

MINIMA OF ECLIPSING BINARY STARS - I

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This report continues previous lists of minima published in the International Astronomical Union's Information Bulletin on Variable Stars, Numbers 111, 114, 119, 129, 154, 180, 221, 247, and 795. This work is sponsored by the AAVSO with the writer currently acting as program coordinator. This report contains 441 observed heliocentric minima of 50 eclipsing binary stars derived from observations submitted by participants in the AAVSO's eclipsing binary program. Except where otherwise noted all are visual timings reduced by the tracing-paper method with reductions made by the writer. Linear elements in the 1969 General Catalog of Variable Stars were used to compute the O-C's unless otherwise specified. The number of estimates used for each minimum is given under n.

J.D. hel. (2400000+)	<u>E</u>	<u>O - C</u>	<u>n</u>	<u>Observer</u>
<u>RX Herculis</u>				
40067.702	3878	0.000	17	R. Monske
40108.618	3901	+0.009	17	J. Bortle
<u>SZ Herculis</u>				
39627.625	5672	+0.011	18	L. Hazel
39636.622	5683	+0.010	18	L. Hazel
39640.713	5688	+0.010	18	L. Hazel
39645.620	5694	+0.008	16	F. Chapman
39645.623	5694	+0.011	18	L. Hazel
40058.761	6199	+0.012	14	R. Monske
40058.762	6199	+0.013	18	M. Baldwin
40067.761	6210	+0.012	14	R. Monske
40081.669	6227	+0.013	22	L. Hazel
40081.671	6227	+0.015	20	J. Bortle
40094.760	6243	+0.015	15	M. Baldwin
40103.758	6254	+0.013	13	T. Cragg
40113.578	6266	+0.016	18	J. Bortle
40117.667:	6271	+0.015:	10	W. Hampton
40121.756	6276	+0.013	13	H. Peterson
40323.825	6523	+0.014	12	L. Hazel
40369.641	6579	+0.016	22	J. Bortle
40405.635	6623	+0.015	12	J. Bortle
40436.721	6661	+0.013	24	R. Nolthenius
40436.724	6661	+0.016	11	M. Baldwin
40440.820	6666	+0.021	12	T. Cragg
40445.728	6672	+0.020	15	R. Monske
40477.631	6711	+0.017	9	W. Hampton
<u>UX Herculis</u>				
39701.807	12800	-0.032	18	M. Baldwin
39983.707 1)	12982	-0.024	12	T. Cragg
40107.606	13062	-0.033	19	J. Bortle
<u>CT Herculis</u>				
39680.779	182	-0.005	9	T. Cragg
39689.708	187	-0.008	7	T. Cragg

