

Table 6. Astrometric Measurements of J703 compared to its orbital solution

J703	WDS 07106+1543 Sixth Orbital Catalog				PREDICTED "Truth"	Rho	Theta	Rho err.	Theta err.	Magnitude Difference 1.97	
						10.06	112.80	N/A	N/A		

Telescope (Section 2.2)	Altitude/A irmass	Filter	Exposure (secs)	Sat.	Date	All measurements in arcseconds									
						Observation Data			Standard Deviation			Difference from "Truth"			
						Number of images	Mean Rho	Mean Theta	of Rho	of Theta	Mean Rho	Mean Theta	Mean Rho	Mean Theta	

SRO 0.4m RC Calif.	Low 1.85	Red	15	U	12/27/2017	5	10.75	112.57	0.058	0.529	0.69	-0.23	0.026	0.237
30	U	12/27/2017	5	10.83	112.91	0.054	0.383	0.77	0.11	0.024	0.171			
60	U	12/27/2017	5	10.79	112.58	0.062	0.244	0.73	-0.22	0.028	0.109			
ALL RED	U	12/27/2017	15	10.79	112.69	0.064	0.407	0.73	-0.11	0.017	0.105			
Green	U	12/27/2017	5	10.71	113.09	0.016	0.202	0.65	0.29	0.007	0.090			
Green	U	12/27/2017	5	10.73	113.03	0.044	0.119	0.67	0.23	0.020	0.053			
Green	U	12/27/2017	5	10.72	113.13	0.052	0.200	0.66	0.33	0.023	0.089			
ALL GREEN	U	12/27/2017	15	10.72	113.08	0.038	0.171	0.66	0.28	0.010	0.044			
ALL LOW	U	12/27/2017	30	10.75	112.88	0.064	0.367	0.70	0.08	0.012	0.067			
SRO 0.4m RC Calif.	High 1.17	Red	15	U	12/27/2017	10	10.76	113.16	0.042	0.536	0.70	0.36	0.013	0.170
30	U	12/27/2017	10	10.77	113.09	0.048	0.561	0.72	0.29	0.015	0.177			
60	U	12/27/2017	10	10.77	113.12	0.038	0.537	0.71	0.32	0.012	0.170			
ALL RED	U	12/27/2017	30	10.77	113.12	0.038	0.537	0.71	0.32	0.007	0.098			
Green	U	12/27/2017	10	10.76	113.23	0.044	0.366	0.70	0.43	0.014	0.116			
Green	U	12/27/2017	10	10.76	113.07	0.026	0.095	0.70	0.27	0.008	0.030			
Green	U	12/27/2017	10	10.75	113.13	0.022	0.175	0.69	0.33	0.007	0.055			
ALL GREEN	U	12/27/2017	30	10.76	113.14	0.032	0.241	0.70	0.34	0.006	0.044			
ALL HIGH	U	12/27/2017	60	10.76	113.13	0.035	0.413	0.70	0.33	0.005	0.053			

The consistent and high Differences from "Truth" for these observations were investigated separately. The further observations from another observatory are consistent with these indicating a possible error in the ephemeris. Because the mean errors are calculated on a potentially erroneous ephemeris, this J703 data was excluded from the statistical analyses except as noted in the Figures in Section 4.

Table 7. Astrometric Measurements of STF911 compared to HRT2017a ephemeris

STF911		WDS 06269+0404		Hrt2017a		PREDICTED "Truth"		Rho	Theta	Rho err.	Theta err.	Magnitude Difference			
		Rectilinear						11.66	155.44	0.14	0.46	0.39			
Telescope (Section 2.2)	Altitude/ Airmass	Filter	Exposure (secs)	Sat.	Date	All measurements in arcseconds									
						Observation Data			Standard Deviation		Difference from "Truth"		Standard Error of		
						Number images	Mean Rho	Mean Theta	of Rho	of Theta	Mean Rho	Mean Theta	Mean Rho	Mean Theta	
SRO 0.4m RC Calif.	Low 2.3	Red	15	U	12/27/2017	5	11.68	155.57	0.019	0.069		0.02	0.13	0.008	0.031
			30	U	12/27/2017	5	11.64	155.44	0.022	0.120		-0.02	0.00	0.010	0.054
			60	U	12/27/2017	5	11.65	155.55	0.022	0.141		-0.01	0.11	0.010	0.063
				U	12/27/2017	15	11.66	155.52	0.028	0.121		0.00	0.08	0.007	0.031
			15	U	12/27/2017	5	11.67	155.61	0.016	0.133		0.01	0.17	0.007	0.059
			30	U	12/27/2017	5	11.60	155.55	0.040	0.083		-0.06	0.11	0.018	0.037
			60	U	12/27/2017	5	11.65	155.63	0.020	0.078		-0.01	0.19	0.009	0.035
				U	12/27/2017	15	11.64	155.60	0.038	0.100		-0.02	0.16	0.010	0.026
				U	12/27/2017	30	11.65	155.56	0.034	0.116		-0.01	0.12	0.006	0.021
				U	12/27/2017										
SRO 0.4m RC Calif.	High 1.3	Red	15	U	12/27/2017	10	11.67	155.48	0.0389	0.0962		0.01	0.04	0.012	0.030
			30	U	12/27/2017	10	11.66	155.16	0.0918	0.6317		0.00	-0.28	0.029	0.200
			60	U	12/27/2017	10	11.60	155.46	0.7275	2.9459		-0.06	0.02	0.230	0.932
				U	12/27/2017	30	11.64	155.37	0.41	1.69		-0.02	-0.07	0.075	0.308
			15	U	12/27/2017	10	11.67	155.41	0.0267	0.1077		0.01	-0.03	0.008	0.034
			30	U	12/27/2017	10	11.67	155.46	0.0508	0.1167		0.01	0.02	0.016	0.037
			60	U	12/27/2017	10	11.61	155.50	0.3105	1.9363		-0.05	0.06	0.098	0.612
				U	12/27/2017	30	11.65	155.45	0.1783	1.0830		-0.01	0.01	0.033	0.198
				U	12/27/2017	60	11.64	155.41	0.3135	1.4054		-0.02	-0.03	0.040	0.181
				U	12/27/2017										

