

Double Star Measures Using the Video Drift Method - XIII

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Abstract: Position angles and separations for 206 multiple star systems are presented using the video drift method.

Introduction

This is Paper XIII 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. Measurements are limited to systems with a separation greater than 3.2". This separation represents the current minimum resolution of the video drift method with our equipment.

Methodology

The techniques used in this paper are the same as in our previous paper (Nugent and Iverson 2018). All measurements were made with a pair of 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 calibration procedure (Nugent and Iverson 2014).

A simple average was calculated to determine the mean PA and SEP for each night. A mean standard deviation was also calculated for each night's observation. Since we frequently made measurements on several nights the means were combined using a weighted average. The weight assigned to each night's measurement is simply the inverse of that night's standard deviation squared.

In Table 1 we report the Standard Error of the Mean (SEM) which is the weighted standard deviation divided by the square root of the number of nights measurements were made. In the case of double star systems measured on only one night, the SEM is equivalent to the nightly standard deviation (Nugent and Iverson 2018). This practice gives a higher error value than if a multi night SEM were calculated. We do not report the weighted standard deviation because it produces an artificially lowered error measure as the number of nights increases.

To reach fainter systems, 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 +10.36, +14.29. Sixteen systems had WDS magnitudes in the range +13.0 to +14.29.

Occasionally we would come across systems in which there was a large magnitude difference between the components. At a nominal gain setting for our video cameras the fainter (secondary) component was usually not visible, therefore position measurements could not be made. If it was visible, the primary (brighter) component was overly saturated on the video chip sensor and thus too large to be measured by the restricted size of the measurement aperture in the Limovie program. The solution is to make two separate drift runs at differ-

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ent gain settings using the same video frames so that each component was visible and thus could be measured; then combine the measurements from both runs to derive a position angle and separation.

Other systems had very close separations causing the components to merge at our nominal scale factor of 0.6"/pixel. This issue was resolved by using a magnification script on the video. The video was enlarged significantly into three sections (typically scale 0.2"/pixel or less) allowing the components to be resolved and measured. Both of the above techniques have been discussed previously (Nugent and Iverson 2018).

Acknowledgements

This research makes use of the Washington Double Star Catalog maintained at the US Naval Observatory.

References

Iverson, E. and Nugent, R., 2015, *Journal of Double Star Observations*, **11**, (2), 91-97.
 Nugent, R. and Iverson, E., 2011, *Journal of Double Star Observations*, **7**, (3), 185-194.
 Nugent, R. and Iverson, E., 2014, *Journal of Double Star Observations*, **10**, (3), 214-222.
 Nugent, R. and Iverson, E., 2018, *Journal of Double Star Observations*, **14**, (3), 566-576.

