

The visual double stars observed by the Hipparcos satellite

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Abstract. This paper is the introduction to the complete and correct list of all systems or individual components known in July 1997 which were observed by the Hipparcos satellite. The list concerns 18644 double or multiple systems and may be found at the CDS under reference I-260¹. Its format is the same as that used in the CCDM catalogue (Dommagnet & Nys 1994a,b).

Key words: catalogs – astrometry – stars: binaries: visual

1. Introduction

In 1980 the Hipparcos project was endorsed by the European Space Agency. It was already known that the mission would need the establishment of an *Input Catalogue* of all the objects to be observed. This catalogue of more than 100000 stars should report their positions with an accuracy of $\pm 1''$ and their magnitudes with an accuracy of $\pm 0.1m$.

Whereas many catalogues exist to help define these parameters for the single stars, no such references exist for double and multiple systems; the best available general catalogue of all known such objects is the Index Catalogue (Jeffers & van den Bos 1963) regularly updated since 1964 by Worley at the US Naval Observatory. This catalogue gives the positions of the systems to a numerical accuracy of only $\pm 1'$ and shows, in many cases, an effective error of 2 to 3', due to the techniques used and to the fact that some systems have angular dimensions larger than one arc minute. This imprecision was acceptable for works pursued by the double star specialists but unfortunately not for the space mission.

As coordinator of the Double Star Working Group inside the Input Catalogue Consortium (INCA), we began the creation of a specific double star catalogue based on the Index (updated to July 1976) but providing accurate positions to $\pm 1''$ or better for at least one component per system. To achieve this, each record was limited to one component only. After more than ten years of work, consisting of catalogue cross-identifications, biblio-

graphic researches, organisation of observation campaigns by devoted members of a Double Star Working Group, and making partial use of the most recent edition of the Index (the WDS catalogue, Worley & al. 1984), this catalogue, called *Catalogue of the Components of Double and Multiple stars* (CCDM), contained 34031 systems, of which at least one component was located with an accuracy of 1 arcsecond. The CCDM served as the basic data file to establish Annexe 1 (vol. 6) of the Hipparcos Input Catalogue (Turon et al. 1992) containing 14167 accurately identified double and multiple systems. The historical sketch of the CCDM has been given elsewhere (Dommagnet & Nys 2000).

However, during the operational period of the mission and since the publication of the first version of the CCDM (Dommagnet & Nys 1994a,b), the identification process continued. Based on a copy of the WDS Catalogue – heir of the Index – updated to January 1, 1994 and kindly put at the disposal of the Double Star Working Group of the Hipparcos Science Team by Worley (1994), two more lists of identifications were published (Dommagnet & Nys 1995, 1996). Unfortunately these were not fully taken into account when the final Hipparcos Catalogue and Celestia 2000 (ESA 1997) were realized (Dommagnet 2000).

2. The visual double stars in the Hipparcos catalogue

We give here the only complete list of all known double and multiple systems (18644) having at least one component identified in the Hipparcos final catalogue in July 1997, including the 2994 systems newly discovered by the satellite as well as the 155 new astrometric orbital pairs of the DMSA/O also discovered by the satellite (Dommagnet, 2000). It may be considered as a subset of the CCDM as it existed in 1998 and of which a second edition, containing more than 45000 systems, is being prepared for publication. Consequently, the format of this list is that of the CCDM for which all information may be found in the introduction to its 1994 published version (mentioned above) as well as at the CDS, ref. I-211². Some additional information should be considered to best interpret the present file. This information is given in Table 1. One

¹ The complete list is only available electronically via <http://cdsweb.u-strasbg.fr/cgi-bin/Cat?I/260>

² Via: <http://cdsweb.u-strasbg.fr/cgi-bin/Cat?I/211>

Table 1

Column 14	(orbit flag)	&	= orbit mentioned in the WDS
Column 15	(astrometric flag)	%	= Hipparcos new astrometric binary
Column 16–18	(discoverer's name)	HDS	= Hipparcos new binary or component
		KZA	= S.M. Kazeza
		LYS	= L. Louys
		NYS	= O. Nys
		ONL	= Occultation News Letter
Column 39–40	(astrom. pos. ref.)	47	= ORB (Carte du Ciel)
		48	= Bordeaux (G. Soulié)
		81	= HIC
		82	= HIP
Column 67	(proper motion flag)	#	= unknown proper motion but much different from those of the other components
Column 105	(note on HD number)	?	= doubtful HD identifier
		*	= possible inversion of the HD numbers
Column 114	(note on USNO identifier)	W	= WDS (1994) identifier in column 115-125

sample of the file is given hereafter for illustration (Table 2). The complete file may be found at the CDS at Strasbourg, ref. I-260³, and other data centers.

