.31	18.8	0.16	2017.068	1502	8.4	13.5	2	1
03380-0405	UC 1034	321.3	0.90	25.0	0.44	2017.068	1463	11.67	12.36	2	1
03382-2243	ARA1977	166.1	1.96	12.0	0.38	2017.068	2470	11.2	12.0	3	1
03393-2219	RSS 67	140.8	0.70	33.6	0.52	2017.068	1561	8.52	10.93	2	1
03421-3136	B 56AC	166.5	1.19	25.8	0.58	2017.068	1787	9.15	10.14	2	1
03447-1047	HJ 3588	236.0	0.14	45.1	0.11	2017.066	5605	8.01	10.24	10	2
03461-1708	GWP 507	189.3	1.52	24.0	0.61	2017.068	1518	10.90	14.73	2	1
03462-4112	CBL 122	257.0	0.60	66.1	0.57	2017.068	1613	9.34	11.37	2	1
03463-1235	GAL 355	346.2	0.85	31.8	0.52	2017.068	1542	10.57	11.81	2	1
03465-1631	HDO 63	113.1	1.17	22.6	0.51	2017.068	1542	12.06	11.46	2	1
03467-1231	GAL 356	76.6	0.79	26.1	0.39	2017.068	2909	11.62	11.89	4	1
03482-0852	HJ 2209	256.3	2.18	15.5	0.63	2017.068	1495	11.48	14.8	2	1
03489-2807	BVD 39	36.2	0.74	51.1	0.60	2017.068	1561	11.40	11.91	2	1
03503-1646	ARA 150	133.0	2.76	10.9	0.59	2017.068	1592	10.63	13.6	2	1
03507-1206	GAL 358	332.9	0.22	50.6	0.19	2017.025	2818	11.25	11.65	5	1
03511-0839	UC 1077	155.9	1.47	21.3	0.60	2017.068	1520	11.86	12.73	2	1
03535-1229	GAL 359	172.4	0.14	43.3	0.11	2017.066	6122	10.65	10.93	10	2
03535-1440	GWP 531	68.4	0.72	58.9	0.75	2017.068	1348	13.09	14.13	2	1
04035-1449	UC 1107	111.4	2.08	7.0	0.34	2017.071	1565	10.5	10.9	2	1
04040-1145	HJ 3617	66.5	1.06	16.1	0.38	2017.071	1492	8.71	11.99	2	1
04043-1231	GAL 363	44.5	0.29	30.2	0.15	2017.066	5912	9.37	12.08	10	2
04045-3229	COO 20	352.6	2.26	8.8	0.42	2017.071	1770	9.47	10.63	2	1
04049-3550	HJ 3622	112.6	1.87	10.2	0.34	2017.071	1833	8.88	9.40	2	1
04077-1007	UC 1119AC	141.6	0.26	85.1	0.48	2017.071	1317	9.27	11.81	2	1
04081-2641	LDS 110	336.3	0.22	177.5	0.75	2017.071	1376	10.21	11.38	2	1
04091-1317	GAL 118	260.0	1.44	10.5	0.27	2017.071	1495	9.24	12.58	2	1
04091-1624	SKF 950	70.2	0.51	44.3	0.43	2017.071	1435	8.20	11.14	2	1
04095-1729	BUP 50AC	40.1	0.44	117.1	0.84	2017.071	1145	8.07	14.29	2	1
04111-1446	CVR1737	188.7	0.21	108.7	0.49	2017.071	1518	9.58	9.91	2	1
04113+0531	ENG 18	36.8	0.06	113.1	0.12	2017.085	4982	5.74	10.94	10	2
04140-1222	GAL 364	46.5	0.95	20.8	0.36	2017.071	1506	11.36	11.43	2	1
04143-0939	GWP 568AB	277.3	0.30	82.0	0.50	2017.071	1211	11.72	11.94	2	1
04155+0611	H 6 98AC	48.2	0.03	233.1	0.14	2017.085	3378	6.38	9.33	10	2
04155+0611	H 6 98CD	314.5	0.12	55.9	0.13	2017.085	5438	9.33	11.17	10	2
04155+0611	STTA 45AB	315.8	0.10	64.1	0.12	2017.085	5408	6.38	7.01	10	2
04155+0611	STU 18CE	149.6	0.10	62.1	0.12	2017.085	5632	9.33	10.08	10	2
04209-1156	GAL 365	357.9	0.60	17.1	0.18	2017.025	3059	8.90	11.25	5	1
04261-1059	GAL 369	330.1	0.49	26.1	0.22	2017.066	8043	11.44	11.69	2	1
04281-1033	GAL 370	173.8	0.44	20.2	0.12	2017.082	16086	11.27	12.45	4	2
04331-1208	STF 564AC	89.4	0.11	119.6	0.16	2017.082	3216	9.39	10.84	5	1
04357+1010	SHJ 45AB	299.6	0.10	69.2	0.12	2017.085	5195	4.27	7.84	10	2
05083-0840	STF 649AB	69.3	0.35	21.3	0.13	2017.085	2886	5.80	8.97	5	1
05083-0840	STF 649AC	4.2	0.10	87.5	0.17	2017.085	15153	5.80	11.28	4	2