Continued

Table 7. Astrometric Measurements of STF911 compared to HRT2017a ephemeris

STF911		WDS 06269+0404		Hrt2017a		PREDICTED		Rho	Theta	Rho err.	Theta err.	Magnitude Difference				
		Rectilinear				"Truth"		11.66	155.44	0.14	0.46	0.39				
Telescope	Altitude/ Filter	Exposure	Sat.	Date	Observation Data				Standard Deviation			Difference from			Standard Error of	
					Number images	Mean	Mean	of	Rho	Theta	Rho	Theta	Mean	Mean	Rho	Theta
						Rho	Theta	of								
All measurements in arcseconds																
LCO	High	15	P	11/29/2017	3	10.98	154.63	0.176	0.330	-0.68	-0.81	0.102	0.191			
0.4m	1.26	30	P	11/29/2017	3	10.90	153.86	0.075	0.439	-0.76	-1.58	0.043	0.254			
RX			P	11/29/2017	6	10.94	154.24	0.129	0.546	-0.72	-1.20	0.053	0.223			
kb26	Green	15	P	11/29/2017	3	11.58	155.72	0.287	0.260	-0.08	0.28	0.166	0.150			
Chile	Green	30	P	11/29/2017	3	11.36	155.44	0.149	0.328	-0.30	0.00	0.086	0.189			
	ALL GREEN		P	11/29/2017	6	11.47	155.58	0.237	0.307	-0.19	0.14	0.097	0.125			
	ALL HIGH		P	11/29/2017	12	11.21	154.91	0.332	0.817	-0.45	-0.53	0.096	0.236			
LCO	Green	15	S	12/7/2017	2	11.64	155.79	0.002	0.156	-0.02	0.35	0.001	0.110			
0.4m	1.27	30	S	12/7/2017	2	11.60	155.86	0.012	0.024	-0.06	0.42	0.008	0.017			
RX			S	12/7/2017	4	11.62	155.82	0.021	0.101	-0.04	0.38	0.011	0.050			
kb99	Infrared	15	S	12/7/2017	2	11.69	155.31	0.000	0.072	0.03	-0.13	0.000	0.051			
Tenerife	Infrared	30	S	12/7/2017	2	11.60	155.52	0.122	0.165	-0.06	0.08	0.086	0.117			
	ALL INFRARED		S	12/7/2017	4	11.64	155.41	0.087	0.159	-0.02	-0.03	0.044	0.079			
	ALL HIGH		S	12/7/2017	8	11.63	155.62	0.060	0.252	-0.03	0.18	0.021	0.089			

