

**"Pseudo-MPEC" for C/2017 O1**Created 2017 Jul 24 21:15:20 UT using [Find\\_Orb](#)

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**Astrometry:**

<a href="#">CK17O010</a>	AC2017	07	19.32085602	32	48.17	-10	31	56.1			oEO045	<a href="#">807</a>	
<a href="#">CK17O010</a>	AC2017	07	19.32213002	32	48.46	-10	31	56.2			oEO045	<a href="#">807</a>	
<a href="#">CK17O010</a>	AC2017	07	19.32340502	32	48.58	-10	31	57.0			oEO045	<a href="#">807</a>	
<a href="#">CK17O010</a>	V2017	07	19.72696	02	33	28.26	-10	24	15.6		oEO045	<a href="#">247</a>	
<a href="#">CK17O010</a>	v2017	07	19.72696	1	144.3578	-17.0571			375		EO045	<a href="#">247</a>	
<a href="#">CK17O010</a>	V2017	07	19.73544	02	33	29.06	-10	24	05.5		oEO045	<a href="#">247</a>	
<a href="#">CK17O010</a>	v2017	07	19.73544	1	144.3578	-17.0571			375		EO045	<a href="#">247</a>	
<a href="#">CK17O010</a>	V2017	07	19.78870	02	33	34.36	-10	23	04.1		oEO045	<a href="#">247</a>	
<a href="#">CK17O010</a>	v2017	07	19.78870	1	144.3578	-17.0571			375		EO045	<a href="#">247</a>	
<a href="#">CK17O010</a>	V2017	07	19.82594	02	33	37.94	-10	22	22.0		oEO045	<a href="#">247</a>	
<a href="#">CK17O010</a>	v2017	07	19.82594	1	144.3578	-17.0571			375		EO045	<a href="#">247</a>	
<a href="#">CK17O010</a>	C2017	07	20.35353502	34	29.89	-10	12	16.0		15.2	ToEO045	<a href="#">W85</a>	
<a href="#">CK17O010</a>	C2017	07	20.35507602	34	30.03	-10	12	14.3			oEO045	<a href="#">W85</a>	
<a href="#">CK17O010</a>	C2017	07	21.06371	02	35	39.69	-09	58	41.6		15.0	TqEO045	<a href="#">470</a>
<a href="#">CK17O010</a>	C2017	07	21.06666	02	35	40.00	-09	58	38.2		14.7	TqEO045	<a href="#">470</a>
<a href="#">CK17O010</a>	C2017	07	21.06967	02	35	40.28	-09	58	34.5		15.4	TqEO045	<a href="#">470</a>
<a href="#">CK17O010</a>	C2017	07	21.08649	02	35	41.86	-09	58	15.0		15.5	TqEO045	<a href="#">C10</a>
<a href="#">CK17O010</a>	C2017	07	21.09670	02	35	42.89	-09	58	03.0		15.4	TqEO045	<a href="#">C10</a>
<a href="#">CK17O010</a>	C2017	07	21.10300	02	35	43.52	-09	57	55.7		15.8	TqEO045	<a href="#">470</a>
<a href="#">CK17O010</a>	C2017	07	21.10475	02	35	43.69	-09	57	54.3		15.2	TqEO045	<a href="#">C10</a>
<a href="#">CK17O010</a>	C2017	07	21.10521	02	35	43.72	-09	57	53.3		15.7	TqEO045	<a href="#">470</a>
<a href="#">CK17O010</a>	C2017	07	21.10735	02	35	43.93	-09	57	51.1		15.6	TqEO045	<a href="#">470</a>
<a href="#">CK17O010</a>	C2017	07	21.11439	02	35	44.59	-09	57	42.7		15.2	TqEO045	<a href="#">C10</a>
<a href="#">CK17O010</a>	C2017	07	21.15717402	35	48.76	-09	56	47.6		15.8	TUEO045	<a href="#">K91</a>	
<a href="#">CK17O010</a>	C2017	07	21.15878402	35	48.91	-09	56	45.6		15.8	TUEO045	<a href="#">K91</a>	
<a href="#">CK17O010</a>	C2017	07	21.16038602	35	49.07	-09	56	43.9		15.8	TUEO045	<a href="#">K91</a>	
<a href="#">CK17O010</a>	C2017	07	21.16201502	35	49.23	-09	56	41.9		15.8	TUEO045	<a href="#">K91</a>	
<a href="#">CK17O010</a>	C2017	07	21.16361902	35	49.38	-09	56	40.0		15.8	TUEO045	<a href="#">K91</a>	
<a href="#">CK17O010</a>	9C2017	07	21.17645	02	35	50.80	-09	56	30.0		15.4	TqEO045	<a href="#">G40</a>
<a href="#">CK17O010</a>	9C2017	07	21.18551	02	35	51.68	-09	56	19.5		15.4	TqEO045	<a href="#">G40</a>
<a href="#">CK17O010</a>	C2017	07	21.18583	02	35	51.72	-09	56	19.3		15.1	TqEO045	<a href="#">J22</a>
<a href="#">CK17O010</a>	9C2017	07	21.18913	02	35	52.00	-09	56	15.2		15.4	TqEO045	<a href="#">G40</a>
<a href="#">CK17O010</a>	C2017	07	21.18942	02	35	52.07	-09	56	14.9		15.1	TqEO045	<a href="#">J22</a>
<a href="#">CK17O010</a>	9C2017	07	21.19130	02	35	52.24	-09	56	12.8		15.3	TqEO045	<a href="#">G40</a>
<a href="#">CK17O010</a>	C2017	07	21.19303	02	35	52.38	-09	56	10.7		15.1	TqEO045	<a href="#">J22</a>
<a href="#">CK17O010</a>	9C2017	07	21.20288	02	35	53.35	-09	55	59.3		15.3	TqEO045	<a href="#">G40</a>
<a href="#">CK17O010</a>	C2017	07	21.20694602	35	53.735	-09	55	54.64		15.1	TUEO045	<a href="#">J04</a>	
<a href="#">CK17O010</a>	C2017	07	21.20804602	35	53.838	-09	55	53.35		15.0	TUEO045	<a href="#">J04</a>	
<a href="#">CK17O010</a>	C2017	07	21.20914702	35	53.944	-09	55	52.15		15.2	TUEO045	<a href="#">J04</a>	
<a href="#">CK17O010</a>	C2017	07	21.28964	02	36	01.94	-09	54	14.0		15.2	TqEO045	<a href="#">W96</a>
<a href="#">CK17O010</a>	C2017	07	21.31935	02	36	04.82	-09	53	39.5		15.2	TqEO045	<a href="#">W96</a>
<a href="#">CK17O010</a>	C2017	07	21.34983	02	36	07.76	-09	53	04.2		15.2	TqEO045	<a href="#">W96</a>
<a href="#">CK17O010</a>	C2017	07	21.36660	02	36	09.38	-09	52	44.8		15.2	TqEO045	<a href="#">W96</a>
<a href="#">CK17O010</a>	3C2017	07	21.40278	02	36	12.87	-09	52	02.1		15.5	TqEO045	<a href="#">W88</a>