Position	Discover Code	PA	PA SEM	Sep.	Sep. SEM	Avg. Date	Mag 1	Mag 2	Drifts	Nights
00020+2347	TVB 2	291.8	0.02	28.10	0.04	2019.80	8.98	9.63	15	3
00040+4942	TOB 9	25.6	0.04	43.90	0.04	2019.87	9.08	9.84	15	3
00078+5723	HJ 3241	8.6	0.03	14.90	0.02	2019.87	9.16	9.83	15	3
00104+4952	ES 2576	294.2	0.03	77.04	0.04	2019.87	8.62	8.72	15	3
00108+5846	ARY 8AB	100.7	0.04	39.24	0.04	2019.87	8.13	8.63	15	3
00108+5846	ARY 8AC	42.8	0.04	104.65	0.05	2019.87	8.13	8.29	15	3
00125+4625	D 1	74.0	0.04	13.92	0.01	2019.80	9.66	10.35	20	4
00227+2434	HJL1003	252.1	0.05	74.29	0.05	2019.80	8.80	9.69	20	4
00545+5619	CTT 2	42.0	0.03	59.63	0.03	2019.81	7.18	9.83	15	3
01147+4255	ARG 49AB	105.9	0.02	35.72	0.03	2019.80	8.79	10.03	15	3
01147+4255	ARG 49AC	103.5	0.05	23.81	0.03	2019.80	8.79	10.29	15	3
01147+4255	ARG 49BC	290.7	0.03	11.96	0.01	2019.80	10.03	10.29	15	3
01175+2105	STF 107	68.7	0.07	21.06	0.02	2019.81	8.82	10.69	15	3
02042+5257	HJ 2104	170.3	0.04	30.41	0.04	2019.81	9.35	9.61	15	3
02282+5423	HJ 5535CD	145.1	0.02	19.67	0.01	2019.81	10.54	11.16	15	3
02282+5423	STF 267AB	28.7	0.07	94.17	0.10	2019.81	8.97	8.95	15	3
02282+5423	STF 267BC	25.5	0.02	69.04	0.01	2019.81	8.95	10.54	15	3
02580+4650	VLM 7	175.5	0.04	11.73	0.02	2019.81	9.6	9.6	15	3
03009+5940	STTA 31	230.5	0.05	73.90	0.06	2019.81	7.33	8.03	15	3
08054+0812	STF1181	141.2	0.21	5.17	0.02	2019.18	8.28	9.26	25	5
08137+0407	ARG 68	325.8	0.07	51.88	0.13	2019.18	9.54	10.01	25	5
08242+3737	ES 1732	83.2	0.24	18.74	0.04	2019.18	9.58	10.3	25	5
08400+2009	ARN 105	153.2	0.09	91.16	0.31	2019.18	8.89	9.69	25	5
08435+4852	STF1258	330.8	0.08	10.14	0.01	2019.18	7.72	7.87	25	5

Table 1. Results of 206 double stars using the video drift method.

Table continues on the next page.