Continued

Table 7. Astrometric Measurements of STF911 compared to HRT2017a ephemeris

STF911		WDS 06269+0404		Hrt2017a		PREDICTED		Rho		Theta		Rho err.		Theta err.		Magnitude Difference	
		Rectilinear				"Truth"		11.66		155.44		0.14		0.46		0.39	
Telescope	Altitude/Filter	Exposure	Sat.	Date	Observation Data		Standard Deviation		Difference from		Standard Error of						
					Number images	Mean Rho Mean Theta	of Rho of Theta	Mean Rho Mean Theta	Mean Rho Mean Theta	Mean Rho Mean Theta							
All measurements in arcseconds																	
LCO	Low	15	S	1/5/2018	5	11.60	155.96	0.0557	0.1434	-0.06	0.52	0.025	0.064				
0.4m	1.59	30	S	1/5/2018	5	11.63	155.93	0.0650	0.1298	-0.03	0.49	0.029	0.058				
RCX	ALL RED		S	1/5/2018	10	11.62	155.55	0.0598	0.1299	-0.04	0.11	0.019	0.041				
kb97	Green	15	S	1/5/2018	5	11.54	155.44	0.0245	0.0627	-0.12	0.00	0.011	0.028				
Australia	Green	30	S	1/5/2018	5	11.54	155.67	0.0208	0.0343	-0.12	0.23	0.009	0.015				
	ALL GREEN		S	1/5/2018	10	11.54	155.55	0.0214	0.1299	-0.12	0.11	0.007	0.041				
	ALL LOW		S	1/5/2018	20	11.58	155.75	0.0599	0.2381	-0.08	0.31	0.013	0.053				
	Red Stack	Median	S	1/5/2018	1	11.66	155.87	N/A	N/A	0.00	0.43	N/A	N/A				
	Red Stack	Mean	S	1/5/2018	1	11.65	155.89	N/A	N/A	-0.01	0.45	N/A	N/A				
	Green Stack	Median	S	1/5/2018	1	11.53	155.62	N/A	N/A	-0.13	0.18	N/A	N/A				
	Green Stack	Mean	S	1/5/2018	1	11.52	155.59	N/A	N/A	-0.14	0.15	N/A	N/A				
LCO	High	15	S	1/5/2018	5	11.66	155.44	0.048	0.095	0.00	0.00	0.021	0.043				
0.4m	1.26	30	S	1/5/2018	5	11.59	155.49	0.100	0.216	-0.07	0.05	0.045	0.097				
RCX	ALL RED		S	1/5/2018	10	11.63	155.47	0.081	0.161	-0.03	0.03	0.026	0.051				
kb97	Green	15	S	1/5/2018	5	11.62	155.50	0.016	0.017	-0.04	0.06	0.007	0.008				
Australia	Green	30	S	1/5/2018	4	11.65	155.64	0.092	0.129	-0.01	0.20	0.046	0.065				
	ALL GREEN		S	1/5/2018	9	11.62	155.56	0.013	0.107	-0.04	0.12	0.004	0.036				
	ALL HIGH		S	1/5/2018	19	11.63	155.51	0.072	0.143	-0.03	0.07	0.016	0.033				
	Red Stack	Med	S	1/5/2018	1	11.61	155.42	N/A	N/A	-0.05	-0.02	N/A	N/A				

Continued

Table 7. Astrometric Measurements of STF911 compared to HRT2017a ephemeris

STF911		WDS 06269+0404		Hrt2017a		PREDICTED		Rho		Theta		Rho err.		Theta err.		Magnitude Difference			
Rectilinear		Rectilinear		Exposure		Sat.		Date		11.66		155.44		0.14		0.46		0.39	
Telescope	Altitude/ Filter	Exposure	Sat.	Date	S=saturated U=unsaturated P=some saturated		Observation Data		Standard Deviation		Difference from		Standard Error of						
					Number images	Mean Rho	Mean Theta	of Rho	of Theta	Mean Rho	Mean Theta	Mean Rho	Mean Theta						
iTelescope T18 0.32m CDK 13 Spain	High 1.3	Green	15	U	3/9/2018	4	11.69	155.47	0.017	0.073	0.03	0.03	0.009	0.036					
			30	U	3/9/2018	5	11.67	155.48	0.006	0.036	0.01	0.04	0.003	0.016					
			15	U	3/9/2018	5	11.67	155.46	0.023	0.059	0.01	0.02	0.010	0.026					
			30	U	3/9/2018	5	11.67	155.48	0.003	0.032	0.01	0.04	0.001	0.014					
				U	3/9/2018	9	11.68	155.48	0.010	0.052	0.02	0.04	0.003	0.017					
				U	3/9/2018	10	11.67	155.47	0.013	0.046	0.01	0.03	0.004	0.014					
				U	3/9/2018	19	11.67	155.48	0.012	0.048	0.01	0.04	0.003	0.011					
iTelescope T18 0.32m CDK 13 Spain	High 1.3	Green	15	U	3/10/2018	5	11.66	155.42	0.015	0.069	0.00	-0.02	0.007	0.031					
			30	U	3/10/2018	2	11.67	155.48	0.000	0.000	0.01	0.04	0.000	0.000					
			15	U	3/10/2018	5	11.68	155.44	0.025	0.032	0.02	0.00	0.011	0.014					
			30	U	3/10/2018	5	11.68	155.47	0.007	0.024	0.02	0.03	0.003	0.011					
				U	3/10/2018	7	11.66	155.44	0.013	0.064	0.00	0.00	0.005	0.024					
				U	3/10/2018	10	11.68	155.45	0.016	0.030	0.02	0.01	0.005	0.010					
				U	3/10/2018	17	11.67	155.45	0.016	0.045	0.01	0.01	0.004	0.011					
iTelescope T17 0.43m CDK 17 Australia	High 1.39	Green	15	P	3/11/2018	5	11.55	155.03	0.024	0.086	-0.11	-0.41	0.011	0.038					
			30	P	3/11/2018	5	11.64	155.35	0.067	0.132	-0.02	-0.09	0.030	0.059					
			15	P	3/11/2018	5	11.54	155.36	0.100	0.398	-0.12	-0.08	0.045	0.178					
			30	P	3/11/2018	5	12.24	157.32	0.826	2.470	0.58	1.88	0.369	1.104					
				P	3/11/2018	10	11.59	155.19	0.064	0.164	-0.07	-0.25	0.020	0.052					
				P	3/11/2018	10	11.89	156.34	0.624	1.759	0.23	0.90	0.197	0.556					
				P	3/11/2018	20	11.74	155.77	0.357	1.091	0.08	0.33	0.080	0.244					
			Mean	P	3/11/2018	1	11.59	154.93	N/A	N/A	-0.07	-0.51	N/A	N/A					