<a href="#">CK17O010</a>	3C2017	07	21.42477	02	36	15.02	-09	51	36.1	15.5	TqEO045	<a href="#">W88</a>
<a href="#">CK17O010</a>	3C2017	07	21.43063	02	36	15.59	-09	51	29.2	15.4	TqEO045	<a href="#">W88</a>
<a href="#">CK17O010</a>	3C2017	07	21.43499	02	36	15.99	-09	51	24.4	15.5	TqEO045	<a href="#">W88</a>
<a href="#">CK17O010</a>	5C2017	07	21.47753	02	36	20.29	-09	50	40.3		vEO045	<a href="#">U69</a>
<a href="#">CK17O010</a>	5C2017	07	21.47947	02	36	20.48	-09	50	38.1		vEO045	<a href="#">U69</a>
<a href="#">CK17O010</a>	5C2017	07	21.48128	02	36	20.65	-09	50	36.0	12.0	TvEO045	<a href="#">U69</a>
<a href="#">CK17O010</a>	2C2017	07	21.71054	02	36	43.23	-09	46	02.0	15.7	TqEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	2C2017	07	21.71359	02	36	43.53	-09	45	58.9	15.8	TqEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	C2017	07	21.73448	02	36	45.49	-09	45	40.6		mEO045	<a href="#">349</a>
<a href="#">CK17O010</a>	C2017	07	21.74036	02	36	46.10	-09	45	33.2	11.9	TmEO045	<a href="#">349</a>
<a href="#">CK17O010</a>	[C2017	07	21.75282	02	36	47.31	-09	45	13.4		qEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	[C2017	07	21.75856	02	36	47.85	-09	45	06.8		qEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	[C2017	07	21.76040	02	36	48.02	-09	45	04.6	12.0	TqEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	3C2017	07	21.79615	02	36	51.49	-09	44	22.9	14.8	TqEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	3C2017	07	21.80170	02	36	52.02	-09	44	16.4	14.8	TqEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	3C2017	07	21.80725	02	36	52.55	-09	44	09.9	14.8	TqEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	C2017	07	22.26587	02	37	37.62	-09	35	12.8	15.5	TrEO045	<a href="#">Y00</a>
<a href="#">CK17O010</a>	C2017	07	22.27020	02	37	38.05	-09	35	07.8	15.5	TrEO045	<a href="#">Y00</a>
<a href="#">CK17O010</a>	C2017	07	22.27526	02	37	38.54	-09	35	01.7	15.5	TrEO045	<a href="#">Y00</a>
<a href="#">CK17O010</a>	C2017	07	22.27616	02	37	38.64	-09	35	00.7	15.5	TrEO045	<a href="#">Y00</a>
<a href="#">CK17O010</a>	C2017	07	22.27946	02	37	38.95	-09	34	56.9	15.5	TrEO045	<a href="#">Y00</a>
<a href="#">CK17O010</a>	C2017	07	22.28275	02	37	39.27	-09	34	53.0	15.5	TrEO045	<a href="#">Y00</a>
<a href="#">CK17O010</a>	C2017	07	22.36145	02	37	46.85	-09	33	20.7	15.5	TrEO045	<a href="#">Y00</a>
<a href="#">CK17O010</a>	C2017	07	22.36422	02	37	47.12	-09	33	17.4	15.4	TrEO045	<a href="#">Y00</a>
<a href="#">CK17O010</a>	C2017	07	22.36695	02	37	47.38	-09	33	14.1	15.4	TrEO045	<a href="#">Y00</a>
<a href="#">CK17O010</a>	C2017	07	22.39609902	37	50.35	-09	32	38.8		16.0	TUEO045	<a href="#">W85</a>
<a href="#">CK17O010</a>	C2017	07	22.39792902	37	50.53	-09	32	36.6		16.0	TUEO045	<a href="#">W85</a>
<a href="#">CK17O010</a>	C2017	07	22.39975302	37	50.69	-09	32	34.5		16.0	TUEO045	<a href="#">W85</a>
<a href="#">CK17O010</a>	C2017	07	22.40158102	37	50.87	-09	32	32.3		16.0	TUEO045	<a href="#">W85</a>
<a href="#">CK17O010</a>	C2017	07	22.40341002	37	51.06	-09	32	30.1		16.1	TUEO045	<a href="#">W85</a>
<a href="#">CK17O010</a>	C2017	07	22.40523802	37	51.22	-09	32	28.1		16.0	TUEO045	<a href="#">W85</a>
<a href="#">CK17O010</a>	C2017	07	22.40713302	37	51.41	-09	32	25.7		16.0	TUEO045	<a href="#">W85</a>