J.D. hel. (2400000+)	<u>E</u>	<u>O - C</u>	<u>n</u>	<u>Observer</u>
40048.774	388	-0.001	10	Curtis Anderson
40416.781	594	+0.015	12	T. Cragg
40441.777	608	+0.001	19	R. Nolthenius
<u>VZ Hydrae</u>				
39926.673	6198	+0.008	10	S. Cook
<u>WY Hydrae</u>				
39941.614	10690	+0.013	14	L. Hazel
<u>SW Lacertae</u>				
39661.809:	6514	+0.014:	12	Curtis Anderson
39669.823	6539	+0.010	13	Curtis Anderson
39731.707	6732	-0.007	17	F. Chapman
39732.668	6735	-0.008	16	F. Chapman
39772.767	6860	0.000	15	M. Baldwin
39793.604	6925	-0.011	17	F. Chapman
39793.612	6925	-0.002	16	D. Livingston
39794.568	6928	-0.008	16	F. Chapman
39799.548	6943.5	0.000	13	J. Bortle
39799.712	6944	+0.004	14	R. Swanberg
39800.672	6947	+0.001	15	M. Baldwin
39801.626	6950	-0.007	20	A. Dobkowski
39801.635	6950	+0.002	13	M. Baldwin
39803.554	6956	-0.003	16	J. Bortle
39810.617	6978	+0.004	16	J. Bortle
39815.574	6993.5	-0.011	16	D. Livingston
39815.580	6993.5	-0.005	18	F. Chapman
39820.551	7009	-0.005	16	J. Bortle
39821.675	7012.5	-0.003	14	M. Baldwin
39822.638	7015.5	-0.003	16	J. Bortle
39823.602	7018.5	-0.001	10	M. Baldwin
39826.645	7028	-0.005	17	F. Chapman
39826.650	7028	+0.001	9	M. Baldwin
39829.538	7037	+0.002	16	J. Bortle
39829.689	7037.5	-0.007	14	F. Chapman
39829.694	7037.5	-0.002	16	J. Bortle
39844.610	7084	0.000	15	J. Bortle
39845.569	7087	-0.004	15	D. Livingston
39845.570	7087	-0.003	16	J. Bortle
39851.667	7106	+0.001	15	M. Baldwin
39854.708:	7115.5	-0.005:	10	H. Peterson
39855.681	7118.5	+0.006	17	H. Peterson
39859.691	7131	+0.007	15	M. Baldwin
39861.609	7137	0.000	17	J. Bortle
39863.530:	7143	-0.003:	10	J. Bortle
39883.576	7205.5	-0.002	17	A. Dobkowski
40056.772	7745.5	0.000	16	M. Baldwin
40056.940	7746	+0.007	9	T. Cragg
40058.854	7752	-0.003	20	M. Baldwin
40059.657	7754.5	-0.001	22	D. Lucas
40064.791	7770.5	+0.001	18	M. Baldwin
40069.761	7786	-0.001	16	M. Baldwin
40070.725	7789	+0.002	11	M. Baldwin
40076.650:	7807.5	-0.007	17	J. Bortle
40080.667	7820	+0.001	21	J. Bortle

J.D. hel. (2400000+)	<u>E</u>	<u>O - C</u>	<u>n</u>	<u>Observer</u>
<u>SW Lacertae</u>				
40081.627	7823	-0.001	22	J. Bortle
40094.783	7864	+0.005	9	M. Baldwin
40098.624	7876	-0.003	20	J. Bortle
40103.597	7891.5	-0.001	19	J. Bortle
40107.605	7904	-0.002	21	J. Bortle
40108.571	7907	+0.002	17	J. Bortle
40112.574	7919.5	-0.004	17	J. Bortle
40115.624	7929	-0.002	19	J. Bortle
40116.588	7932	0.000	19	J. Bortle
40116.748	7932.5	0.000	11	M. Baldwin
40128.609	7969.5	-0.006	21	J. Bortle
40128.772	7970	-0.003	14	M. Baldwin
40129.734	7973	-0.004	11	M. Baldwin
40137.590	7997.5	-0.005	16	J. Bortle
40145.618	8022.5	+0.005	20	J. Bortle
40156.681	8057	+0.002	11	M. Baldwin
40160.687	8069.5	0.000	16	J. Bortle
40161.645	8072.5	-0.005	16	J. Bortle
40162.606	8075.5	-0.007	10	A. Dobkowski
40178.649	8125.5	0.000	13	M. Baldwin
40186.665	8150.5	-0.002	11	M. Baldwin
40196.607	8181.5	-0.002	19	J. Bortle
40197.576	8184.5	+0.004	16	J. Bortle
40200.616	8194	-0.003	19	J. Bortle
40208.633	8219	-0.004	20	J. Bortle
40210.558	8225	-0.003	15	A. Dobkowski
40249.529	8346.5	-0.001	14	J. Bortle
40428.812	8905.5	-0.005	18	R. Nolthenius
40434.749	8924	-0.001	19	R. Nolthenius
40436.826	8930.5	-0.008	14	M. Baldwin
40443.724	8952	-0.006	14	M. Baldwin
40445.805	8958.5	-0.010	20	R. Nolthenius
40447.731	8964.5	-0.009	13	M. Baldwin
40451.742	8977	-0.006	12	M. Baldwin
40453.666	8983	-0.007	17	T. Balonek
40453.820:	8983.5	-0.013:	20	T. Balonek
40454.624	8986	-0.011	10	L. Hazel
40454.633	8986	-0.002	18	T. Balonek
40454.642	8986	+0.007	17	J. Bortle
40454.786:	8986.5	-0.010:	23	T. Balonek
40457.844	8996	+0.001	13	M. Baldwin
40470.669	9036	-0.002	8	M. Baldwin
40471.788	9039.5	-0.006	9	M. Baldwin
40498.732	9123.5	-0.003	13	D. Hutter
40499.694	9126.5	-0.003	18	D. Hutter
40504.664	9142	-0.005	13	D. Hutter
40512.683	9167	-0.004	11	W. Hampton
40513.643	9170	-0.006	14	M. Baldwin
40514.611	9173	0.000	18	D. Hutter
40528.723	9217	0.000	11	M. Baldwin
40529.686	9220	0.000	10	M. Baldwin
<u>VX Lacertae</u>				
39679.694	5077	-0.027	13	L. Hazel
39765.653	5157	-0.029	16	L. Hazel