Continued

Table 7. Astrometric Measurements of STF911 compared to HRT2017a ephemeris

STF911		WDS 06269+0404		Hrt2017a		PREDICTED "Truth"		Rho	Theta	Rho err.	Theta err.	Magnitude Difference 0.39	
Rectilinear								11.66	155.44	0.14	0.46		
Telescope	Altitude/ Filter	Exposure	Sat.	Date	Observation Data			Standard Deviation		Difference from		Standard Error of	
					Number Images	Mean Rho	Mean Theta	of Rho	of Theta	Mean Rho	Mean Theta	Mean Rho	Mean Theta
All measurements in arcseconds													
Telescope T17 0.43m CDK 17 Australia	High 1.32 Green Red Red ALL GREEN ALL RED ALL Green Stack	15 30 15 30 ALL GREEN ALL RED ALL Green Stack	P P P P P P P P	3/12/2018 3/12/2018 3/12/2018 3/12/2018 3/12/2018 3/12/2018 3/12/2018 3/12/2018	5	11.69	155.47	0.020	0.066	0.03	0.03	0.009	0.030
					5	11.57	155.54	0.032	0.150	-0.09	0.10	0.015	0.067
					5	11.64	155.03	0.015	0.136	-0.02	-0.41	0.006	0.061
					5	11.76	155.46	0.726	2.430	0.10	0.02	0.325	1.087
					10	11.63	155.51	0.059	0.119	-0.03	0.07	0.019	0.038
					10	11.70	155.24	0.388	1.326	0.04	-0.20	0.123	0.419
					20	11.67	155.38	0.216	0.766	0.01	-0.06	0.048	0.171
					1	11.60	155.41	N/A	N/A	-0.06	-0.03	N/A	N/A
					5	11.67	155.49	0.009	0.018	0.01	0.05	0.004	0.008
					5	11.65	155.49	0.005	0.018	-0.01	0.05	0.002	0.008
Telescope T21 0.43m CDK 17 New Mex.	High 1.32 Green Red Red ALL GREEN ALL RED ALL Green Stack Red Stack	15 30 15 30 ALL GREEN ALL RED ALL Green Stack Red Stack	U U U U U U U U	3/3/2018 3/3/2018 3/3/2018 3/3/2018 3/3/2018 3/3/2018 3/3/2018 3/3/2018	5	11.65	155.45	0.005	0.012	-0.01	0.01	0.002	0.005
					5	11.65	155.45	0.005	0.012	-0.01	0.01	0.002	0.005
					5	11.64	155.48	0.007	0.041	-0.02	0.04	0.003	0.018
					10	11.66	155.49	0.010	0.018	0.00	0.05	0.003	0.006
					10	11.65	155.47	0.007	0.024	-0.01	0.03	0.002	0.008
					20	11.65	155.48	0.009	0.026	-0.01	0.04	0.002	0.006
					1	11.66	155.49	N/A	N/A	0.00	0.05	N/A	N/A
					1	11.65	155.45	N/A	N/A	-0.01	0.00	N/A	N/A
					15	11.67	155.49	0.009	0.018	0.01	0.05	0.004	0.008
					30	11.65	155.49	0.005	0.018	-0.01	0.05	0.002	0.008