Table 1 continues on next page.

Double Star Measures Using the Video Drift Method - IX

Table 1 (continued). Results of 230 Double Stars Using the Video Drift Method.

WDS	Discoverer	PA°	σ -PA	Sep "	σ -Sep	Date	No. of (x,y) pairs	Mag Pri	Mag Sec	Drifts	Nights
05083-0840	STF 649BC	350.3	0.11	80.7	0.17	2017.085	15096	8.97	11.28	4	2
05100-0704	STF 651	27.8	0.13	47.1	0.11	2017.129	5837	8.55	9.96	10	2
05152-1404	LDS3648	132.3	2.66	13.2	0.63	2017.071	1520	13.96	14.66	2	1
05161-0535	STF 675AC	8.7	0.52	9.4	0.09	2017.129	6101	9.41	9.75	10	2
05164-1531	GAL 172	188.3	2.25	8.4	0.41	2017.071	1566	9.7	10.7	2	1
05181-1611	BVD 52	226.8	0.29	89.7	0.50	2017.071	1303	7.72	9.05	2	1
05204-0802	STF 692AB,C	4.4	0.20	34.8	0.13	2017.025	7550	7.64	8.57	11	2
05204-3324	HJ 3751	321.5	1.18	19.9	0.43	2017.071	1748	9.36	10.44	2	1
05211-2210	ARA1625	65.5	2.72	11.5	0.51	2017.071	1405	12.46	12.16	2	1
05214-0653	MAD 2AC	136.0	0.77	34.2	0.51	2017.071	1423	10.28	12.16	2	1
05230-1613	GAL 380	36.5	1.33	16.9	0.35	2017.066	1566	10.31	10.8	2	1
05240-0940	GAL 381	296.7	0.76	29.8	0.44	2017.066	1449	10.49	12.33	2	1
05244-1750	ARA 160	215.7	2.15	7.7	0.35	2017.066	1570	10.28	11.01	2	1
05245-0224	H 6 67AC	51.4	0.06	114.3	0.12	2017.085	4538	3.56	10.99	10	2
05246-1752	ARA 161	128.8	1.75	11.4	0.35	2017.066	1575	10.84	10.55	2	1
05248-1642	GAL 382	276.5	1.76	15.5	0.52	2017.066	780	10.86	11.4	1	1
05250-0249	H 6 68AB	282.1	0.05	135.6	0.12	2017.085	3984	7.31	9.16	10	2
05252-1119	STF 710AB	196.2	1.38	10.3	0.32	2017.066	1568	8.61	8.91	2	1
05252-1119	HJ 5538AD	85.4	0.50	54.9	0.51	2017.066	1373	8.61	12.47	2	1
05260-0938	GAL 383	321.4	0.23	27.0	0.10	2017.025	5860	9.60	10.93	10	2
05285-1131	GAL 386	341.1	0.96	21.1	0.38	2017.066	1542	10.78	11.18	2	1
05290-1125	GAL 187	307.9	3.16	5.3	0.35	2017.066	1381	10.78	11.8	2	1
05294-0716	H 5 101	115.8	0.38	49.3	0.38	2017.066	1362	6.71	10.60	2	1
05303-2331	B 2587	245.3	1.40	9.4	0.25	2017.066	2411	9.56	12.6	3	1
05307-2304	HDO 72	3.2	1.36	19.2	0.47	2017.066	1664	9.48	11.00	2	1
05313-1834	B 2588	306.8	1.40	19.2	0.51	2017.066	1572	10.05	11.9	2	1
05321-1452	GAL 388	302.6	1.71	11.8	0.44	2017.066	1554	11.20	10.97	2	1
05324-1458	GAL 389	286.5	1.50	13.7	0.41	2017.066	1528	9.67	11.27	2	1
05327-2012	ARA 845	100.9	2.13	12.9	0.50	2017.066	1599	12.15	12.03	2	1
05370-1340	BU 1399AB	189.9	1.38	24.5	0.55	2017.066	1539	9.73	11.99	2	1
05373-2359	ARA2293	171.4	1.98	14.1	0.49	2017.066	1692	11.19	12.10	2	1
05374-2009	ARA 846	140.0	3.51	8.8	0.50	2017.066	1580	13.8	13.9	2	1
05379+0058	BU 1535BC	64.8	0.77	20.8	0.21	2017.088	8496	8.01	14.	2	1
05379+0058	STTA 65AB	31.9	0.07	79.5	0.11	2017.121	5486	7.45	7.99	10	2
05397-2115	ARA1277	81.4	2.08	9.2	0.42	2017.066	1570	12.5	12.6	2	1
05401-2343	UC 1344	268.8	0.54	20.3	0.33	2017.068	1563	7.28	10.03	2	1
05413-1416	HJ 3785	145.2	1.38	15.6	0.44	2017.066	1549	10.74	10.86	2	1
05413-2621	HJ 3788	154.7	0.87	25.7	0.39	2017.066	1656	7.60	9.20	2	1
05426-2134	ARA1279	168.3	2.49	14.2	0.63	2017.068	1644	11.50	11.94	2	1
05428-2332	B 2589	159.4	2.57	11.4	0.53	2017.068	1624	9.87	13.2	2	1
05429-2021	ARA 851	224.1	4.54	10.3	0.77	2017.068	1612	12.41	12.34	2	1
05433-2040	HJ 3791	58.2	2.40	10.2	0.43	2017.068	1630	8.54	10.03	2	1
05441-1559	ARA 23	355.9	2.15	8.6	0.50	2017.068	1590	10.56	12.3	2	1
05441-1928	ARA 536	16.0	2.96	15.0	0.67	2017.066	806	11.96	11.97	1	1
05447+0350	STF 788AB	91.3	1.27	7.5	0.18	2017.121	6137	7.61	10.05	2	1