<a href="#">CK17O010</a>	3C2017	07	22.78411	02	38	28.38	-09	25	00.3	15.0	TqEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	3C2017	07	22.78803	02	38	28.76	-09	24	55.7	14.9	TqEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	3C2017	07	22.79203	02	38	29.14	-09	24	51.0	14.9	TqEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	C2017	07	23.10904	02	39	00.25	-09	18	41.2	14.9	TvEO045	<a href="#">587</a>
<a href="#">CK17O010</a>	C2017	07	23.11272	02	39	00.64	-09	18	36.7		vEO045	<a href="#">587</a>
<a href="#">CK17O010</a>	C2017	07	23.21573	02	39	10.64	-09	16	33.7	13.7	ToEO045	<a href="#">Z22</a>
<a href="#">CK17O010</a>	C2017	07	23.21834	02	39	10.90	-09	16	30.5	13.7	ToEO045	<a href="#">Z22</a>
<a href="#">CK17O010</a>	C2017	07	23.22086	02	39	11.15	-09	16	27.2	13.7	ToEO045	<a href="#">Z22</a>
<a href="#">CK17O010</a>	C2017	07	23.22361	02	39	11.43	-09	16	23.9	13.8	ToEO045	<a href="#">Z22</a>
<a href="#">CK17O010</a>	KC2017	07	23.43953	02	39	32.48	-09	12	06.8	14.7	TUEO045	<a href="#">H47</a>
<a href="#">CK17O010</a>	KC2017	07	23.44201	02	39	32.72	-09	12	04.6	14.0	TUEO045	<a href="#">H47</a>
<a href="#">CK17O010</a>	&C2017	07	23.47725	02	39	36.33	-09	11	22.3	15.3	TUEO045	<a href="#">U69</a>
<a href="#">CK17O010</a>	&C2017	07	23.47834	02	39	36.42	-09	11	20.9	15.3	TUEO045	<a href="#">U69</a>
<a href="#">CK17O010</a>	&C2017	07	23.47925	02	39	36.51	-09	11	20.0	15.3	TUEO045	<a href="#">U69</a>
<a href="#">CK17O010</a>	&C2017	07	23.48032	02	39	36.63	-09	11	18.5	15.3	TUEO045	<a href="#">U69</a>
<a href="#">CK17O010</a>	0C2017	07	23.68017	02	39	56.24	-09	07	13.8	16.0	TUEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	0C2017	07	23.68444	02	39	56.68	-09	07	08.3	15.9	TUEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	0C2017	07	23.68789	02	39	57.01	-09	07	04.5	15.9	TUEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	6C2017	07	23.75172	02	40	03.15	-09	05	48.5	15.3	TQEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	6C2017	07	23.75344	02	40	03.36	-09	05	46.0	15.4	TQEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	6C2017	07	23.75615	02	40	03.60	-09	05	42.7	15.3	TQEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	6C2017	07	23.75877	02	40	03.83	-09	05	39.7	15.3	TQEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	6C2017	07	23.76145	02	40	04.07	-09	05	36.6	15.3	TQEO045	<a href="#">Q62</a>
<a href="#">CK17O010</a>	C2017	07	24.30960	02	40	57.76	-08	54	38.6	14.9	TqEO045	<a href="#">W96</a>
<a href="#">CK17O010</a>	C2017	07	24.34269	02	41	00.94	-08	53	58.6	14.9	TqEO045	<a href="#">W96</a>
<a href="#">CK17O010</a>	C2017	07	24.35606	02	41	02.10	-08	53	43.4	15.4	TrEO045	<a href="#">Y00</a>
<a href="#">CK17O010</a>	C2017	07	24.36150	02	41	02.66	-08	53	36.6	15.4	TrEO045	<a href="#">Y00</a>
<a href="#">CK17O010</a>	C2017	07	24.36398	02	41	02.88	-08	53	33.7	15.4	TrEO045	<a href="#">Y00</a>
<a href="#">CK17O010</a>	C2017	07	24.42103	02	41	08.50	-08	52	24.3	15.0	TQEO045	<a href="#">G39</a>
<a href="#">CK17O010</a>	C2017	07	24.42177	02	41	08.52	-08	52	23.1	15.1	TQEO045	<a href="#">G39</a>
<a href="#">CK17O010</a>	C2017	07	24.42250	02	41	08.62	-08	52	21.8	15.0	TQEO045	<a href="#">G39</a>
<a href="#">CK17O010</a>	C2017	07	24.42405	02	41	08.77	-08	52	20.7	14.9	TQEO045	<a href="#">G39</a>
<a href="#">CK17O010</a>	C2017	07	24.42479	02	41	08.86	-08	52	20.3	14.9	TQEO045	<a href="#">G39</a>
<a href="#">CK17O010</a>	C2017	07	24.42627	02	41	09.00	-08	52	17.6	14.8	TQEO045	<a href="#">G39</a>