Continued

Table 7. Astrometric Measurements of STF911 compared to HRT2017a ephemeris

STF911		WDS 06269+0404		Hrt2017a		PREDICTED				Magnitude Difference							
Rectilinear		Rectilinear		Hrt2017a		"Truth"		Rho		Theta		Rho err.		Theta err.		0.39	
Telescope	Altitude/ Filter	Exposure	Sat.	Date	Observation Data				Standard Deviation		Difference from		Standard Error of				
					Number images	Mean Rho	Mean Theta	of Rho	of Theta	Mean Rho	Mean Theta	Mean Rho	Mean Theta				
All measurements in arcseconds																	
Telescope T21 0.43m CDK 17 New Mex.	High 1.33	15	U	3/4/2018	5	11.65	155.50	0.014	0.019	-0.01	0.06	0.006	0.008				
		30	U	3/4/2018	5	11.64	155.50	0.010	0.020	-0.02	0.06	0.005	0.009				
	Red	15	U	3/4/2018	5	11.63	155.46	0.015	0.026	-0.03	0.02	0.007	0.012				
		30	U	3/4/2018	5	11.63	155.47	0.018	0.010	-0.03	0.03	0.008	0.005				
	ALL GREEN		U	3/4/2018	10	11.65	155.50	0.012	0.020	-0.01	0.06	0.004	0.006				
		ALL RED		U	3/4/2018	10	11.63	155.46	0.017	0.019	-0.03	0.02	0.005	0.006			
	ALL		U	3/4/2018	20	11.64	155.48	0.014	0.023	-0.02	0.04	0.003	0.005				
		Green Stack	Mean	U	3/4/2018	1	11.64	155.50	N/A	N/A	-0.02	0.06	N/A	N/A			
	Red Stack		Mean	U	3/4/2018	1	11.64	155.46	N/A	N/A	-0.02	0.02	N/A	N/A			
Telescope T31 0.5m CDK 20 Australia	High 1.25	15	P	3/12/2018	5	11.62	155.25	0.017	0.033	-0.04	-0.19	0.008	0.015				
		30	P	3/12/2018	5	11.46	155.45	0.096	0.276	-0.20	0.01	0.043	0.123				
	Red	15	P	3/12/2018	5	11.68	155.15	0.020	0.055	0.02	-0.29	0.009	0.024				
		30	P	3/12/2018	5	11.66	155.19	0.012	0.109	0.00	-0.25	0.006	0.049				
	ALL GREEN		P	3/12/2018	10	11.54	155.35	0.086	0.215	-0.12	-0.09	0.027	0.068				
		ALL RED		P	3/12/2018	10	11.67	155.17	0.016	0.091	0.01	-0.27	0.005	0.029			
	ALL		P	3/12/2018	20	11.60	155.26	0.073	0.160	-0.06	-0.18	0.016	0.036				
		Green Stack	Mean	P	3/12/2018	1	11.58	155.37	N/A	N/A	-0.08	-0.07	N/A	N/A			
	Red Stack		Mean	P	3/12/2018	1	11.65	155.16	N/A	N/A	-0.01	-0.28	N/A	N/A			

Continued

Table 7. Astrometric Measurements of STF911 compared to HRT2017a ephemeris

STF911	WDS 06269+0404				Hrt2017a		PREDICTED				Magnitude Difference							
	Rectilinear						"Truth"		Rho		Theta		Rho err.		Theta err.		0.39	
Telescope	Altitude/	Filter	Exposure	Sat.	Date	Observation Data						Standard Deviation		Difference from		Standard Error of		
						Number images	Mean Rho	Mean Theta	of Rho	of Theta	Mean Rho	Mean Theta	Mean Rho	Mean Theta	Mean Rho	Mean Theta		
All measurements in arcseconds																		
iTelescope T11 0.5m CDK 20 New Mex.	High	Green	15	U	3/3/2018	1	11.69	155.54	N/A	N/A	0.03	0.10	N/A	N/A	N/A	N/A		
	1.23	Green	30	U	3/3/2018	3	11.70	155.57	0.009	0.029	0.04	0.13	0.005	0.017	0.005	0.017		
	Red	Red	15	U	3/3/2018	3	11.69	155.49	0.003	0.020	0.03	0.05	0.001	0.012	0.001	0.012		
	Red	Red	30	U	3/3/2018	1	11.71	155.46	N/A	N/A	0.05	0.02	N/A	N/A	N/A	N/A		
	ALL GREEN	ALL GREEN		U	3/3/2018	4	11.70	155.56	0.008	0.031	0.04	0.12	0.004	0.016	0.004	0.016		
	ALL RED	ALL RED		U	3/3/2018	4	11.69	155.48	0.007	0.022	0.03	0.04	0.004	0.011	0.004	0.011		
	ALL	ALL		U	3/3/2018	8	11.69	155.52	0.007	0.039	0.03	0.08	0.003	0.014	0.003	0.014		
iTelescope T27 0.7m CDK 27 Australia	High	Green	15	P	3/9/2018	5	11.66	155.40	0.016	0.027	0.00	-0.04	0.007	0.012	0.007	0.012		
	1.25	Green	30	P	3/9/2018	5	11.67	155.42	0.016	0.037	0.01	-0.02	0.007	0.016	0.007	0.016		
	Red	Red	15	P	3/9/2018	5	11.63	155.46	0.009	0.086	-0.03	0.02	0.004	0.039	0.004	0.039		
	Red	Red	30	P	3/9/2018	5	11.66	155.51	0.021	0.119	0.00	0.07	0.009	0.053	0.009	0.053		
	ALL GREEN	ALL GREEN		P	3/9/2018	10	11.66	155.41	0.016	0.033	0.00	-0.03	0.005	0.010	0.005	0.010		
	ALL RED	ALL RED		P	3/9/2018	10	11.65	155.48	0.020	0.103	-0.01	0.04	0.006	0.032	0.006	0.032		
	ALL	ALL		P	3/9/2018	20	11.66	155.45	0.020	0.072	0.00	0.01	0.005	0.016	0.005	0.016		
iTelescope T27 0.7m CDK 27 Australia	High	Green	15	P	3/10/2018	5	11.66	155.44	0.007	0.052	0.00	0.00	0.003	0.023	0.003	0.023		
	1.26	Green	30	P	3/10/2018	5	11.66	155.40	0.002	0.026	0.00	-0.04	0.001	0.012	0.001	0.012		
	Red	Red	15	P	3/10/2018	5	11.63	155.54	0.022	0.118	-0.03	0.10	0.010	0.053	0.010	0.053		
	Red	Red	30	P	3/10/2018	5	11.69	155.01	0.099	0.826	0.03	-0.43	0.044	0.370	0.044	0.370		
	ALL GREEN	ALL GREEN		P	3/10/2018	10	11.66	155.42	0.005	0.046	0.00	-0.02	0.002	0.015	0.002	0.015		
	ALL RED	ALL RED		P	3/10/2018	10	11.66	155.28	0.062	0.545	0.00	-0.16	0.020	0.172	0.020	0.172		
	ALL	ALL		P	3/10/2018	20	11.66	155.35	0.034	0.299	0.00	-0.09	0.008	0.067	0.008	0.067		
	Green Stack	Green Stack	Mean	P	3/10/2018	1	11.66	155.38	N/A	N/A	0.00	-0.06	N/A	N/A	N/A	N/A		
	Red Stack	Red Stack	Mean	P	3/10/2018	1	11.66	155.34	N/A	N/A	0.00	-0.10	N/A	N/A	N/A	N/A		