Table 1 continues on next page.

Double Star Measures Using the Video Drift Method - IX

Table 1 (continued). Results of 230 Double Stars Using the Video Drift Method.

WDS	Discoverer	PA°	σ -PA	Sep "	σ -Sep	Date	No. of (x,y) pairs	Mag Pri	Mag Sec	Drifts	Nights
05447+0350	STF 788AC	148.7	0.18	36.2	0.12	2017.129	5911	7.61	10.37	10	2
05447-2101	STN 11	144.6	2.39	10.9	0.50	2017.066	768	11.29	10.99	2	1
05450+0400	STF 789AB	149.9	0.56	14.0	0.14	2017.121	2986	6.13	10.17	5	1
05450-1254	GAL 199AB	189.6	0.83	31.4	0.52	2017.068	1579	10.67	11.07	2	1
05450-3030	BVD 55	313.1	1.34	20.8	0.54	2017.068	1700	9.45	10.76	2	1
05456-1503	ENG 23AB	160.7	0.29	123.9	0.80	2017.068	1360	8.56	9.33	2	1
05456-1503	ENG 23AC	228.9	0.25	166.3	0.76	2017.068	1041	8.56	10.47	2	1
05456-1503	BUP 83AD	258.6	0.95	35.0	0.62	2017.068	1410	8.56	13.2	2	1
05456-1503	BUP 83CE	213.4	1.14	34.3	0.70	2017.068	1515	10.47	11.98	2	1
05468-0316	STF 792	131.0	0.22	24.7	0.10	2017.085	5857	8.66	8.93	10	2
05472-2430	HJ 3798	70.0	1.28	15.3	0.37	2017.068	1636	8.19	8.76	2	1
05482-0823	STF 798	181.7	0.23	21.2	0.10	2017.066	6062	7.27	9.49	10	2
05514-1108	GAL 394	177.1	0.48	11.5	0.10	2017.066	6189	11.25	11.7	10	2
06032+0228	BAL1681	239.8	0.37	14.9	0.10	2017.085	5856	10.28	11.21	10	2
06107-0951	STF 869	279.8	0.23	24.5	0.10	2017.066	5884	8.18	9.09	10	2
06129-0609	HJ 36AC	208.8	0.35	22.7	0.14	2017.082	17148	11.6	12.10	4	2
06238+0240	J 53AC	104.9	0.17	34.5	0.11	2017.085	5560	7.01	10.71	10	2
06267-0731	STF 914	298.1	0.47	21.0	0.18	2017.074	2906	6.32	9.25	5	1
06269+0404	STF 911	155.7	0.46	11.7	0.09	2017.088	6028	8.65	9.04	10	2
06342+0759	ABH 46AD	80.7	0.20	38.7	0.17	2017.126	16229	8.38	13.50	4	2
06342+0759	ABH 46AE	25.8	0.13	71.0	0.15	2017.126	16308	8.38	14.23	4	2