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References

- Dommanget J., 2000, The Hipparcos Catalogue and the Tycho Catalogue, Analysis of the results for the visual double stars, The Observatory 120, pp. 202-210
- Dommanget J., Nys O., 1994a, Catalogue des Composantes d'étoiles Doubles et Multiples (CCDM), première édition, Communication de l'Obs. R. de Belg., Série A, n° 115
- Dommanget J., Nys O., 1994b, Catalogue of the components of double and multiple stars (CCDM), First edition, June 1994, Bull. d'Information du CDS, n° 46, pp. 3-7
- Dommanget J., Nys O., 1995, Catalogue d'entrée Hipparcos (HIC), Corrections et données complémentaires, Bull. d'Inf. du Centre de Données Astron. de Strasbourg 46, pp. 13-22
- Dommanget J., Nys O., 1996, Catalogue d'Entrée Hipparcos (HIC), Corrections et données complémentaires (II), Bull. d'Inf. du Centre de Données Astronomiques de Strasbourg 48 (1996), pp. 19-33
- Dommanget J., Nys O., 2000, Histoire d'un catalogue, Le CCDM, Observations et Travaux, 52, pp. 26-31
- ESA, 1997, The Hipparcos and Tycho Catalogues (17 volumes), SP-1200
- Jeffers H.M., van den Bos W.H., 1963, Index Catalogue of Visual Double Stars, 1961, 0, Publication of the Lick Observatory, 21 (parts 1 and 2)
- Turon C., et al., 1992, The Hipparcos Input Catalogue (7 volumes), ESA SP-1136
- Worley C.E., Douglass G.G., 1984, The Washington Visual Double Star Catalogue, Bull. Inf. du CDS, n° 28, pp. 165-166

³ The complete list is only available electronically via <http://cdsweb.u-strasbg.fr/cgi-bin/Cat?I/260>

Table 2.