**Station data:**

- (247) Roving observer ([S17.05711](#) [E144.35780](#)) Australia/QLD.
- (349) [Ageo](#) ([N35.95651](#) [E139.56622](#)) Japan. Observer K. [Kadota](#). 0.25-m f/5.0 reflector + CCD.
- (470) [Ceccano](#) ([N41.57033](#) [E13.32756](#)) Italy. 0.28-m Schmidt-Cassegrain.
- (587) [Sormano](#) ([N45.88397](#) [E9.23025](#)) Italy. Observers F. Manca, A. Testa. Measurer F. Manca. 0.5-m + CCD.
- (807) [Cerro Tololo Observatory, La Serena](#) ([S30.1692](#) [W70.8059](#)) Chile. Observers M. [Holman](#), J. [Kavelaars](#), T. [Grav](#), W. Fraser. Measurer M. Holman. 4-m Blanco reflector + CCD.
- (C10) Maisoncelles ([N48.71776](#) [E3.42622](#)) France.
- (G39) ROAD, San Pedro de Atacama ([S22.95319](#) [W68.17961](#)) Chile.
- (G40) Slooh.com Canary Islands Observatory ([N28.29982](#) [W16.50826](#)) Canary Islands (Spain).
- (H47) [Vicksburg](#) ([N32.2663](#) [W90.8561](#)) US/Mississippi.
- (J04) [ESA Optical Ground Station, Tenerife](#) ([N28.30102](#) [W16.51183](#)) Canary Islands (Spain).
- (J22) [Tacande Observatory, La Palma](#) ([N28.64162](#) [W17.86765](#)) Canary Islands (Spain).
- (K91) Sutherland-LCOGT A ([S32.38063](#) [E20.81019](#)) South Africa.
- (Q62) iTelescope Observatory, Siding Spring ([S31.27336](#) [E149.06442](#)) Australia/NSW. 0.50-m f/6.8 astrograph + CCD + focal reducer, 0.70-m f/6.6 astrograph + CCD.
- (U69) iTelescope SRO Observatory, Auberry ([N37.0705](#) [W119.4130](#)) US/California.
- (W85) Cerro Tololo-LCOGT A ([S30.16750](#) [W70.80481](#)) Chile. Observers T. Lister, S. Greenstreet, E. Gomez. Measurer T. Lister. 1.0-m f/8 Ritchey-Chrétien + CCD.
- (W88) [Slooh.com Chile Observatory, La Dehesa](#) ([S33.26921](#) [W70.53430](#)) Chile. 0.35-m f/11 Schmidt-Cassegrain + CCD.
- (W96) CAO, San Pedro de Atacam ([since 2013](#)) ([S22.95357](#) [W68.17994](#)) Chile.
- (Y00) [SONEAR Observatory, Oliveira](#) ([S20.71513](#) [W44.78496](#)) Brazil. Observers C. Jacques, E. Pimentel, J. Barros. Measurer C. Jacques. 0.28-m f/2.2 astrograph + CCD.
- (Z22) MASTER-IAC Observatory, Tenerife ([N28.2990](#) [W16.5106](#)) Canary Islands (Spain).

**Orbital elements: C/2017 O1**

Perihelion 2017 Oct 14.458157 +/- 0.136 TT; Constraint: e=1  
 Epoch 2017 Jul 24.0 TT = JDT 2457958.5 Earth MOID: 0.5388 [Find\\_Orb](#)  
 q 1.50370598 +/- 0.00204

	Peri.	20.52135 +/- 0.16	
	Node	25.90488 +/- 0.033	
e 1.0 +/- 0	Incl.	39.79572 +/- 0.029	