Table 8. Astrometric Measurements of STI579 compared to Hrt2017a ephemeris

STI579		WDS 05446+6320		Hrt2017a		PREDICTED		Rho	Theta	Rho err.	Theta err.	Magnitude Difference							
		Rectilinear				"Truth"		7.99	121.72	2.869	16.000	2.4							
Telescope (Section 2.2)	Altitude/ Airmass	Filter	Exposure (secs)	Sat.	Date	Observation Data			Standard Deviation			Difference from "Truth"			Standard Error of				
						Number of images	Mean		of	Rho	Theta	Mean	Rho	Theta	Mean	Rho	Theta		
							Rho	Theta											
All measurements in arcseconds																			
SRO 0.4m RC Calif.	High 1.25	Red	15	U	12/27/2017	13	7.98	121.05	0.269	2.655	2.655	0.00	-0.67	0.075	0.075	0.736	0.736		
			30	U	12/27/2017	14	7.92	122.85	0.535	2.868	2.868	-0.07	1.13	0.143	0.143	0.766	0.766		
			60	U	12/27/2017	13	7.80	123.19	0.249	2.539	2.539	-0.19	1.47	0.069	0.069	0.704	0.704		
			15	U	12/27/2017	40	7.90	122.37	0.378	2.790	2.790	-0.09	0.65	0.060	0.060	0.441	0.441		
				U	12/27/2017	15	7.85	122.43	0.247	3.943	3.943	-0.14	0.71	0.064	0.064	1.018	1.018		
				U	12/27/2017	14	7.92	122.08	0.236	2.738	2.738	-0.06	0.36	0.063	0.063	0.732	0.732		
				U	12/27/2017	15	7.88	122.01	0.239	1.699	1.699	-0.11	0.29	0.062	0.062	0.439	0.439		
			60	U	12/27/2017	44	7.88	122.18	0.237	2.881	2.881	-0.10	0.46	0.036	0.036	0.434	0.434		
				U	12/27/2017	84	7.89	122.27	0.310	2.823	2.823	-0.10	0.55	0.034	0.034	0.308	0.308		
			ALL GREEN																
ALL HIGH																			
LCO 0.4m RCX kb99 Tenerife	Low 1.49	Red	15	P	11/30/2017	1	7.74	122.34	N/A	N/A	N/A	-0.25	0.62	N/A	N/A	N/A	N/A		
			30	P	11/30/2017	3	7.67	122.48	0.311	0.486	0.486	-0.32	0.76	0.179	0.179	0.280	0.280		
			ALL RED	P	11/30/2017	4	7.74	122.44	0.104	0.402	0.402	-0.25	0.72	0.052	0.052	0.201	0.201		
				P	11/30/2017	3	7.62	122.62	0.048	0.161	0.161	-0.37	0.90	0.028	0.028	0.093	0.093		
				P	11/30/2017	3	7.85	122.71	0.007	0.270	0.270	-0.14	0.99	0.004	0.004	0.156	0.156		
				P	11/30/2017	6	7.64	122.67	0.201	0.205	0.205	-0.34	0.95	0.082	0.082	0.084	0.084		
			ALL GREEN	P	11/30/2017	10	7.68	122.58	0.169	0.301	0.301	-0.31	0.86	0.053	0.053	0.095	0.095		
			ALL LOW	P	11/30/2017														
			30	P	11/30/2017														
				P	11/30/2017														