CCDM (2000)	CO	Name	Δ (RA)	Δ (D)	Rf	t	theta	rho	n	m	Sp	p.m.	DM	2d id	HD	ADS BDS	INDEX (1900) WDS (2000)	HIC (HIP)
02317-4821	A		-1.89-	9.3	10				02	9.5	G0*-0004-0037-48		668.2	215934.8	15891		02281S4848A	11756
02317-4821	B	HU 1349	-2.29-	1.0	10	1913	332	8.8	3	11.3	* 0000-0023			215933.8			02281S4848B	11756
02318+3807	A		+2.22+	19.1	10				02	7.2	K0*+0035-0014+37		572.0+37	290.6	15625	A 1919	02257N3741A	11765
02318+3807	B	ES				1923	330	19.9	1	11.7						A 1919	02257N3741B	
02319+8915	A	@	-2.50+	50.6	10				04	2.1	F8*+0058-0004+88		8.0	308.8	8890	A 1477	01226N8846A	11767
02319+8915	B	STF 93				1955	218	18.4	99	9.1						A 1477N	01226N8846B	
02319+8915	C	STF 93				1890	083	44.7	2	13.1						A 1477	01226N8846C	
02319+8915	D	STF 93				1884	172	82.7	1	12.1						A 1477	01226N8846D	
02319+5742	A		-0.67-	8.4	10				06	7.2	B3*-0009+0002+57		582.0+57	333.6	15497	A 1911	02247N5715A	11769
02319+5742	B	BU 1314				1902	120	3.6	2	12.9						A 1911	02247N5715B	11769
02319+5742	C	BU 1314				1904	121	6.8	1	14.4						A 1911	02247N5715C	11769
02319+5742	D	BU 1314				1902	334	13.4	4	11.5						A 1911	02247N5715D	
02319+5742	E	BU 1314				1902	162	14.3	2	13.7						A 1911	02247N5715E	
02319+5742	F	BU 1314				1902	268	25.2	3	11.5						A 1911	02247N5715F	
02320+1822	A		+2.92+	26.0	10				02	8.8	F5*-0011+0021+17		383.0+18	192.6	15718	A 1929	02265N1756A	11781
02320+1822	B	STF 273	+2.92+	33.1	10	1830	358	6.9	17	9.8	*-0007-0010		+18	191.6		A 1929	02265N1756B	11781
02321+5640	A		-1.02-	1.5	10				02	8.9	B8*-0006+0003+56		647.0+56	336.6	15548		02249N5613A	11782
02321+5640	B	STI1906				1908	095	11.0	2	12.3							02249N5613B	
02322+0901	A		-1.11-	8.8	82				02	10.2	K7*+0005-0111+08		390.0					11793
02322+0901	B	HDS	-1.12-	8.2	82	1991	344	0.6	1	11.8	*+0005-0111							11793
02323+3542	A		-1.99+	28.4	10				02	8.1	G5*+0069-0014+35		498.0+35	234.6	15671	A 1927	02262N3516A	11806
02323+3542	B	A 1927				1958	188	0.9	7	10.6						A 1927	02262N3516B	11806
02323+2834	A		-1.10-	0.2	10				02	8.0	A0*+0024-0010+27		394.0+28	283.6	15705	A 1930	02264N2807A	11808
02323+2834	B	A 2020				1909	039	2.9	3	13.9						A 1930	02264N2807B	11808
02324+6149	A		+0.14-	29.8	10				02	8.4	A0*+0015-0029+61		422.0+61	240.6	15522	A 1916	02248N6122A	11818
02324+6149	B	DOO 6				1900	286	1.0	2	12.7						A 1916	02248N6122B	11818
02327+6127	A		+0.57+	20.9	11				02	7.8	B +0007-0021+60		502.0+61	243.6	15558	A 1920	02251N6101A	11832
02327+6127	B	STI 368				1898	095	10.2	2	11.5						A 1920	02251N6101B	
02327+0620	A		-2.45-	12.3	10				02	9.6	G5*+0018-0074+05		353.0+06	265.6	15804	A 1940	02274N0553A	11829
02327+0620	B	STF 276				1953	265	2.2	22	9.6						A 1940	02274N0553B	11829
02327+0344	A		-2.87+	17.9	10				02	8.7	F0*-0027-0023+03		351.0+03	290.6	15805	A 1941	02274N0318A	11828
02327+0344	B	A 2334				1957	330	0.2	7	8.8						A 1941N	02274N0318B	11828
02327-0145	A		-0.64-	23.0	10				02	9.2	F0*-0013 0000-02		433.0-01	234.6	15822	A 1945	02276S0212A	11830
02327-0145	B	A 316				1944	093	0.5	10	9.8						A 1945	02276S0212B	11830
02329+3433	A	%	-1.38-	27.4	82				01	5.8	K0 -55- 19+33		454.0+34	251.6	15755			11840
02331+5828	A		+2.71-	15.0	10				02	8.3	A2*-0015-0001+57		585.0+58	270.6	15641	A 1933	02258N5801A	11870
02331+5828	B	STF 272				1955	035	1.8	15	8.3						A 1933	02258N5801B	11870
02331-1821	A		+1.88-	18.1	10				02	9.4	G5*+0006+0024-19		473.0	148458.8	15916	B 1315	02285S1848A	11868
02331-1821	B	HJ 3505				1916	019	18.8	2	12.6						B 1315	02285S1848B	
02331-7227	A		+0.40+	22.2	10				02	8.2	G0*-0075+0050-72		190.4	255899.8	16382		02324S7253A	11866
02331-7227	B	B 2073					105	8.0		13.0							02324S7253B	11866

Table 2. (continued)