J.D. hel. (2400000+)	<u>E</u>	<u>O - C</u>	<u>n</u>	<u>Observer</u>
39793.598	5183	-0.021	16	L. Hazel
40084.784	5454	-0.026	14	L. Hazel
40097.675	5466	-0.029	16	L. Hazel
40125.610	5492	-0.031	12	L. Hazel
40197.607	5559	-0.026	16	J. Bortle
40472.672	5815	-0.033	17	L. Hazel
<u>CM Lacertae</u>				
39677.701	7884	-0.003	13	M. Baldwin
39701.774	7899	-0.001	10	M. Baldwin
39767.567	7940	-0.001	10	W. Lowder
40112.578	8155	+0.002	19	J. Bortle
40128.636	8165	+0.013	20	J. Bortle
40181.582	8198	+0.005	11	J. Bortle
40197.628	8208	+0.003	19	J. Bortle
40412.654	8342	+0.001	15	J. Bortle
<u>Y Leonis</u>				
39617.716	3516	+0.035	13	T. Cragg
39961.679	3720	+0.039	29	F. Chapman
40332.619	3940	+0.044	22	J. Bortle
<u>UV Leonis</u>				
39892.640	2419.5	+0.005	9	J. Bortle
39910.634	2449.5	-0.003	9	M. Baldwin
39912.742	2453	+0.005	7	M. Baldwin
39915.735	2458	-0.002	11	M. Baldwin
39916.638	2459.5	0.000	8	M. Baldwin
39918.737	2463	-0.001	10	M. Baldwin
39918.740	2463	+0.002	10	S. Cook
39923.537	2471	-0.001	13	J. Bortle
39930.743	2483	+0.003	12	S. Cook
39933.739	2488	-0.002	11	S. Cook
39934.647	2489.5	+0.007	9	S. Cook
39935.534	2491	-0.007	8	J. Bortle
39936.744	2493	+0.003	11	S. Cook
39939.743	2498	+0.002	11	S. Cook
39940.637	2499.5	-0.004	11	J. Bortle
39941.536	2501	-0.005	9	J. Bortle
39943.649	2504.5	+0.008	10	S. Cook
39946.645	2509.5	+0.003	9	J. Bortle
39946.652	2509.5	+0.010	15	F. Sanner
39969.744	2548	-0.001	10	S. Cook
39975.741	2558	-0.005	12	M. Baldwin
40268.587	3046	-0.001	16	J. Bortle
40274.589	3056	0.000	18	J. Bortle
40286.587	3076	-0.003	19	J. Bortle
40289.592	3081	+0.001	16	J. Bortle
40319.593	3131	-0.002	14	J. Bortle
40343.595	3171	-0.004	14	J. Bortle
40346.593	3176	-0.006	13	J. Bortle
40358.603	3196	+0.002	14	J. Bortle
40364.598	3206	-0.004	13	J. Bortle
40373.604	3221	+0.001	13	J. Bortle
40376.604	3226	+0.001	13	J. Bortle