Continued

Table 8. Astrometric Measurements of STI579 compared to Hrt2017a ephemeris

STI579		WDS 05446+6320		Hrt2017a		PREDICTED		Rho		Theta		Rho err.		Theta err.		Magnitude Difference	
		Rectilinear				"Truth"		7.99		121.72		2.869		16.000		2.4	
Telescope	Airmass	Filter	Exposure	Sat.	Date	Observation Data			Standard Deviation		Difference from			Standard Error of			
						Number of images	Mean Rho	Mean Theta	of Rho	of Theta	Mean Rho	Mean Theta	Mean Rho	Mean Theta			
All measurements in arcseconds																	
LCO 0.4m RCX kb27 Hawaii	Low 1.53	Red	30	P	1/30/2018	3	7.81	122.09	0.082	0.080		-0.18	0.37	0.047	0.046		
			60	P	1/30/2018	3	7.81	122.28	0.002	0.111		-0.18	0.56	0.001	0.064		
			90	P	1/30/2018	6	7.81	122.19	0.052	0.137		-0.18	0.47	0.021	0.056		
				P	1/30/2018	5	7.77	122.11	0.066	0.133		-0.22	0.39	0.030	0.060		
			30	P	1/30/2018	4	7.69	122.17	0.122	0.077		-0.29	0.45	0.061	0.038		
			60	P	1/30/2018	5	7.74	122.43	0.063	0.064		-0.25	0.71	0.028	0.029		
			90	P	1/30/2018	5	7.72	122.36	0.082	0.078		-0.27	0.64	0.037	0.035		
			ALL GREEN	P	1/30/2018	14	7.72	122.33	0.084	0.130		-0.27	0.61	0.023	0.035		
				P	1/30/2018	25	7.75	122.25	0.082	0.158		-0.24	0.53	0.016	0.032		
			ALL LOW														
LCO 0.4m RCX kb27 Hawaii	High 1.37	Red	30	P	1/30/2018	4	7.86	122.45	0.017	0.079		-0.13	0.73	0.008	0.040		
			60	P	1/30/2018	5	7.76	121.59	0.065	1.192		-0.23	-0.13	0.029	0.533		
			90	P	1/30/2018	9	7.80	121.97	0.069	0.959		-0.18	0.25	0.023	0.320		
				P	1/30/2018	3	7.81	121.79	0.012	0.196		-0.18	0.07	0.007	0.113		
			30	P	1/30/2018	5	7.83	122.01	0.010	0.216		-0.16	0.29	0.005	0.096		
			60	P	1/30/2018	5	7.83	121.97	0.012	0.155		-0.15	0.25	0.005	0.069		
			90	P	1/30/2018	5	7.84	122.24	0.016	0.387		-0.15	0.52	0.007	0.173		
			ALL GREEN	P	1/30/2018	15	7.84	122.07	0.013	0.278		-0.15	0.35	0.003	0.072		
				P	1/30/2018	27	7.82	122.01	0.043	0.580		-0.17	0.29	0.008	0.112		
			Mean Sta	P	1/30/2018	1	7.75	122.51	N/A	N/A		-0.24	0.79	N/A	N/A		
Mean	P	1/30/2018		1	7.67	121.86	N/A	N/A		-0.32	0.14	N/A	N/A				
Mean	P	1/30/2018		1	7.77	122.01	N/A	N/A		-0.22	0.28	N/A	N/A				

Table 9. Astrometric Measurements of STI579 compared to USN2013a ephemeris

STI579		WDS 05446+6320		USN2013a		PREDICTED		Rho	Theta	Rho err.	Theta err.	Magnitude Difference					
		Rectilinear				"Truth"		7.88	122.6	1.553	12.960	2.4					
Telescope (Section 2.2)	Altitude/Airmass	Filter	Exposure (secs)	Sat.	Date	Observation Data			Standard Deviation			Difference from "Truth"			Standard Error of		
						Number of images	Mean Rho	Mean Theta	of Rho	of Theta	Mean Rho	Mean Theta	Mean Rho	Mean Theta			
All measurements in arcseconds																	
SRO 0.4m RC Calif.	High	Red	15	U	12/27/2017	13	7.98	121.05	0.269	2.655		0.11	-1.55	0.075	0.736		
	1.25	Red	30	U	12/27/2017	14	7.92	122.85	0.535	2.868		0.04	0.25	0.143	0.766		
		Red	60	U	12/27/2017	13	7.80	123.19	0.249	2.539		-0.08	0.59	0.069	0.704		
		ALL RED		U	12/27/2017	40	7.90	122.37	0.378	2.790		0.02	-0.23	0.060	0.441		
		Green	15	U	12/27/2017	15	7.85	122.43	0.247	3.943		-0.03	-0.17	0.064	1.018		
		Green	30	U	12/27/2017	14	7.92	122.08	0.236	2.738		0.05	-0.52	0.063	0.732		
		Green	60	U	12/27/2017	15	7.88	122.01	0.239	1.699		0.00	-0.59	0.062	0.439		
		ALL GREEN		U	12/27/2017	44	7.88	122.18	0.237	2.881		0.01	-0.42	0.036	0.434		
LCO 0.4m RCX kb99 Tenerife		ALL HIGH		U	12/27/2017	84	7.89	122.27	0.310	2.823		0.02	-0.33	0.034	0.308		
	Low	Red	15	P	11/30/2017	1	7.74	122.34	N/A	N/A		-0.14	-0.26	N/A	N/A		
	1.49	Red	30	P	11/30/2017	3	7.74	122.48	0.127	0.486		-0.13	-0.12	0.073	0.280		
		ALL RED		P	11/30/2017	4	7.74	122.44	0.104	0.402		-0.14	-0.16	0.052	0.201		
		Green	15	P	11/30/2017	3	7.62	122.62	0.048	0.161		-0.26	0.02	0.028	0.093		
		Green	30	P	11/30/2017	3	7.85	122.71	0.007	0.270		-0.03	0.11	0.004	0.156		
		ALL GREEN		P	11/30/2017	6	7.64	122.67	0.201	0.205		-0.23	0.07	0.082	0.084		
		ALL LOW		P	11/30/2017	10	7.72	122.58	0.169	0.301		-0.15	-0.02	0.053	0.095		