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Position	Discover Code	PA	PA SEM	Sep.	Sep. SEM	Avg. Date	Mag 1	Mag 2	Drifts	Nights
09032+0140	XMI 87	306.1	0.11	26.87	0.18	2019.18	9.36	10.63	25	5
09227+5036	STF1341	88.9	0.21	20.46	0.10	2019.18	9.09	9.17	25	5
09251+2915	CTT 22	42.8	0.16	89.03	0.16	2019.18	9.4	9.9	25	5
09307+4502	FLA 1	238.8	0.09	34.00	0.06	2019.18	9.61	10.58	25	5
09309+4441	STF1358	176.4	0.06	24.14	0.07	2019.18	7.93	9.25	25	5
09357+5318	STF1366	320.6	0.18	7.77	0.04	2019.18	8.44	10.09	20	4
09361+5318	STF1368	219.8	0.12	21.85	0.02	2019.18	8.79	10.45	25	5
09505+4505	CBL 38	11.6	0.08	52.21	0.05	2019.18	7.46	11.71	25	5
11076-1732	ARA 225AB	171.3	2.70	8.00	0.46	2019.33	11.9	11.9	5	1
11076-1732	WNO 28AC	132.4	2.24	31.84	1.24	2019.33	12.24	13.66	5	2
11084+0313	H 5 68AB	226.4	0.11	143.71	0.31	2019.33	7.74	9.24	3	1
11084+0313	SLE 686AC	222.0	0.13	185.73	0.39	2019.33	7.74	11.88	3	1
11084+0313	H 5 68BC	206.6	0.57	43.20	0.37	2019.33	9.24	11.88	3	1
11285+0750	WLF 1AB	335.7	0.15	114.69	0.33	2019.33	10.34	10.51	3	1
11285+0750	WLF 1AC	300.9	0.11	236.60	0.50	2019.33	10.34	12.88	3	1
11285+0750	WLF 1BC	276.1	0.15	156.93	0.43	2019.33	10.51	12.88	3	1
11349-1325	BRT2729	227.8	1.26	3.92	0.09	2019.33	10.3	11.2	9	1
11390-0950	J 2083	112.6	2.03	4.78	0.19	2019.33	11.99	13.0	5	1
11404-0606	ROE 73AC	57.2	0.08	84.85	0.11	2019.33	11.56	11.08	9	1
11484-1019	H 6 115BC	352.2	0.18	100.74	0.28	2019.33	9.17	12.55	3	1
11518-0335	J 1581AB	223.7	2.03	6.53	0.24	2019.33	10.60	13.8	3	1
11561-0409	BRT 436	192.5	1.03	3.21	0.09	2019.33	11.89	12.35	9	1
11584+2352	POU3119	175.0	2.29	11.63	0.53	2019.34	13.40	13.82	3	1
12019-4100	WG 148	291.3	3.39	7.41	0.38	2019.34	11.52	12.4	3	1
12051-2335	DON1096	168.0	0.88	5.26	0.08	2019.33	10.37	12.7	9	1
12053-3511	LDS 854	114.7	1.02	28.23	0.48	2019.33	10.69	13.43	3	1
12085-0259	BAL 219	16.9	2.15	7.66	0.27	2019.34	10.65	12.9	3	1
12110-2934	BRT2991	132.0	0.96	5.38	0.09	2019.34	10.56	12.9	9	1
12141-3644	SEE 147AB,C	306.4	0.69	27.83	0.31	2019.34	8.53	11.72	3	1
12219-0237	HLD 12AC	314.5	0.66	50.23	0.65	2019.34	10.36	14.29	3	1
12219-0237	HLD 12AD	306.8	0.15	117.76	0.33	2019.34	10.36	12.11	3	1
12242-3224	HJ 4519AB	89.2	1.20	8.91	0.26	2019.34	9.8	11.4	3	1
12247+0225	AG 177AB	220.5	1.51	7.30	0.20	2019.34	9.35	10.64	3	1
12247+0225	AG 177AC	57.4	0.20	96.27	0.33	2019.34	9.35	12.94	3	1
12256-0737	HDS1747	330.5	1.31	7.99	0.19	2019.33	9.36	11.97	3	1
12265-0153	HLD 13AC	71.9	0.14	130.75	0.34	2019.34	9.72	12.38	3	1
12267-2850	FOX 174	311.4	1.47	13.94	0.36	2019.33	9.6	12.1	3	1
12290+3735	KZA 36AB	114.7	0.31	57.13	0.26	2019.34	9.12	12.86	3	1
12290+3735	KZA 36AC	322.8	0.22	83.67	0.27	2019.34	9.17	13.12	3	1
12333-2410	ARA2180	276.0	2.17	6.32	0.29	2019.33	11.4	11.8	3	1

Table 1 (continued). Results of 206 double stars using the video drift method.

Table continues on the next page.

