

Double Star Measurements Using a Webcam: Annual Report of 2007

Joerg S. Schlimmer

Seeheim-Jugenheim,
Hessen, Germany

Email: js@epsilon-lyrae.de

Abstract: I report on the measurements of 58 double stars in 2007 using a standard webcam.

The double star measurements reported here were made with an 8-inch Newtonian telescope. The primary focal length is only 800 mm. For observing double stars with separation more than 5 arc seconds, I enlarge the focal length up to 1500 mm by using a barlow system. For double stars between 1 and 5 arc second of separation, I enlarge the focal length up to about 3000 mm.

To record the observations I use a standard webcam (Philips ToUcam pro 740 k). This webcam has a small CCD chip with square pixel of 5.6 x 5.6 micrometers. The resolution is 640 x 480 pixels. The reproduction scale of the optical system (focal length 1500 mm) is about 0.79 arc seconds / pixel or 0.34 arc seconds / pixel if a focal length of 3000 mm is used (Schlimmer 2007a). The faintest stellar magnitude which can be directly recorded is about 10.5.

For analyses of the webcam records I use the REDUC software package, written by Florent Losse. The version 3.74 or higher includes a separate module for loading AVI files and converts them into BMP files. This module is very helpful for webcam users like me, because I need no other software tool for analysis of webcam records.

For double stars with components of equal brightness, the typical standard deviation is about 0.25 arc seconds by using the 0.79 arc seconds per pixel con-

figuration. In cases of high contrast differences between the components like Vega (STFB 9AE) or Altair (STFB 10AC), the standard deviation is about 0.5 arc seconds. Anyway, reproduction tests show mostly better results.

In some cases the signal to noise ratio is too low to analyze the frames. In those instances, the REDUC software can stack the frames. After stacking, the signal to noise ratio is much better with the result that the frame can be analyzed. The faintest magnitude of the stacked frame is 11.1 up to 11.5 magnitudes (e.g. STT 532).

References

- Schlimmer 2007a, Double Star Measurements Using a Webcam, JDSO Vol. 3 No. 3 summer 2007
- Schlimmer 2007b, Christian Mayer's Double Star Catalog of 1779, JDSO Vol. 3 No. 4 fall 2007

Table begins on next page.

Double Star Measurements Using a Webcam: Annual Report of 2007

NAME	RA+DEC	MAGS	PA	SEP	DATE	N	NOTES
STFA 1	00464+3057	7.25 7.43	47.1	47.05	2007.832	66	notes 1
STF 205A-BC	02039+4220	2.31 5.02	62.9	9.45	2007.783	80	γ And
STF 464AB	03541+3153	2.85 9.16	209.3	12.94	2007.783	24	44 Per
STF 464AC	03541+3153	2.85 11.24	287.4	33.81	2007.783	1	44 Per
STF 464AD	03541+3153	2.86 10.44	196.1	98.14	2007.783	27	44 Per
STF 464AE	03541+3153	2.86 9.96	186.2	119.29	2007.783	27	44 Per
SHJ 70AB	06278+2047	6.65 8.18	202.4	24.81	2007.181	65	Gemini
STF1110AB	07346+3153	1.93 2.97	60.5	4.43	2007.230	56	Castor
STF1196AB	08122+1739	5.30 6.25	44.0	1.02	2007.230	8	ζ Cnc
STF1196AC	08122+1739	5.31 5.85	70.4	6.27	2007.230	16	
STF1196AD	08122+1739	5.31 8.89	107.1	275.23	2007.268		
S 566	08265+2754	5.74 10.7	20.8	138.91	2007.195	42	ϕ 1 Cnc
STF1223	08268+2656	6.16 6.21	217.7	5.09	2007.195	48	ϕ 2 Cnc
STF1268	08467+2846	4.13 5.99	308.2	30.43	2007.181	85	ι Boo
STFB 6AB	10084+1158	1.40 8.24	307.8	175.03	2007.230	85	Regulus
STF1424AB	10200+1950	2.37 3.64	125.9	4.68	2007.202		Algieba
STF1424AC	10200+1950	2.37 9.64	288.2	332.94	2007.193		
STF1424AD	10200+1950	2.60 10.0	301.9	367.30	2007.199		
STF1424CD	10200+1950	9.64 10.6	2.5	89.70	2007.199		
STF1523	11182+3132	4.33 4.80	230.5	1.60	2007.304	35	ζ UMa
STF1633	12207+2703	7.04 7.13	246.0	8.94	2007.304	53	notes 2
STF1657	12351+1823	5.11 6.33	270.7	19.98	2007.304	170	24 Com
SHJ 162Aa-B	13149-1122	7.11 8.18	44.4	109.30	2007.378		
SHJ 169	13547+1824	2.72 9.99	86.7	113.34	2007.564	31	η Boo
STF1864AB	14407+1625	4.88 5.79	111.4	5.54	2007.386		π Boo
STF1888AB	14514+1906	4.76 6.95	310.9	6.30	2007.531		ζ Boo
STF1909	15038+4739	5.20 6.10	56.7	1.80	2007.531	20	44 Boo
H 3 7AC	16054-1948	2.59 4.52	20.7	13.57	2007.515	78	β Sco
H 5 6Aa-C	16120-1928	4.21 6.60	336.7	40.94	2007.515	80	ν Sco
STF2098AB	16457+3000	8.77 9.61	145.4	14.27	2007.534		Her
STF2098AC	16457+3000	8.77 8.81	129.2	65.52	2007.534		
STF2098AD	16457+3000	8.77 11.0	17.9	66.61	2007.534		
SHJ 243AB	17153-2636	5.12 5.12	326.7	5.10	2007.591	22	36 Oph
H 3 25	17180-2417	5.23 6.64	355.2	10.07	2007.591	54	39 Oph
STF2272AB	18055+0230	4.20 6.20	134.6	5.32	2007.523		70 Oph
H 5 39AB	18369+3846	0.02 9.5	182.9	79.22	2007.701	25	Vega
STFB 9AE	18369+3846	0.02 9.5	38.9	89.50	2007.701	28	Vega