Continued

Table 9. Astrometric Measurements of STI579 compared to USN2013a ephemeris

STI579		WDS 05446+6320		USN2013a		PREDICTED		Rho	Theta	Rho err.	Theta err.	Magnitude Difference			
		Rectilinear				"Truth"		7.88	122.6	1.553	12.960	2.4			
Telescope	r _{mass}	Filter	Exposure	Sat.	Date	Observation Data			Standard Deviation		Difference from		Standard Error of		
						Number of images	Mean	Mean	of Rho	of Theta	Mean Rho	Mean Theta	Mean Rho	Mean Theta	
							Rho	Theta							
All measurements in arcseconds															
LCO	Low	Red	30	P	1/30/2018	3	7.81	122.09	0.082	0.080	-0.06	-0.51	0.047	0.046	
0.4m	1.53	Red	60	P	1/30/2018	3	7.81	122.28	0.002	0.111	-0.07	-0.32	0.001	0.064	
RCX		ALL RED		P	1/30/2018	6	7.81	122.19	0.052	0.137	-0.07	-0.41	0.021	0.056	
kb27		Infrared	90	P	1/30/2018	5	7.77	122.11	0.066	0.133	-0.11	-0.49	0.030	0.060	
Hawaii		Green	30	P	1/30/2018	4	7.69	122.17	0.122	0.077	-0.18	-0.43	0.061	0.038	
		Green	60	P	1/30/2018	5	7.74	122.43	0.063	0.064	-0.14	-0.17	0.028	0.029	
		Green	90	P	1/30/2018	5	7.72	122.36	0.082	0.078	-0.16	-0.24	0.037	0.035	
		ALL GREEN		P	1/30/2018	14	7.72	122.33	0.084	0.130	-0.16	-0.27	0.023	0.035	
		ALL LOW		P	1/30/2018	25	7.75	122.25	0.082	0.158	-0.13	-0.35	0.016	0.032	
LCO	High	Red	30	P	1/30/2018	5	7.86	122.45	0.017	0.079	-0.02	-0.15	0.007	0.035	
0.4m	1.37	Red	60	P	1/30/2018	5	7.76	121.59	0.065	1.192	-0.12	-1.01	0.029	0.533	
RCX		ALL RED		P	1/30/2018	10	7.80	121.97	0.069	0.959	-0.07	-0.63	0.022	0.308	
kb27		Infrared	90	P	1/30/2018	3	7.81	121.79	0.012	0.196	-0.07	-0.81	0.007	0.113	
Hawaii		Green	30	P	1/30/2018	5	7.83	122.01	0.010	0.216	-0.04	-0.59	0.005	0.096	
		Green	60	P	1/30/2018	5	7.83	121.97	0.012	0.155	-0.04	-0.63	0.005	0.069	
		Green	90	P	1/30/2018	5	7.84	122.24	0.016	0.387	-0.03	-0.36	0.007	0.173	
		ALL GREEN		P	1/30/2018	15	7.84	122.07	0.013	0.278	-0.04	-0.53	0.003	0.072	
		ALL HIGH		P	1/30/2018	28	7.82	122.01	0.043	0.580	-0.05	-0.59	0.008	0.110	
		Green	Mean	P	1/30/2018	1	7.75	122.51	N/A	N/A	-0.12	-0.09	N/A	N/A	
		Infrared	Mean	P	1/30/2018	1	7.67	121.86	N/A	N/A	-0.21	-0.74	N/A	N/A	
		Red Stack	Mean	P	1/30/2018	1	7.77	122.01	N/A	N/A	-0.11	-0.59	N/A	N/A	

Table 10. Astrometric Measurements of POU1245 compared to HRT2017a ephemeris

POU1245				WDS 06214+2431				Hrt2017a				PREDICTED				Magnitude Difference			
				Rectilinear								"Truth"				2.33			

Continued

Table 10. Astrometric Measurements of POU1245 compared to HRT2017a ephemeris

POU1245				WDS 06214+2431				Hrt2017a				PREDICTED				Rho				Theta				Rho err.				Theta err.				Magnitude Difference																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
Rectilinear				Hrt2017a				"Truth"				14.05				19.58				0.5948				2.880				2.33																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
Telescope	lrmass	Filter	Exposure	Sat.	Date	Observation Data												Standard Deviation				Difference from				Standard Error of																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
						Number of images	Mean		Mean Theta	Rho	of	Theta	Mean Rho	Mean Theta	Mean Rho	Mean Theta	of	Theta	Mean Rho	Mean Theta	Mean Rho	Mean Theta																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
All measurements in arcseconds																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
LCO kb80	High	Red	15	S	11/30/2017	3	14.18	19.13	0.005	0.074	0.13	-0.45	0.003	0.043																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						</