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Position	Discover Code	PA	PA SEM	Sep.	Sep. SEM	Avg. Date	Mag 1	Mag 2	Drifts	Nights
12383-1131	STF1664AB	223.2	0.32	38.71	0.23	2019.33	7.82	9.17	3	1
12383-1131	STF1664AC	306.4	0.21	60.70	0.25	2019.33	7.82	11.52	3	1
12383-1131	STF1664AD	290.9	0.20	83.77	0.34	2019.33	7.82	12.43	3	1
12383-1131	STF1664AE	109.8	0.12	121.38	0.27	2019.33	7.82	8.58	3	1
12383-1131	STF1664BC	340.9	0.22	68.09	0.28	2019.33	9.17	11.52	3	1
12383-1131	STF1664BD	318.2	0.25	77.91	0.34	2019.33	9.17	12.43	3	1
12383-1131	STF1664CD	258.1	0.58	30.00	0.35	2019.33	11.52	12.43	3	1
12383-1131	STF1664EF	111.5	0.15	92.73	0.27	2019.33	8.58	8.91	3	1
12392-0800	ENG 47BC	61.2	0.12	105.63	0.22	2019.33	8.80	10.56	3	1
12406+4017	HJ 2617AB	1.9	1.24	5.37	0.12	2019.34	8.41	9.61	3	1
12406+4017	HJ 2617AC	175.6	0.08	168.72	0.18	2019.34	8.41	11.02	3	1
12406+4017	BKO 114AD	343.2	0.47	43.05	0.20	2019.34	8.41	13.78	3	1
12432-2722	B 2300	314.5	2.10	10.61	0.34	2019.33	8.97	13.0	3	1
12464-4605	I 9024AC	215.4	0.97	24.51	0.29	2019.34	10.04	13.0	3	1
12481-3542	SEE 161AB	108.2	0.54	34.19	0.29	2019.33	9.21	11.67	3	1
12481-3542	SEE 161BC	95.9	1.12	5.55	0.12	2019.33	12.4	13.4	9	1
12490-1217	J 2086	299.7	1.77	5.81	0.21	2019.33	10.4	12.0	9	1
12525-4603	CPO 354	282.0	2.37	8.60	0.29	2019.34	11.2	12.2	3	1
13011-3337	HJ 4563	236.7	0.31	5.73	0.04	2019.33	7.02	8.23	9	1
13038-3415	SEE 169	236.4	0.74	10.34	0.15	2019.33	7.22	11.5	3	1
13058-0503	A 10AC	55.6	0.21	72.96	0.24	2019.33	11.47	10.50	3	1
13108-4404	CPO 363	87.9	0.86	5.07	0.10	2019.34	10.97	12.5	9	1
13127-2258	ARA1797	50.3	1.68	9.29	0.25	2019.33	10.41	11.6	3	1
13153+1612	SLE 917	298.5	0.53	28.30	0.22	2019.33	8.71	12.72	3	1
13208-0431	BRT 446	296.9	0.65	14.47	0.19	2019.33	11.25	11.7	9	1
13216+1717	GRV 866AB,C	295.5	0.24	64.19	0.27	2019.33	10.32	10.99	3	1
13236+3608	KZA 61AB	108.8	0.24	88.07	0.34	2019.34	11.65	11.74	2	1
13236+3608	KZA 61AC	292.5	0.20	158.90	0.54	2019.34	11.65	13.31	2	1
13239-2346	ARA2185	234.4	2.22	9.04	0.33	2019.33	11.3	12.5	3	1
13253+1033	HJ 227AB	314.8	0.37	39.71	0.25	2019.34	9.02	10.59	3	1
13253+1033	STU 8AC	212.5	0.25	77.70	0.35	2019.34	9.02	12.19	3	1
13253+4028	HJ 1231AB	14.4	0.63	24.04	0.22	2019.34	8.67	12.5	3	1
13253+4028	HJ 1231AC	52.9	0.14	90.35	0.18	2019.34	8.67	8.85	3	1
13253+4028	BKO 49AD	202.3	0.41	39.22	0.22	2019.34	8.85	12.89	3	1
13277-4312	I 400AC	263.3	1.01	17.22	0.23	2019.34	9.25	13.83	3	1
13277-4312	DAM 23AD	311.0	0.42	43.81	0.27	2019.34	9.25	9.58	3	1
13291+2211	STF1748AB	183.9	1.77	5.74	0.13	2019.34	8.26	10.85	3	1
13291+2211	STF1748AC	183.9	0.12	138.87	0.24	2019.34	8.26	11.00	3	1
13325+1428	FOX 178	26.6	2.36	12.06	0.47	2019.34	9.67	13.0	3	1
13328+2242	POU3143	154.2	1.61	13.12	0.33	2019.34	10.16	12.6	3	1

Table 1 (continued). Results of 206 double stars using the video drift method.