J.D. hel. (2400000+)	<u>E</u>	<u>O - C</u>	<u>n</u>	<u>Observer</u>
<u>Delta Librae</u>				
40337.781	7513	+0.018	10	R. Sweetsir
40407.592	7543	+0.008	10	J. Green
<u>UZ Lyrae</u>				
39640.695	8128	-0.018	20	L. Hazel
<u>EW Lyrae</u>				
40064.861	2605	+0.023	22	M. Baldwin
40066.807	2606	+0.021	18	M. Baldwin
40528.661	2843	+0.024	25	M. Baldwin
<u>FL Lyrae</u>				
40044.671	837	+0.003	13	J. Bortle
<u>RU Monocerotis</u>				
39893.540	2860	-0.094	13	L. Hazel
39893.548:	2860	-0.087:	9	J. Bortle
39918.618	2867	-0.109	17	L. Hazel
39918.628:	2867	-0.100:	8	S. Cook
40282.683:	2968.5	+0.114:	7	T. Cragg
<u>RW Monocerotis</u>				
39884.789	3255	+0.002	7	T. Cragg
39886.690	3256	-0.003	18	M. Baldwin
39907.657	3267	-0.004	16	M. Baldwin
<u>BO Monocerotis</u>				
39940.562	5271	+0.067	13	L. Hazel
<u>U Ophiuchi</u>				
39694.642	18729	-0.013	9	M. Baldwin
40333.710	19110	-0.013	12	R. Sweetsir
40338.758	19113	+0.003	9	R. Sweetsir
40427.652	19166	-0.003	21	J. Bortle
40442.743	19175	-0.008	16	M. Baldwin
40447.770	19178	-0.013	21	M. Baldwin
<u>RV Ophiuchi</u>				
39678.717 2)	4253	+0.003	10	T. Cragg
<u>V566 Ophiuchi</u>				
40107.581	11869	+0.008	16	J. Bortle
<u>ER Orionis</u>				
39903.609	8018	-0.004	16	J. Bortle
39906.570	8025	-0.007	18	J. Bortle
39923.513	8065	0.000	13	J. Bortle
39927.529	8074.5	-0.007	10	J. Bortle
40197.659	8712.5	-0.006	16	J. Bortle
40200.621	8719.5	-0.008	19	J. Bortle
40208.663	8738.5	-0.011	17	J. Bortle
40232.589	8795	-0.007	16	J. Bortle
40253.543	8844.5	-0.011	13	J. Bortle
40258.621	8856.5	-0.014	16	J. Bortle
40268.574	8880	-0.011	16	J. Bortle

J.D. hel. (2400000+)	<u>E</u>	<u>O - C</u>	<u>n</u>	<u>Observer</u>
40289.532	8929.5	-0.011	13	J. Bortle
40292.708	8937	-0.011	5	M. Baldwin
40294.616	8941.5	-0.008	7	M. Baldwin
40295.674	8944	-0.008	6	T. Cragg
40298.636	8951	-0.011	7	M. Baldwin
40554.789	9556	-0.016	17	M. Baldwin
40580.627	9617	-0.005	11	D. Ortwein
40585.703	9629	-0.009	10	T. Cragg
<u>FO Orionis</u>				
39829.647	426	-0.027	14	L. Hazel
<u>FT Orionis</u>				
40554.782	2395	+0.011	23	M. Baldwin
<u>U Pegasi</u>				
40128.681	9651	-0.008	12	M. Baldwin
40145.551	9696	-0.003	9	L. Hazel
40147.617	9701.5	+0.001	13	L. Hazel
40510.593	10670	+0.001	11	J. Bortle
40513.585	10678	-0.005	16	J. Bortle
40529.700	10721	-0.005	12	M. Baldwin
40554.800	10788	-0.016	16	M. Baldwin
40566.623	10819.5	+0.001	13	M. Baldwin
<u>TY Pegasi</u>				
40145.651	361	-0.040	12	L. Hazel
40451.777	460	-0.043	10	L. Hazel
40513.624	480	-0.041	11	M. Baldwin
<u>AQ Pegasi</u>				
40562.431 3)	1143	+0.027	34	M. Baldwin
<u>Beta Persel</u>				
39800.790	112	-0.005	15	F. Sanner
39803.659	113	-0.003	16	F. Sanner
39803.661	113	-0.001	12	W. Hampton
39823.715	120	-0.019	13	S. Cook
39869.593:	136	-0.019:	14	A. Dobkowski
39892.548	144	-0.003	19	S. Ashe
39912.606	151	-0.017	14	S. John
39912.631	151	+0.008	15	J. Bortle
40104.717:	218	-0.021:	16	A. Dobkowski
40144.8771	232	-0.0044	27pe	H. Landis
40150.601	234	-0.015	20	S. John
40236.632	264	-0.006	19	J. Bortle
40560.630	377	-0.023	9	T. Cragg
40583.569	385	-0.024	19	R. Sweetsir
<u>Z Persel</u>				
39769.723	360	-0.002	20	L. Hazel
40472.690	590	+0.016	14	L. Hazel
40475.734	591	+0.003	23	M. Baldwin
40478.788	592	+0.001	14	L. Hazel
<u>RT Persel</u>				
39762.700	17906	-0.034	10	M. Baldwin
39869.725	18032	-0.033	7	T. Cragg