CCDM (2000)	CO	Name	Δ (RA)	Δ (D)	Rf	t	theta	rho	n	m	Sp	p.m.	DM	2d id	HD	ADS BDS	INDEX (1900) WDS (2000)	HIC (HIP)
02332+6000	A		+1.55-	1.5	10				02	7.5	A0*+0002-0018+59		505.0+59	276.6	15640	A 1932	02258N5933A	11878
02332+6000	B	A 823				1904	250	0.6	4	11.5						A 1932	02258N5933B	11878
02332+4149	A		-2.68+	3.6	82				02	8.0	F8*+0043+0000+41		480.0+41	260.6	15754			11871
02332+4149	B	HDS	-2.76+	3.7	82	1991	273	1.0	1	12.1	*+0043+0000							11871
02332-5156	A		+1.35-	17.7	82				02	8.6	K0*-0034+0166-52		317.4	232813.8	16077			11877
02332-5156	B	HDS	+1.34-	18.0	82	1991	197	0.3	1	10.9	*-0034+0166							11877
02332-7554	A		+4.39+	24.3	10				03	7.0	F2*+0085+0041-76		211.4	255904.8	16493		02337S7620A	11886
02332-7554	B	HJ 3522				1918	290	34.3	1	10.7							02337S7620B	
02332-7554	BC	DAW				1918	354	11.4	1	12.6							02337S7620C	
02333+5619	A		-1.24+	2.3	12				02	9.2	B5 -0016-0024+55		643.0+56	339.6	236970	A 1934	02262N5553A	11888
02333+5619	B	A 1276				1906	200	0.8	5	10.1						A 1934	02262N5553B	11888
02333+0008	A		-2.22+	1.9	10				02	8.7	G5*+0003+0037-00		382.0	129971.8	15897		02282S0018A	11883
02333+0008	B	GAU1542				1920	169	9.3	1	11.1							02282S0018B	11883
02334+5219	A		-5.05-	27.5	10				04	7.0	A2* 0000-0004+51		588.0+52	274.6	15703	A 1938	02264N5152A	11889
02334+5219	B*	STT 42				1960	273	0.2	99	7.5						A 1938N	02264N5152B	11889
02334+5219	C	STT 42				1903	348	90.9	2							A 1938	02264N5152C	
02334+5219	D	STT 42	+8.70-	12.9	10	1875	083	125.1	3	9.1	K *+0012-0001+51		589.0+52	275.6	232671	A 1938	02264N5152D	
02335-6912	A		-0.91+	3.9	10				02	9.2	K0*-0011+0010-69		130.4	248599.8	16334		02320S6938A	11896
02335-6912	B	HJ 3517				1916	239	16.3	1	11.7							02320S6938B	
02336+5732	A		-3.29+	14.3	10				02	8.2	B3*-0011-0002+56		656.0+57	338.6	15690	A 1937	02263N5706A	11898
02336+5732	B	HJ 2143	-2.19+	37.3	10	1904	019	23.4	3	8.8	*+0002+0010+56		657.0+57	339.6		A 1937	02263N5706B	11902
02336+3125	A		-2.33-	29.6	10				02	7.4	K2*-0013-0029+30		409.0+31	249.6	15832	A 1947	02276N3058A	11901
02336+3125	B	HJ 653				1904	042	23.0	4	11.1						A 1947	02276N3058B	
02336-3724	A		-0.52-	26.5	82				02	7.9	K3*+0012-0004-37		962.2	193770.8	16048			11903
02336-3724	B	HDS	-0.54-	26.7	82	1991	222	0.2	1	10.9	*+0012-0004							11903
02337-4823	A		-0.81-	23.8	10				02	8.0	F8*-0031-0007-48		681.2	215942.8	16105		02301S4850A	11908
02337-4823	B	RST 53				1947	197	9.2	2	13.9							02301S4850B	11908
02338-2814	A		+2.68+	3.0	10				02	5.0	B9*-0018-0006-28		819.2	167882.8	16046	A 1954	02295S2840A	11918
02338-2814	B	HJ 3506	+1.93-	1.4	91	1952	244	10.8	23	7.7	*-0018-0002			167881.8		A 1954	02295S2840B	
02340-1257	A		-1.54-	4.1	82				02	9.6	G5*+0019-0017-13		481.0	148470.8	16006			11931
02340-1257	B	HDS	-1.54-	4.3	82	1991	168	0.2	1	10.5	*+0019-0017							11931
02341-0538	A		+1.39-	4.5	10				02	8.0	K2*+0017+0041-06		502.0	129981.8	15994	A 1953	02291S0605A	11945
02341-0538	B	STF 280				1831	346	3.6	31	8.2						A 1953	02291S0605B	11945
02342-1331	A		+0.09-	25.3	82				02	10.2	G3*+0020-0011-14		479.0	148475.8	16044			11955
02342-1331	B	HDS	+0.08-	25.2	82	1991	312	0.2	1	11.4	*+0020-0011							11955
02342-3131	A		-1.57-	27.6	10				02	7.5	F0*-0034-0053-32		934.2	193774.8	16087		02299S3158A	11950
02342-3131	B	HJ 3509				1918	059	23.5	1	11.5							02299S3158B	
02347-0751	A		+0.68-	33.7	10				02	5.8	K0*+0062-0062-08		484.0	129984.8	16074		02298S0818A	12002
02347-0751	B	BUP				1911	047	95.1	1	12.5							02298S0818B	
02350-0953	A		+2.25-	19.4	10				02	8.3	K0*-0037-0017-10		512.0	148479.8	16116	A 1965	02302S1020A	12020
02350-0953	B	A 2606				1958	079	5.2	4	14.3						A 1965	02302S1020B	12020