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Position	Discover Code	PA	PA SEM	Sep.	Sep. SEM	Avg. Date	Mag 1	Mag 2	Drifts	Nights
13330-0225	HLD 15AB	296.6	0.57	16.57	0.20	2019.33	7.36	12.1	3	1
13330-0225	HLD 15AC	249.2	0.14	144.53	0.34	2019.33	7.36	12.32	3	1
13367+2847	GRV 870AB,C	118.0	0.69	22.39	0.24	2019.34	9.72	11.67	3	1
13372-2957	HJ 4599	206.6	1.97	7.78	0.23	2019.33	10.75	11.66	3	1
13376-1048	STF1762AB	275.1	0.81	4.40	0.07	2019.33	9.39	9.88	9	1
13376-1048	UC 2570AC	256.5	0.06	85.59	0.07	2019.33	9.39	12.46	9	1
14008-1108	GWP2174AB	183.6	0.43	76.23	0.52	2019.33	12.1	13.9	3	1
14060+0315	A 2168AC	110.9	0.99	23.63	0.48	2019.33	9.55	13.7	3	1
14303-2020	B 2769	249.2	1.11	13.79	0.24	2019.34	9.15	12.2	3	1
14310-4351	HDS2049AB	226.0	1.91	8.33	0.23	2019.34	8.82	10.11	3	1
14310-4351	FAB 13AC	230.7	0.98	24.57	0.33	2019.34	8.82	10.40	3	1
14326-2327	ARA2188	177.2	1.09	9.17	0.31	2019.34	10.6	12.7	3	1
14398-3833	I 1576AC	230.2	1.01	18.92	0.27	2019.34	9.11	12.54	3	1
15569+3604	HJ 258	253.2	0.06	16.63	0.02	2019.52	10.40	11.20	15	3
16160+1126	ENG 56AB	252.2	0.23	61.63	0.28	2019.56	7.37	10.60	3	1
16160+1126	BUP 166AC	342.4	0.31	86.81	0.43	2019.56	7.37	12.34	3	1
16160+1126	BUP 166BC	17.2	0.22	106.61	0.22	2019.56	10.60	12.34	3	1
16197+1054	KU 52AB	49.7	1.68	9.45	0.26	2019.56	10.14	11.5	3	1
16197+1054	KU 52AC	276.3	0.17	83.51	0.25	2019.56	10.14	11.26	3	1
16212-2958	B 1319AB	130.4	1.85	7.64	0.26	2019.56	9.99	11.3	3	1
16304+0140	SKF1592	220.3	0.04	63.15	0.05	2019.52	8.87	9.30	15	3
16418+1309	LBU 15AB	327.1	0.15	81.03	0.20	2019.56	8.02	9.86	3	1
16418+1309	LBU 15AC	223.3	0.15	39.42	0.10	2019.56	8.02	12.82	3	1
16450+0605	STT 585BC	323.0	0.09	152.42	0.25	2019.56	10.40	10.77	3	1
16450+0605	STT 585CP	107.9	0.22	105.15	0.38	2019.56	10.77	12.8	3	1
16458+0835	SHJ 239BC	131.5	0.26	96.90	0.24	2019.56	9.29	12.38	3	1
17003+1958	SLE 4	283.4	0.05	11.42	0.01	2019.56	10.82	10.90	20	4
17118+2906	SLE 11	285.5	0.08	9.21	0.01	2019.56	11.36	12.3	15	3
17120+2859	GRF 3	185.9	0.03	96.54	0.09	2019.52	9.70	10.09	25	5
17155-2346	ARA2200	194.6	2.93	6.58	0.39	2019.56	11.6	12.0	3	1
17174+1939	COU 496AC	250.1	3.16	7.35	0.42	2019.56	11.3	12.8	3	1
17189-2029	ARA1124	72.7	2.55	6.55	0.33	2019.56	11.4	11.9	3	1
17189-2400	H 6 54AC	141.5	0.23	79.01	0.32	2019.56	9.73	9.74	3	1
17244-0538	J 1615	187.6	2.13	6.93	0.23	2019.56	10.95	12.9	3	1
17284+2950	ARY 13	88.8	0.04	102.92	0.06	2019.56	8.57	8.91	20	4
17287-2235	B 2837	224.7	1.58	12.99	0.33	2019.56	9.61	12.10	3	1
17529+0744	SKF2779	62.0	0.05	67.72	0.07	2019.56	8.4	10.1	15	3
18041+0628	STF2265	281.9	0.03	23.45	0.02	2019.56	9.91	10.59	15	3
18264+4649	STT 352	220.3	0.03	24.52	0.02	2019.56	7.91	9.38	30	6
18386+4901	CBL 171	260.1	0.04	47.50	0.04	2019.56	9.49	10.74	30	6

Table 1 (continued). Results of 206 double stars using the video drift method.