J.D. hel. (2400000+)	<u>E</u>	<u>O - C</u>	<u>n</u>	<u>Observer</u>
39886.713	18052	-0.034	17	M. Baldwin
39892.656	18059	-0.036	17	M. Baldwin
39904.557	18073	-0.028	17	A. Dobkowski
39920.687	18092	-0.036	11	M. Baldwin
39937.674	18112	-0.038	11	M. Baldwin
40128.787	18337	-0.041	13	M. Baldwin
40135.601	18345	-0.023	17	A. Dobkowski
40208.635	18431	-0.037	16	J. Bortle
40208.635	18431	-0.037	13	M. Baldwin
40270.638	18504	-0.041	8	M. Baldwin
40524.617	18803	-0.034	12	L. Hazel
40529.702	18809	-0.046	12	M. Baldwin
40552.646	18836	-0.036	7	T. Cragg
40557.740	18842	-0.039	11	M. Baldwin
<u>RV Persei</u>				
40566.800	10775	+0.007	24	M. Baldwin
<u>ST Persei</u>				
39769.707	256	+0.014	20	L. Hazel
39859.741	290	+0.004	15	H. Peterson
40145.777	398	+0.017	14	L. Hazel
<u>XZ Persei</u>				
39772.727	12697	+0.004	30	M. Baldwin
39886.743	12796	+0.009	19	M. Baldwin
39893.653	12802	+0.008	15	M. Baldwin
39916.682	12822	+0.005	16	M. Baldwin
40151.618	13026	+0.007	22	J. Bortle
40471.766	13304	+0.002	19	M. Baldwin
40539.713	13363	+0.002	23	M. Baldwin
40554.681	13376	-0.001	22	M. Baldwin
<u>DM Persei</u>				
39844.641	2417	+0.030	11	S. Cook
39874.645	2428	+0.029	10	S. Cook
39893.706	2435	-0.005	10	S. Cook
<u>Y Piscium</u>				
40528.790	1460	+0.091	32	M. Baldwin
40562.681	1469	+0.089	27	M. Baldwin
<u>U Sagittae</u>				
39675.762	3125	+0.007	27	M. Baldwin
40456.686	3346	+0.008	25	R. Monske
<u>V Sagittae</u>				
40087.586:	4274	+0.001:	21	J. Bortle
<u>V505 Sagittarii</u>				
39688.734:	5219	-0.001:	6	T. Cragg
<u>RW Tauri</u>				
39916.717	8205	-0.077	14	M. Baldwin
40229.594	8318	-0.079	19	J. Bortle
40539.708	8430	-0.077	18	M. Baldwin