From 106 observations 2017 July 19-24; mean residual 0".43

**Residuals in arcseconds:**

<a href="#">170719</a>	<a href="#">807</a>	1.9-	1.0+	<a href="#">170721</a>	<a href="#">W96</a>	.02+	.02-	<a href="#">170722</a>	<a href="#">Q62</a>	.25+	.06+
<a href="#">170719</a>	<a href="#">807</a>	.51+	.53-	<a href="#">170721</a>	<a href="#">W96</a>	.14-	.07-	<a href="#">170722</a>	<a href="#">Q62</a>	.29+	.03+
<a href="#">170719</a>	<a href="#">807</a>	.44+	2.8-	<a href="#">170721</a>	<a href="#">W96</a>	.14-	.13-	<a href="#">170722</a>	<a href="#">Q62</a>	.21+	.00
<a href="#">170719</a>	<a href="#">247</a>	.58-	.18-	<a href="#">170721</a>	<a href="#">W88</a>	.10-	.34-	<a href="#">170723</a>	<a href="#">587</a>	.16+	.01+
<a href="#">170719</a>	<a href="#">247</a>	.93-	.27+	<a href="#">170721</a>	<a href="#">W88</a>	.33+	.09+	<a href="#">170723</a>	<a href="#">587</a>	.65+	.15+
<a href="#">170719</a>	<a href="#">247</a>	1.1+	1.0+	<a href="#">170721</a>	<a href="#">W88</a>	.41+	.17+	<a href="#">170723</a>	<a href="#">Z22</a>	.69-	.39-
<a href="#">170719</a>	<a href="#">247</a>	.93+	.63+	<a href="#">170721</a>	<a href="#">W88</a>	.11+	.11-	<a href="#">170723</a>	<a href="#">Z22</a>	.56-	.29-
<a href="#">170720</a>	<a href="#">W85</a>	.26+	.20+	<a href="#">170721</a>	<a href="#">U69</a>	.09-	.08+	<a href="#">170723</a>	<a href="#">Z22</a>	.45-	.02+
<a href="#">170720</a>	<a href="#">W85</a>	.12+	.13+	<a href="#">170721</a>	<a href="#">U69</a>	.06-	.02+	<a href="#">170723</a>	<a href="#">Z22</a>	.22-	.05+
<a href="#">170721</a>	<a href="#">470</a>	.01-	.02-	<a href="#">170721</a>	<a href="#">U69</a>	.14-	.02+	<a href="#">170723</a>	<a href="#">H47</a>	1.2-	.23+
<a href="#">170721</a>	<a href="#">470</a>	.32+	.03-	<a href="#">170721</a>	<a href="#">Q62</a>	.37+	.68+	<a href="#">170723</a>	<a href="#">H47</a>	1.1-	.52-
<a href="#">170721</a>	<a href="#">470</a>	.13+	.19+	<a href="#">170721</a>	<a href="#">Q62</a>	.43+	.22+	<a href="#">170723</a>	<a href="#">U69</a>	.45+	.06-
<a href="#">170721</a>	<a href="#">C10</a>	.64-	.55+	<a href="#">170721</a>	<a href="#">349</a>	.80-	.26-	<a href="#">170723</a>	<a href="#">U69</a>	.23+	.04+
<a href="#">170721</a>	<a href="#">C10</a>	.14-	.74+	<a href="#">170721</a>	<a href="#">349</a>	.22-	.29+	<a href="#">170723</a>	<a href="#">U69</a>	.26+	.14-
<a href="#">170721</a>	<a href="#">470</a>	.09+	.44+	<a href="#">170721</a>	<a href="#">Q62</a>	.16+	.00	<a href="#">170723</a>	<a href="#">U69</a>	.50+	.08+
<a href="#">170721</a>	<a href="#">C10</a>	.09+	.13+	<a href="#">170721</a>	<a href="#">Q62</a>	.06-	.09-	<a href="#">170723</a>	<a href="#">Q62</a>	.22+	.07-
<a href="#">170721</a>	<a href="#">470</a>	.13-	.28+	<a href="#">170721</a>	<a href="#">Q62</a>	.17-	.04-	<a href="#">170723</a>	<a href="#">Q62</a>	.60+	.34+
<a href="#">170721</a>	<a href="#">470</a>	.10-	.01+	<a href="#">170721</a>	<a href="#">Q62</a>	.14+	.06-	<a href="#">170723</a>	<a href="#">Q62</a>	.54+	.02+
<a href="#">170721</a>	<a href="#">C10</a>	.49-	.57+	<a href="#">170721</a>	<a href="#">Q62</a>	.06+	.04-	<a href="#">170723</a>	<a href="#">Q62</a>	.15+	.16-
<a href="#">170721</a>	<a href="#">K91</a>	.18+	.18-	<a href="#">170721</a>	<a href="#">Q62</a>	.00	.02-	<a href="#">170723</a>	<a href="#">Q62</a>	.81+	.28+
<a href="#">170721</a>	<a href="#">K91</a>	.10+	.05-	<a href="#">170722</a>	<a href="#">Y00</a>	.86-	.23-	<a href="#">170723</a>	<a href="#">Q62</a>	.50+	.34+
<a href="#">170721</a>	<a href="#">K91</a>	.18+	.21-	<a href="#">170722</a>	<a href="#">Y00</a>	.69-	.31-	<a href="#">170723</a>	<a href="#">Q62</a>	.17+	.21+
<a href="#">170721</a>	<a href="#">K91</a>	.22+	.10-	<a href="#">170722</a>	<a href="#">Y00</a>	.67-	.14-	<a href="#">170723</a>	<a href="#">Q62</a>	.10-	.11+
<a href="#">170721</a>	<a href="#">K91</a>	.15+	.06-	<a href="#">170722</a>	<a href="#">Y00</a>	.48-	.20-	<a href="#">170724</a>	<a href="#">W96</a>	.12-	.07-