Table continues on the next page.

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Position	Discover Code	PA	PA SEM	Sep.	Sep. SEM	Avg. Date	Mag 1	Mag 2	Drifts	Nights
18404+0942	S 704	263.8	0.03	58.08	0.05	2019.64	8.49	9.07	15	3
18479+1110	STTA174	158.5	0.07	104.56	0.09	2019.64	7.51	8.32	15	3
18577+0942	HJ 5505	122.1	0.07	14.43	0.02	2019.52	9.41	9.46	25	5
19019+2718	ES 479	142.2	0.08	8.41	0.01	2019.56	9.3	10.5	20	4
19021+0230	BAL1973	189.7	0.04	10.68	0.04	2019.56	9.45	11.09	10	2
19031+0350	HJL1100	21.1	0.02	88.56	0.05	2019.64	8.35	9.22	15	3
19037+1658	STF2442	209.6	0.07	9.94	0.02	2019.64	8.48	9.77	15	3
19100+4941	JKA 30	76.7	0.03	61.77	0.05	2019.56	7.99	9.90	20	4
19190+3934	DEA 466	258.2	0.03	40.36	0.07	2019.64	8.8	10.7	15	3
19196+2321	POU3765	230.2	0.05	16.08	0.02	2019.56	9.56	10.98	20	4
19248+1215	SKF 921	237.3	0.04	54.03	0.08	2019.56	9.73	10.67	20	4
19250+1157	COM 7AD	190.6	0.01	130.14	0.02	2019.56	5.24	10.3	10	2
19250+1157	STT 588AB	280.7	0.05	108.27	0.10	2019.56	5.24	8.65	20	4
19250+1157	STT 588AC	276.6	0.06	151.58	0.15	2019.56	5.24	10.34	20	4
19250+1157	STT 588BC	266.5	0.04	44.49	0.04	2019.56	8.65	10.34	20	4
19254+2542	ARY 17	267.9	0.07	115.97	0.10	2019.64	8.31	8.72	15	3
20065+1253	HJ 1476	73.1	0.04	12.31	0.02	2019.63	9.7	10.7	15	3
20095+4752	BLL 45	139.5	0.02	145.37	0.10	2019.63	9.01	9.92	15	3
20131+3411	STTA203	36.9	0.03	88.37	0.10	2019.67	8.26	9.14	15	3
20168+3731	ARY 25	293.1	0.04	147.14	0.10	2019.63	8.65	8.72	15	3
20234+3053	ARG 91	175.4	0.05	20.75	0.03	2019.63	8.59	9.48	15	3
20248+1452	STF2680	287.8	0.03	16.21	0.02	2019.65	9.20	9.48	15	3
20332+4028	HJ 609	320.2	0.04	26.67	0.02	2019.63	8.84	9.34	15	3
20348+0514	SCJ 26	88.4	0.04	25.11	0.03	2019.65	8.49	10.13	15	3
20371+3837	SEI1193	353.0	0.06	17.06	0.03	2019.65	8.76	10.1	15	3
20413+2922	ARY 29	142.7	0.03	119.29	0.10	2019.63	8.10	8.46	15	3
20433+4456	ES 2699	296.4	0.05	40.05	0.03	2019.66	8.64	9.51	15	3
20459+4448	ES 2701	80.8	0.03	50.94	0.02	2019.70	8.76	9.24	15	3
20520+6022	SKF2091	291.5	0.04	45.37	0.03	2019.63	8.69	9.87	15	3
20582+0447	AG 268	286.9	0.05	12.54	0.01	2019.68	8.59	9.99	15	3
20583+0831	ARY 87	214.9	0.03	62.18	0.03	2019.68	8.24	9.85	15	3
20584+0757	ARY 68	339.1	0.03	112.40	0.09	2019.68	8.80	9.30	15	3
21090+0643	STT 428	255.7	0.06	24.01	0.03	2019.63	8.41	9.93	15	3
21122+5854	ARG 107	192.6	0.04	37.02	0.03	2019.63	8.16	9.24	15	3
21183+4244	HJ 1634	143.1	0.02	28.88	0.03	2019.68	9.32	9.53	15	3
21314+4829	ARN 78	100.9	0.02	50.04	0.03	2019.63	7.64	8.82	15	3
21346+5906	STF2810	290.1	0.03	16.82	0.01	2019.68	8.43	9.04	15	3
22110+3024	DAM1271	79.7	0.03	34.69	0.03	2019.68	9.3	9.5	15	3
22112+2335	ARY 63	189.0	0.02	92.44	0.07	2019.80	9.68	10.14	15	3
22120+3739	STF2876	68.6	0.08	11.75	0.02	2019.63	8.06	9.81	15	3