06342+0759	ABH 46AF	110.3	0.06	130.0	0.17	2017.126	16902	8.38	13.26	4	2
06342+0759	ABH 46AG	104.2	0.09	118.5	0.16	2017.126	16506	8.38	13.27	4	2
06342+0759	STF 930AB	276.5	0.22	26.2	0.10	2017.126	5733	8.38	9.87	10	2
06342+0759	STF 930AC	106.6	0.13	43.6	0.10	2017.126	5535	8.38	9.53	10	2
06348-0610	A 507AB,C	161.4	0.11	61.6	0.14	2017.074	5100	8.27	10.10	8	2
06359+0519	ABH 47AD	304.3	0.37	34.9	0.21	2017.085	4445	8.39	12.07	2	1
06359+0519	STF 939AB	106.8	0.22	30.3	0.11	2017.088	8157	8.39	9.20	7	2
06359+0519	STF 939AC	51.4	0.17	39.6	0.12	2017.088	7971	8.39	9.40	7	2
06359+0519	STF 939BC	3.3	0.19	33.6	0.13	2017.088	8366	9.21	9.40	7	2
06539-0424	STF 985	323.3	0.18	32.6	0.11	2017.082	5804	7.78	8.39	10	2
07002-2243	S 543	272.3	0.38	91.3	0.71	2017.068	1085	8.36	8.58	2	1
07013-2034	ARA 886	320.6	2.64	8.5	0.42	2017.068	1438	9.26	9.85	2	1
07015-0307	ARN 43AD	250.9	0.06	124.1	0.12	2017.082	4162	7.68	9.42	10	2
07015-0307	MZA 22AF	194.9	0.68	11.7	0.16	2017.074	2182	7.68	13.5	5	1
07015-0307	STF1010AC	6.5	0.29	22.3	0.13	2017.082	6018	7.68	8.77	10	2
07113-2148	HJ 3934A,BC	237.7	1.92	13.6	0.46	2017.068	1435	6.91	8.49	2	1
07119-0130	BAL 441	33.7	0.46	14.3	0.11	2017.085	5910	10.65	11.42	10	2
07179-0142	BAL 466AB	343.7	0.46	14.7	0.12	2017.085	10075	10.95	11.33	7	2
07179-0142	BAL 466AC	329.3	0.42	20.1	0.16	2017.085	14211	10.95	12.0	4	2
07179-0142	BAL 466BC	297.8	1.75	6.9	0.22	2017.085	7919	11.33	12.0	2	1
07231-2532	RSS 7AB,C	339.6	0.76	37.9	0.56	2017.068	1421	9.15	9.26	2	1
07369-1527	ROE 30	283.8	2.22	9.0	0.43	2017.066	1566	9.75	10.8	2	1
07370-2852	LDS 190	126.9	1.29	32.5	0.70	2017.066	1623	12.01	12.27	2	1
07374-1726	SLE 808	335.9	2.64	16.7	0.73	2017.066	1572	11.5	12.2	2	1

Table 1 continues on next page.