<a href="#">170721</a>	<a href="#">G40</a>	.37+	.05-	<a href="#">170722</a>	<a href="#">Y00</a>	.60-	.27-	<a href="#">170724</a>	<a href="#">W96</a>	.25-	.15+
<a href="#">170721</a>	<a href="#">G40</a>	.39+	.03-	<a href="#">170722</a>	<a href="#">Y00</a>	.57-	.23-	<a href="#">170724</a>	<a href="#">Y00</a>	.33-	.40-
<a href="#">170721</a>	<a href="#">J22</a>	.47+	.19-	<a href="#">170722</a>	<a href="#">Y00</a>	.45-	.37-	<a href="#">170724</a>	<a href="#">Y00</a>	.26+	.16-
<a href="#">170721</a>	<a href="#">G40</a>	.06-	.08+	<a href="#">170722</a>	<a href="#">Y00</a>	.39-	.33-	<a href="#">170724</a>	<a href="#">Y00</a>	.00	.25-
<a href="#">170721</a>	<a href="#">J22</a>	.50+	.05+	<a href="#">170722</a>	<a href="#">Y00</a>	.42-	.24-	<a href="#">170724</a>	<a href="#">G39</a>	.45+	.08+
<a href="#">170721</a>	<a href="#">G40</a>	.38+	.04-	<a href="#">170722</a>	<a href="#">W85</a>	.17+	.17-	<a href="#">170724</a>	<a href="#">G39</a>	.31-	.39+
<a href="#">170721</a>	<a href="#">J22</a>	.09-	.07+	<a href="#">170722</a>	<a href="#">W85</a>	.22+	.13-	<a href="#">170724</a>	<a href="#">G39</a>	.14+	.81+
<a href="#">170721</a>	<a href="#">G40</a>	.21+	.06+	<a href="#">170722</a>	<a href="#">W85</a>	.01-	.17-	<a href="#">170724</a>	<a href="#">G39</a>	.17+	.04+
<a href="#">170721</a>	<a href="#">J04</a>	.08+	.01+	<a href="#">170722</a>	<a href="#">W85</a>	.05+	.12-	<a href="#">170724</a>	<a href="#">G39</a>	.45+	.45-
<a href="#">170721</a>	<a href="#">J04</a>	.03+	.02+	<a href="#">170722</a>	<a href="#">W85</a>	.26+	.07-	<a href="#">170724</a>	<a href="#">G39</a>	.43+	.46+
<a href="#">170721</a>	<a href="#">J04</a>	.02+	.05-	<a href="#">170722</a>	<a href="#">W85</a>	.02+	.22-				
<a href="#">170721</a>	<a href="#">W96</a>	.10+	.10-	<a href="#">170722</a>	<a href="#">W85</a>	.13+	.05-				