Table 1 (continued). Results of 206 double stars using the video drift method.

Table continues on the next page.

Double Star Measures Using the Video Drift Method - XIII

Position	Discover Code	PA	PA SEM	Sep.	Sep. SEM	Avg. Date	Mag 1	Mag 2	Drifts	Nights
22152+4953	STF2890AB	11.1	0.03	9.42	0.01	2019.80	9.42	9.71	20	4
22152+4953	STF2890AC	277.5	0.03	73.12	0.03	2019.80	9.42	9.40	20	4
22221+0045	ARY 30	339.6	0.01	119.94	0.05	2019.63	8.69	9.24	15	3
22338+0352	GRV 587	229.4	0.04	77.88	0.06	2019.87	9.72	9.98	15	3
22375+3855	STF2926	334.8	0.04	21.58	0.04	2019.64	9.10	9.54	15	3
22387+3718	AG 284	229.8	0.07	26.45	0.03	2019.64	9.86	9.94	15	3
22451+3841	HDS3229	330.1	0.05	19.84	0.03	2019.87	8.56	10.66	15	3
22485+4524	ARN 99	228.6	0.03	37.48	0.05	2019.67	8.42	10.42	15	3
22487+3818	AG 288	186.3	0.04	18.70	0.03	2019.87	8.93	10.36	15	3
22530+3140	HJ 972	208.0	0.05	28.64	0.03	2019.80	9.64	10.71	15	3
23029+4610	HJ 1841AB	344.2	0.05	18.15	0.02	2019.80	9.69	10.18	15	3
23029+4610	HJ 1841AC	285.2	0.06	33.59	0.02	2019.80	9.69	10.42	15	3
23065+4655	STTA242	31.0	0.03	79.95	0.06	2019.76	7.75	8.57	30	3
23169+4238	HJ 1864	205.4	0.04	22.87	0.02	2019.80	9.79	10.35	15	3
23188+0510	STF2999AB	166.8	0.02	78.90	0.07	2019.80	8.90	9.17	20	4
23188+0510	STF2999AD	19.1	0.04	27.40	0.03	2019.80	8.90	11.9	20	4
23188+0510	STF2999BC	171.9	0.05	9.78	0.02	2019.80	9.17	10.86	20	4
23207+4848	ARY 3AB	210.7	0.04	120.46	0.08	2019.87	8.96	9.47	15	3
23231+4501	SCA9004	107.1	0.05	79.48	0.03	2019.87	8.35	9.39	15	3
23428+4727	ES 548	316.0	0.07	14.25	0.01	2019.87	9.23	10.19	15	3
23530+4121	ARG 108	147.5	0.03	52.98	0.06	2019.87	7.15	9.46	15	3
23593+5352	ES 2736	107.7	0.03	19.47	0.01	2019.80	9.07	10.50	15	3

Table 1 (conclusion). Results of 206 double stars using the video drift method.

Table 1 Notes:

- All magnitudes taken from the WDS catalogue. All position angle/separation measurements are for the Equator and Equinox of date.
- "SEM" is the Standard Error of the Mean. See the text for the definition and usage. The column "Drifts" is the number of separate measurements made using both the drift and modified drift methods. "Nights" is the number of nights' drift runs were made for that system.