Table continued on next page.

Double Star Measurements Using a Webcam: Annual Report of 2007

NAME	RA+DEC	MAGS	PA	SEP	DATE	N	NOTES
H 5 36AC	18423-0903	4.73 10.56	130.7	51.05	2007.591	45	δ Sct
STF2382AB	18443+3940	5.01 6.10	348.7	2.37	2007.513		
STF2383Cc-D	18443+3940	5.25 5.38	79.3	2.37	2007.513		notes 3
STF2470	19088+3446	7.03 8.44	267.8	13.74	2007.761	74	notes 4
STF2474Aa-B	19091+3436	6.78 7.88	262.5	15.73	2007.761	91	notes 5
STFA 42	19287+2440	4.61 5.93	28.8	422.93	2007.701	74	α Vul
BUP 198	19463+1037	2.72 10.8	233.5	215.45	2007.564	19	γ Aql
STF2585AB-C	19490+1909	5.04 9.01	311.4	8.11	2007.706	18	ζ Sge
STFB 10AB	19508+0852	0.95 9.82	286.5	192.10	2007.701	34	Altair
STFB 10AC	19508+0852	0.77 10.1	107.3	189.64	2007.701	20	Altair
STT 532AB	19553+0624	3.71 11.8	2.4	12.29	2007.564	1	β Aql
STT 532AC	19553+0624	3.81 11.2	349.9	213.43	2007.564	1	
STFA 50Aa-C	20136+4644	3.93 6.97	173.0	106.01	2007.706	70	30/31 Cyg
STF2703AB	20368+1444	8.35 8.42	290.2	25.26	2007.706	35	notes 6
STF2703AC	20368+1444	8.35 8.76	233.9	76.71	2007.706	30	
STF2703BC	20368+1444	8.42 8.76	35.6	66.08	2007.706		
STF2704AB-D	20375+1436	3.25 11.0	319.2	46.48	2007.706	21	β Del
STF2727	20467+1607	4.36 5.03	266.7	9.05	2007.706	82	γ Del
STF2758AB	21069+3845	5.35 6.10	151.0	30.82	2007.706	86	61 Cyg
STF2848	21580+0556	7.21 7.73	55.9	10.79	2007.783	81	
STF2909	22288-0001	4.34 4.49	171.8	2.04	2007.783	31	ζ Aqu
STF3050	23595+3343	6.46 6.72	334.3	2.13	2007.783	155	notes 7

N = number of analyzed frames

Notes :

1. STFA 1 = Mayer 1, introduced in Christian Mayer's Double Star catalog of 1779 (Schlimmer 2007b)
2. STF1633 = Mayer 32, introduced in Christian Mayer's Double Star catalog of 1779 (Schlimmer 2007b)
3. calibration star for focal length of 3000 mm
4. 3 degree north east of γ Lyr, near STF2474
5. 3 degree north east of γ Lyr, near STF2470
6. STF2703AB = Mayer 66, introduced in Christian Mayer's Double Star catalog of 1779 (Schlimmer 2007b)
7. STF3050 = Mayer 80, introduced in Christian Mayer's Double Star catalog of 1779 (Schlimmer 2007b)