J.D. hel. (2400000+)	<u>E</u>	<u>O - C</u>	<u>n</u>	<u>Observer</u>
<u>CD Tauri</u>				
39860.733	3804	+0.069	11	S. Cook
<u>HU Tauri</u>				
39864.707	6917	+0.015	13	M. Baldwin
40156.710:	7059	+0.024:	14	R. Sweetsir
40158.731:	7060	-0.011:	18	R. Sweetsir
40228.679:	7094	+0.023:	16	T. Cragg
40298.575	7128	+0.005	10	J. Bortle
40557.674	7254	+0.010	23	M. Baldwin
<u>X Trianguli</u>				
39701.808	2192	-0.003	10	M. Baldwin
39772.727	2265	-0.006	15	M. Baldwin
39844.622	2339	-0.006	18	J. Bortle
39844.624	2339	-0.003	12	S. Cook
39845.593	2340	-0.006	22	J. Bortle
39845.593	2340	-0.006	24	F. Chapman
39845.595	2340	-0.004	13	L. Hazel
39874.740	2370	-0.005	12	S. Cook
39876.683	2372	-0.005	15	S. Cook
39876.683	2372	-0.005	18	H. Peterson
39877.653	2373	-0.006	16	R. Swanberg
39878.623	2374	-0.008	14	S. Cook
39881.540	2377	-0.006	14	L. Hazel
39882.511	2378	-0.006	14	D. Livingston
39912.629	2409	-0.006	16	M. Baldwin
40118.593	2621	-0.008	15	J. Bortle
40149.690	2653	-0.009	13	L. Hazel
40151.624	2655	-0.010	15	J. Bortle
40183.690	2688	-0.004	15	R. Swanberg
40220.604	2726	-0.008	19	J. Bortle
40451.824	2964	-0.015	13	L. Hazel
40453.767	2966	-0.015	14	L. Hazel
40453.770	2966	-0.012	34	T. Balonek
40454.735	2967	-0.018	14	L. Hazel
40454.738	2967	-0.015	25	T. Balonek
<u>X Trianguli</u>				
40525.660	3040	-0.016	22	D. Ortwein
40525.661	3040	-0.014	24	F. Chapman
40554.807	3070	-0.014	16	M. Baldwin
40556.749	3072	-0.016	15	M. Baldwin
40557.720	3073	-0.016	16	M. Baldwin
40558.694	3074	-0.014	16	R. Swanberg
40559.667	3075	-0.013	14	T. Cragg
40561.609	3077	-0.014	12	J. Bortle
40562.579	3078	-0.015	13	J. Bortle
<u>W Ursae Majoris</u>				
39617.801	2473	-0.019	6	T. Cragg
39832.660	3117	-0.029	15	D. Lucas
39844.668	3153	-0.032	13	F. Chapman
39845.672	3156	-0.029	10	F. Chapman
39851.676	3174	-0.030	14	D. Lucas
39876.699	3249	-0.031	9	S. Cook
39878.700	3255	-0.032	10	S. Cook
39880.700	3261	-0.033	10	S. Cook

J.D. hel. (2400000+)	<u>E</u>	<u>O - C</u>	<u>n</u>	<u>Observer</u>
39885.713	3276	-0.026	11	S. Cook
39891.713	3294	-0.031	11	S. Cook
39893.717	3300	-0.029	12	S. Cook
39903.568	3329.5	-0.020	18	J. Bortle
39905.728	3336	-0.030	10	S. Cook
39906.570	3338.5	-0.021	18	J. Bortle
39908.569	3344.5	-0.024	18	J. Bortle
39911.737	3354	-0.026	11	S. Cook
39912.567	3356.5	-0.030	14	F. Chapman
39918.566	3374.5	-0.037	15	A. Dobkowski
39918.737	3375	-0.033	10	S. Cook
39919.915	3378.5	-0.022	8	T. Cragg
39923.580	3389.5	-0.027	15	F. Chapman
39923.581	3389.5	-0.026	22	J. Bortle
39926.738	3399	-0.039	11	S. Cook
39927.576	3401.5	-0.036	14	J. Bortle
39930.740	3411	-0.041	10	S. Cook
39933.749	3420	-0.034	10	S. Cook
39934.748	3423	-0.037	10	S. Cook
39936.749	3429	-0.038	10	S. Cook
39939.752	3438	-0.037	10	S. Cook
39940.583	3440.5	-0.040	9	H. Blake
39940.588	3440.5	-0.035	19	J. Bortle
39946.600	3458.5	-0.029	17	J. Bortle
39948.583	3464.5	-0.048	17	A. Dobkowski
39948.604	3464.5	-0.027	20	J. Bortle
39949.600	3467.5	-0.032	14	F. Chapman
39949.603	3467.5	-0.029	20	J. Bortle
<u>W Ursae Majoris</u>				
39952.600	3476.5	-0.035	14	F. Chapman
39954.610	3482.5	-0.027	17	J. Bortle
39964.600:	3512.5	-0.046:	17	A. Dobkowski
39965.623	3515.5	-0.024	20	J. Bortle
39973.615	3539.5	-0.039	15	A. Dobkowski
40012.644	3656.5	-0.047	16	J. Bortle
40013.664	3659.5	-0.028	20	J. Bortle
40208.675	4244	-0.033	18	J. Bortle
40268.565	4423.5	-0.033	21	J. Bortle
40274.571	4441.5	-0.033	20	J. Bortle
40285.574	4474.5	-0.040	20	J. Bortle
40286.573	4477.5	-0.042	21	J. Bortle
40289.578	4486.5	-0.040	21	J. Bortle
40291.581	4492.5	-0.039	21	J. Bortle
40296.584	4507.5	-0.041	19	J. Bortle
40297.756	4511	-0.036	8	T. Cragg
40302.599	4525.5	-0.031	20	J. Bortle
40315.601	4564.5	-0.041	17	J. Bortle
40319.611	4576.5	-0.035	18	J. Bortle
40323.614	4588.5	-0.036	16	J. Bortle
40324.623	4591.5	-0.028	16	J. Bortle
40332.622	4615.5	-0.036	16	J. Bortle
40338.627	4633.5	-0.037	18	J. Bortle
40343.625	4648.5	-0.044	18	J. Bortle
40346.635	4657.5	-0.037	15	J. Bortle
40347.632	4660.5	-0.041	16	J. Bortle
40348.635	4663.5	-0.038	19	J. Bortle
40353.638	4678.5	-0.040	19	J. Bortle