Double Star Measures Using the Video Drift Method - IX

Table 1 (continued). Results of 230 Double Stars Using the Video Drift Method.

WDS	Discoverer	PA°	σ -PA	Sep "	σ -Sep	Date	No. of (x,y) pairs	Mag Pri	Mag Sec	Drifts	Nights
07375-0202	HO 244AD	109.6	0.51	69.8	0.56	2017.066	1206	7.39	10.80	2	1
07382-2114	ARA 971	193.5	4.47	13.3	0.94	2017.066	798	11.35	13.09	1	1
07384-1946	ARA 617	26.6	1.95	11.5	0.42	2017.066	1588	12.78	12.8	2	1
07386-2146	ARA1373	86.5	1.99	10.1	0.48	2017.066	1548	12.8	13.4	2	1
07387-0127	HO 245AC	97.8	0.13	46.1	0.10	2017.126	5347	7.92	10.80	10	2
07387-0127	HO 245AD	154.1	0.08	76.0	0.12	2017.126	5501	7.92	11.18	10	2
07389-1421	A 3093AB,C	243.1	1.57	10.8	0.34	2017.066	1552	9.07	13.5	2	1
07389-2113	ARA 972	199.8	2.32	11.8	0.48	2017.066	1634	11.9	12.5	2	1
07390-1737	SLE 813	218.1	2.54	12.4	0.52	2017.066	1574	11.43	12.03	2	1
08008-0100	BAL 844	88.1	0.30	14.0	0.10	2017.126	5847	11.02	11.21	10	2
08059-0146	AG 148	176.3	0.73	6.8	0.08	2017.129	6105	10.27	10.32	10	2
08113+0117	STF1198	337.8	0.15	33.4	0.10	2017.129	5872	8.72	8.77	10	2
08155+0202	DOB 9	127.1	0.45	12.7	0.10	2017.129	5942	8.11	9.66	10	2
08258-0025	SCJ 10A,BC	76.9	0.16	36.5	0.11	2017.129	5548	7.41	9.92	10	2
08476+0001	STF1281AB	310.1	0.11	53.1	0.11	2017.129	5508	7.84	9.02	10	2
08476+0001	STU 23AC	351.3	0.03	219.8	0.11	2017.129	5601	7.84	7.82	10	2
09157-0114	STF1329AB	265.2	0.60	8.2	0.08	2017.129	5986	9.16	9.17	10	2
09157-0114	STF1329AC	99.6	0.06	170.1	0.21	2017.129	7033	9.16	13.30	2	1
20088+1308	HJ 1482	111.1	2.34	5.6	0.25	2016.814	1549	9.87	12.2	2	1
20088+2431	POU4234	147.5	3.44	7.6	0.43	2016.814	1665	13.0	13.5	2	1
20088-2242	WHC 18	312.2	0.90	20.8	0.32	2016.814	1627	8.84	10.33	2	1
20090+1808	HJ 2932AB	165.3	1.34	12.6	0.41	2016.814	1591	10.01	11.17	2	1
20090+1808	HJ 2932AC	216.6	0.68	24.3	0.29	2016.814	2300	10.01	14.0	3	1
20090+1808	HJ 2932AD	322.1	1.54	13.0	0.43	2016.814	2379	10.01	14.7	3	1
20091+3657	SEI 921	336.1	1.19	25.7	0.46	2016.814	1850	10.73	13.16	2	1
20092+3243	TOB 171	117.1	1.35	19.1	0.43	2016.814	1751	11.3	13.3	2	1
20092+3520	ALI 184	228.0	1.36	13.2	0.27	2016.814	1855	11.34	11.30	2	1
20093+3529	STF2639AB	299.5	2.25	5.5	0.18	2016.814	1837	7.78	8.67	2	1
20093+3529	SEI 923AC	92.9	0.82	37.4	0.35	2016.814	1718	7.78	11.26	2	1
20093+3529	SEI 924CD	207.1	0.72	27.8	0.28	2016.814	1840	11.26	11.61	2	1
20099+2055	STF2637AB	329.8	0.79	11.2	0.15	2016.759	3193	6.56	8.85	5	1
20099+2055	STF2637AC	221.4	0.09	91.5	0.13	2016.759	2751	6.56	7.52	5	1
20099+2055	STF2637AD	226.3	0.08	172.8	0.22	2016.759	8025	6.56	11.94	2	1
20099+2055	STF2637BC	215.0	0.10	95.6	0.15	2016.759	2808	8.85	7.52	5	1
21238-0635	S 788	93.1	0.15	57.5	0.17	2016.800	2624	7.65	8.27	5	1
21504-0356	SCA 101	111.2	0.05	105.7	0.11	2016.742	4529	9.01	10.11	10	2
21510-0352	SCA 102	338.4	0.11	50.5	0.10	2016.742	5794	9.61	10.25	10	2
22054-0526	HJ 1720	146.1	0.49	12.4	0.10	2016.742	6016	11.56	11.15	10	2
22241-0450	BU 172AB,C	341.0	0.19	53.9	0.20	2016.742	16100	5.77	12.2	4	2
22241-0450	BU 172AB,D	191.0	0.05	124.8	0.11	2016.742	5541	5.77	11.5	10	2
22241-0450	BU 172AB,E	133.5	0.04	130.3	0.11	2016.742	4535	5.77	9.87	10	2
22346+2944	HJ 1785	172.5	0.40	14.2	0.09	2016.800	6977	8.93	10.05	10	2
22378-0414	HJ 5529AB	251.9	0.12	84.4	0.17	2016.742	16097	5.16	12.2	4	2
22582+3022	HJ 1834AB	173.6	0.33	28.4	0.16	2016.800	16057	8.66	10.98	4	2
22582+3022	HJ 1834AC	6.1	0.46	28.3	0.20	2016.800	8047	8.66	12.9	2	1