**Ephemerides for (970) Chelmsford:**

Date (UTC)	RA	Dec	delta	r	elong	'/hr	PA	"	sig	PA
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2017 07 25	02 42 05.159	-08 40 48.24	1.6274	1.8745	87.1	1.31	50.1	0.2	47	
2017 07 26	02 43 42.709	-08 20 24.40	1.6110	1.8666	87.5	1.32	49.7	0.4	48	
2017 07 27	02 45 20.100	-07 59 44.77	1.5948	1.8588	87.9	1.33	49.3	0.7	48	
2017 07 28	02 46 57.331	-07 38 48.81	1.5786	1.8510	88.3	1.33	48.9	1.0	48	
2017 07 29	02 48 34.401	-07 17 35.98	1.5624	1.8433	88.7	1.34	48.5	1.4	48	
2017 07 30	02 50 11.310	-06 56 05.72	1.5463	1.8357	89.0	1.35	48.1	1.8	48	
2017 07 31	02 51 48.058	-06 34 17.46	1.5303	1.8280	89.4	1.36	47.6	2.4	48	
2017 08 01	02 53 24.644	-06 12 10.61	1.5143	1.8205	89.8	1.36	47.2	3.0	48	
2017 08 02	02 55 01.067	-05 49 44.57	1.4984	1.8130	90.2	1.37	46.8	3.7	48	
2017 08 03	02 56 37.329	-05 26 58.71	1.4825	1.8056	90.6	1.38	46.3	4.5	48	
2017 08 04	02 58 13.427	-05 03 52.41	1.4667	1.7982	91.0	1.39	45.8	5.3	48	
2017 08 05	02 59 49.362	-04 40 25.00	1.4510	1.7909	91.4	1.40	45.3	6.3	47	
2017 08 06	03 01 25.132	-04 16 35.83	1.4354	1.7836	91.8	1.41	44.9	7.3	47	
2017 08 07	03 03 00.737	-03 52 24.21	1.4198	1.7765	92.2	1.42	44.4	8.5	47	
2017 08 08	03 04 36.174	-03 27 49.42	1.4043	1.7693	92.6	1.43	43.9	9	47	
2017 08 09	03 06 11.443	-03 02 50.77	1.3889	1.7623	93.0	1.44	43.4	11	47	
2017 08 10	03 07 46.539	-02 37 27.49	1.3736	1.7553	93.4	1.45	42.8	12	47	
2017 08 11	03 09 21.460	-02 11 38.85	1.3583	1.7484	93.8	1.47	42.3	14	46	
2017 08 12	03 10 56.201	-01 45 24.06	1.3431	1.7415	94.3	1.48	41.8	15	46	
2017 08 13	03 12 30.758	-01 18 42.33	1.3280	1.7348	94.7	1.49	41.2	17	46	
2017 08 14	03 14 05.125	-00 51 32.85	1.3130	1.7280	95.1	1.50	40.7	19	46	
2017 08 15	03 15 39.295	-00 23 54.77	1.2981	1.7214	95.5	1.52	40.1	21	46	
2017 08 16	03 17 13.261	+00 04 12.75	1.2833	1.7149	95.9	1.53	39.5	23	45	
2017 08 17	03 18 47.017	+00 32 50.61	1.2685	1.7084	96.4	1.55	39.0	26	45	
2017 08 18	03 20 20.553	+01 01 59.71	1.2539	1.7020	96.8	1.56	38.4	28	45	
2017 08 19	03 21 53.863	+01 31 40.98	1.2394	1.6956	97.2	1.58	37.8	31	45	
2017 08 20	03 23 26.941	+02 01 55.38	1.2249	1.6894	97.6	1.60	37.2	34	45	
2017 08 21	03 24 59.779	+02 32 43.88	1.2106	1.6832	98.1	1.61	36.6	37	44	
2017 08 22	03 26 32.373	+03 04 07.50	1.1964	1.6772	98.5	1.63	36.0	40	44	
2017 08 23	03 28 04.719	+03 36 07.23	1.1823	1.6712	99.0	1.65	35.3	44	44	
2017 08 24	03 29 36.813	+04 08 44.14	1.1683	1.6652	99.4	1.67	34.7	47	44	
2017 08 25	03 31 08.655	+04 41 59.26	1.1544	1.6594	99.8	1.69	34.1	51	44	
2017 08 26	03 32 40.241	+05 15 53.66	1.1407	1.6537	100.3	1.71	33.5	55	43	
2017 08 27	03 34 11.571	+05 50 28.41	1.1271	1.6480	100.7	1.73	32.8	59	43	
2017 08 28	03 35 42.643	+06 25 44.60	1.1136	1.6425	101.2	1.76	32.2	64	43	
2017 08 29	03 37 13.456	+07 01 43.30	1.1003	1.6370	101.7	1.78	31.6	68	43	
2017 08 30	03 38 44.008	+07 38 25.60	1.0871	1.6316	102.1	1.80	31.0	73	43	
2017 08 31	03 40 14.299	+08 15 52.59	1.0740	1.6263	102.6	1.83	30.3	78	43	
2017 09 01	03 41 44.325	+08 54 05.35	1.0611	1.6211	103.0	1.86	29.7	84	42	
2017 09 02	03 43 14.086	+09 33 04.95	1.0484	1.6160	103.5	1.88	29.1	90	42	
2017 09 03	03 44 43.577	+10 12 52.45	1.0358	1.6110	104.0	1.91	28.4	96	42	
2017 09 04	03 46 12.798	+10 53 28.90	1.0234	1.6061	104.5	1.94	27.8	102	42	
2017 09 05	03 47 41.743	+11 34 55.33	1.0111	1.6013	104.9	1.97	27.2	108	42	
2017 09 06	03 49 10.408	+12 17 12.73	0.9991	1.5966	105.4	2.00	26.6	115	41	
2017 09 07	03 50 38.786	+13 00 22.06	.98718	1.5920	105.9	2.03	26.0	122	41	
2017 09 08	03 52 06.872	+13 44 24.27	.97547	1.5876	106.4	2.06	25.4	130	41	
2017 09 09	03 53 34.655	+14 29 20.23	.96394	1.5832	106.8	2.09	24.8	138	41	
2017 09 10	03 55 02.125	+15 15 10.77	.95261	1.5789	107.3	2.12	24.2	146	41	
2017 09 11	03 56 29.269	+16 01 56.67	.94149	1.5747	107.8	2.15	23.6	154	40	
2017 09 12	03 57 56.074	+16 49 38.63	.93056	1.5707	108.3	2.19	23.0	163	40	