J.D. hel. (2400000+)	<u>E</u>	<u>O - C</u>	<u>n</u>	<u>Observer</u>
40359.642	4696.5	-0.041	19	J. Bortle
40363.647	4708.5	-0.041	16	J. Bortle
<u>TX Ursae Majoris</u>				
39891.743	228	+0.013	11	S. Cook
40369.606	384	+0.011	14	J. Bortle
<u>VV Ursae Majoris</u>				
40291.599	4281	+0.060	22	J. Bortle
40302.589	4297	+0.053	19	J. Bortle
40315.649	4316	+0.053	18	J. Bortle
40324.587	4329	+0.055	19	J. Bortle
40348.646	4364	+0.056	22	J. Bortle
40359.640	4380	+0.052	18	J. Bortle
<u>XZ Ursae Majoris</u>				
40291.557	11377	-0.054	13	J. Bortle
40302.556	11386	-0.052	17	J. Bortle
40319.669	11400	-0.055	22	J. Bortle
40363.669	11436	-0.058	18	J. Bortle
<u>ZZ Ursae Majoris</u>				
40347.667	1912	-0.002	16	L. Hazel
<u>W Ursae Minoris</u>				
39845.595	3755	-0.013	14	J. Bortle
40323.637	4036	+0.004	20	J. Bortle
40454.620	4113	-0.002	13	J. Bortle
<u>AW Vulpeculae</u>				
39768.530	16440	-0.016	14	L. Hazel
40042.729	16780	-0.011	14	R. Monske
40067.726	16811	-0.014	14	R. Monske
<u>BU Vulpeculae</u>				
40028.733	11415	-0.002	12	L. Hazel
40081.646	11508	-0.004	14	L. Hazel
40094.740	11531	+0.003	13	M. Baldwin
40097.588	11536	+0.005	11	L. Hazel
40098.723	11538	+0.003	11	M. Baldwin
40147.665	11624	+0.011	9	M. Baldwin
40419.638	12102	+0.006	13	J. Bortle
40456.614	12167	-0.003	13	L. Hazel
40456.623	12167	+0.006	14	R. Monske
40457.757	12169	+0.002	14	M. Baldwin
40460.601	12174	+0.001	14	D. Ortwein
40465.721	12183	0.000	13	M. Baldwin
40473.685	12197	-0.002	15	L. Hazel
40493.598	12232	-0.003	10	L. Hazel
40505.557	12253	+0.007	17	D. Ortwein
40538.562	12311	+0.010	14	D. Ortwein
40538.558	12311	+0.006	12	L. Hazel
40559.610	12348	+0.005	14	M. Baldwin

- 1) Determined by combining portions of eclipses on JD 39983 & 39986
- 2) Determined by combining portions of eclipses on JD 39678 & 39689
- 3) Determined by combining portions of eclipses on JD 40556 & 40562