Table 1 concludes on next page.

Double Star Measures Using the Video Drift Method - IX

Table 1 (conclusion). Results of 230 Double Stars Using the Video Drift Method.

WDS	Discoverer	PA°	σ -PA	Sep "	σ -Sep	Date	No. of (x,y) pairs	Mag Pri	Mag Sec	Drifts	Nights
22582+3022	HJ 1834AD	270.4	0.08	58.1	0.11	2016.800	6022	8.66	9.67	10	2
23144+2946	FYM 146AD	314.1	0.22	57.9	0.18	2016.800	8081	6.45	13.46	2	1
23144+2946	FYM 146AE	252.6	0.20	59.1	0.19	2016.800	8046	6.45	14.23	2	1
23237-1430	HJ 5397	345.2	0.08	73.7	0.10	2016.742	5956	8.18	9.63	4	2
23377-1304	HJ 316AB	99.4	0.22	30.2	0.12	2016.742	5688	5.77	11.19	10	2

Table 1 Notes:

All magnitudes taken from the WDS catalog. All position angle/separation measurements are for the Equator and Epoch of date.

Column titled "No. of (x,y) pairs" is the total combined number of (x,y) pairs (video frames) from all drift runs. All video frames were used, none were discarded.

The column "drifts" is the number of separate drifts made. "Nights" is the number of nights drift runs were made for that system.

Table 2. Results of 2 Double Stars not in WDS Using the Video Drift Method

Primary Star	PA°	σ - PA	Sep "	σ - Sep	Date	(x,y) pairs	Mag Pri	Mag Sec	No drifts	Nights
TYC 1212-301-1	262.1	1.61	7.5	0.27	2017.066	2434	9.83	9.93	3	1
TYC 1212-409-1	61.6	3.19	6.0	0.39	2017.066	2088	12.11	12.27	3	1

(Continued from page 608)

1 and 2.

TYC 1212-301-1's proper motion vectors from the UCAC4 catalog are aligned in almost the same direction, suggesting that this might be a binary system that is physically connected. However, TYC 1212-409-1's proper motion vectors are 140° apart, suggesting this system might be a chance optical pair that is not physically connected. Accurate distances to these two doubles are not known at the current time although the release of the Gaia catalog in the next few years could potentially resolve the binary nature of these systems.

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