2017 09 13	03 59	22.523	+17 38	17.27	.91985	1.5667	108.8	2.22	22.4	172	40
2017 09 14	04 00	48.602	+18 27	53.13	.90935	1.5629	109.3	2.26	21.8	182	40
2017 09 15	04 02	14.292	+19 18	26.67	.89908	1.5591	109.7	2.29	21.2	192	40
2017 09 16	04 03	39.576	+20 09	58.20	.88904	1.5555	110.2	2.33	20.7	202	40
2017 09 17	04 05	04.437	+21 02	27.96	.87924	1.5520	110.7	2.36	20.1	212	39
2017 09 18	04 06	28.859	+21 55	56.03	.86967	1.5486	111.2	2.40	19.6	223	39
2017 09 19	04 07	52.824	+22 50	22.36	.86036	1.5454	111.7	2.43	19.0	235	39
2017 09 20	04 09	16.317	+23 45	46.74	.85131	1.5422	112.2	2.47	18.5	246	39
2017 09 21	04 10	39.323	+24 42	08.82	.84251	1.5392	112.6	2.50	17.9	258	39
2017 09 22	04 12	01.825	+25 39	28.06	.83399	1.5362	113.1	2.54	17.4	271	39
2017 09 23	04 13	23.809	+26 37	43.74	.82574	1.5335	113.6	2.57	16.9	283	39
2017 09 24	04 14	45.259	+27 36	54.94	.81778	1.5308	114.0	2.60	16.4	296	39
2017 09 25	04 16	06.158	+28 37	00.55	.81010	1.5282	114.5	2.64	15.9	310	38
2017 09 26	04 17	26.489	+29 37	59.24	.80272	1.5258	114.9	2.67	15.4	323	38
2017 09 27	04 18	46.231	+30 39	49.48	.79564	1.5235	115.4	2.70	15.0	337	38
2017 09 28	04 20	05.365	+31 42	29.49	.78886	1.5213	115.8	2.73	14.5	352	38
2017 09 29	04 21	23.867	+32 45	57.30	.78240	1.5192	116.2	2.76	14.0	366	38
2017 09 30	04 22	41.714	+33 50	10.67	.77625	1.5173	116.6	2.78	13.6	381	38
2017 10 01	04 23	58.877	+34 55	07.16	.77042	1.5155	117.0	2.81	13.1	396	38
2017 10 02	04 25	15.328	+36 00	44.09	.76491	1.5138	117.4	2.83	12.7	411	38
2017 10 03	04 26	31.033	+37 06	58.58	.75974	1.5123	117.8	2.85	12.3	426	38
2017 10 04	04 27	45.956	+38 13	47.50	.75489	1.5108	118.1	2.87	11.9	441	38
2017 10 05	04 29	00.056	+39 21	07.54	.75038	1.5095	118.5	2.89	11.5	457	38
2017 10 06	04 30	13.286	+40 28	55.17	.74621	1.5084	118.8	2.90	11.1	472	38
2017 10 07	04 31	25.592	+41 37	06.69	.74238	1.5073	119.1	2.92	10.7	488	38
2017 10 08	04 32	36.918	+42 45	38.19	.73889	1.5064	119.4	2.93	10.3	503	38
2017 10 09	04 33	47.195	+43 54	25.61	.73574	1.5057	119.7	2.93	9.9	519	37
2017 10 10	04 34	56.350	+45 03	24.76	.73294	1.5050	119.9	2.94	9.5	534	37
2017 10 11	04 36	04.305	+46 12	31.27	.73048	1.5045	120.2	2.94	9.1	550	37
2017 10 12	04 37	10.972	+47 21	40.70	.72837	1.5041	120.4	2.93	8.7	565	37
2017 10 13	04 38	16.259	+48 30	48.50	.72660	1.5038	120.6	2.93	8.3	580	38
2017 10 14	04 39	20.067	+49 39	50.05	.72517	1.5037	120.8	2.92	7.9	594	38
2017 10 15	04 40	22.293	+50 48	40.73	.72409	1.5037	120.9	2.91	7.5	609	38
2017 10 16	04 41	22.824	+51 57	15.86	.72334	1.5039	121.1	2.89	7.1	623	38
2017 10 17	04 42	21.544	+53 05	30.84	.72293	1.5041	121.2	2.87	6.8	637	38
2017 10 18	04 43	18.328	+54 13	21.08	.72286	1.5045	121.3	2.85	6.4	651	38
2017 10 19	04 44	13.041	+55 20	42.08	.72312	1.5051	121.4	2.83	6.0	664	38
2017 10 20	04 45	05.541	+56 27	29.46	.72370	1.5057	121.4	2.80	5.6	677	38
2017 10 21	04 45	55.674	+57 33	38.95	.72461	1.5065	121.5	2.77	5.1	689	38
2017 10 22	04 46	43.274	+58 39	06.44	.72583	1.5074	121.5	2.74	4.7	701	38
2017 10 23	04 47	28.160	+59 43	47.99	.72737	1.5085	121.5	2.70	4.3	713	38
2017 10 24	04 48	10.137	+60 47	39.85	.72921	1.5096	121.5	2.67	3.9	724	38
2017 10 25	04 48	48.990	+61 50	38.45	.73135	1.5109	121.5	2.63	3.4	735	38
2017 10 26	04 49	24.485	+62 52	40.46	.73379	1.5124	121.4	2.59	3.0	745	38
2017 10 27	04 49	56.364	+63 53	42.73	.73651	1.5139	121.4	2.54	2.5	755	38
2017 10 28	04 50	24.345	+64 53	42.38	.73951	1.5156	121.3	2.50	2.0	765	38
2017 10 29	04 50	48.117	+65 52	36.71	.74278	1.5175	121.2	2.45	1.5	774	38
2017 10 30	04 51	07.339	+66 50	23.27	.74631	1.5194	121.1	2.40	1.0	783	38
2017 10 31	04 51	21.630	+67 46	59.83	.75010	1.5215	121.0	2.35	0.5	791	38
2017 11 01	04 51	30.574	+68 42	24.39	.75414	1.5237	120.8	2.30	359.9	799	38