

# Single Night Observations

Figure 8 (row 1, column 3). For each of the 12 asteroids, we averaged the distances from all six observations, and find the residuals by comparison with NASA JPL Horizons Data.

## 2024 ON

R1: .05847 R2: .05771 Quit About Open... NewObj AddObj ephem Full Herget Vaisa resID Gauss constr Epoch all\_perts Undo FilterObs NonGra  
 (1)Mer (2)Ven (3)Ear (4)Mar (5)Jup (6)Sat (7)Ura (8)Nep (9)Plu (0)Moo (a)Ast  
 Click on an observation to get information about it. Right-click to get further options. Ctrl-click to select multiple observations.  
 Version 2025 May 15  
 Using DE405/DE405; covers years 1599.9 to 2201.1

Orbital elements: [Unnamed]	MOIDs: Me 0.641623 Ve 0.282754 Ea 0.002939 Ma 0.219440
Perihelion 2024 Sep 20.07752 ± 3.75 TT = 1:51:37 (JD 2460573.57752)	MOIDs: Ju 1.716113 Sa 5.700310 Ur 14.560321 Ne 26.510468
Epoch 2024 Sep 4.0 TT = JDT 2460557.5 Earth MOID: 0.0029 Find_Orb	Find_Orb ver: 2025 May 15
M 355.64710842 ± 6 (J2000 ecliptic)	Tisserand relative to Earth: 2.91795
n 0.27074404 ± 0.318 Peri. 185.37107 ± 0.7	Tisserand relative to Jupiter: 3.29273
a 2.36644693 ± 1.81 Node 172.35789 ± 3.5	Earth encounter velocity 8.5932 km/s
e 0.5744676 ± 0.332 Incl. 7.74040 ± 2.3	Barbee-style encounter velocity: 8.8263 km/s
P 3.64037 U 12.0	Score: 0.295193
q 1.00699976 ± 0.00068 Q 3.72589410 ± 3.62	
From 6 observations 2024 Sept. 5-6 (3.8 hr); mean residual 0".01	
YYYY MM.DDDDD RA (J2000) dec ----- mag ref Obs Kres Yres delta R	
C2460559.48819444 269.22849341+05.07965721	807 .01- .00 .05847 1.0234
C2460559.51944444 269.22604611+05.06272526	807 .01+ .01- .05831 1.0234
C2460559.55069444 269.22388915+05.04558949	807 .00 .01+ .05816 1.0233
C2460559.58194444 269.22230483+05.02823636	807 .01+ .01- .05801 1.0232
C2460559.61319444 269.22152712+05.01069504	807 .01- .00 .05786 1.0231
C2460559.64444444 269.22179405+04.99297066	807 .01+ .00 .05771 1.0231

## 2024 SJ

R1: .09609 R2: .09574   [Quit](#) [About](#) [Open...](#) [NewObj](#) [AddObj](#) [ephem](#) [Full](#) [Herget](#) [Vaisa](#) [resID](#) [Gauss](#) [constr](#) [Epoch](#) [all\\_perts](#) [Undo](#) [FilterObs](#) [NonGrav](#)  
 (1)Mer (2)Ven (3)Ear (4)Mar (5)Jup (6)Sat (7)Ura (8)Nep (9)Plu (0)Moo (a)Ast  
 Click on an observation to get information about it. Right-click to get further options. Ctrl-click to select multiple observations.  
 Version 2025 May 15  
 Using DE405/DE405; covers years 1599.9 to 2201.1

Orbital elements: [Unnamed]	MOIDs: Me 0.680263 Ve 0.343777 Ea 0.068767 Ma 0.064453
Perihelion 2024 Sep 9.79243 ± 15.2 TT = 19:01:05 (JD 2460563.29243)	MOIDs: Ju 3.611775 Sa 7.434027 Ur 16.485702 Ne 28.349559
Epoch 2024 Sep 4.0 TT = JDT 2460557.5 Earth MOID: 0.0688 Ma: 0.0645	Find_Orb ver: 2025 May 15
M 356.65795833 ± 8 (J2000 ecliptic)	Tisserand relative to Earth: 2.98032
n 0.57696733 ± 0.0787 Peri. 151.85442 ± 34	Barbee-style encounter velocity: 5.8186 km/s
a 1.42900988 ± 0.13 Node 194.68372 ± 18	Score: 0.143315
e 0.2620411 ± 0.069 Incl. 8.73265 ± 4.5	
P 1.708/623.940d U 11.0	
q 1.05455044 ± 0.00563 Q 1.80346931 ± 0.262	

From 6 observations 2024 Sept. 5-6 (3.8 hr); mean residual 0".01

YYYY MM DD.DDDDD	RA (J2000)	dec	-----	mag	ref	Obs	Xres	Yres	delta	R
C2460559.48819444	305.19366881	+45.77277518				807	.01+	.01+	.09609	1.0551
C2460559.51944444	305.24093344	+45.77091682				807	.02-	.01-	.09602	1.0550
C2460559.55069444	305.28781912	+45.76847189				807	.01+	.00	.09595	1.0550
C2460559.58194444	305.33451075	+45.76538897				807	.01+	.01-	.09588	1.0550
C2460559.61319444	305.38125284	+45.76166757				807	.00	.02+	.09581	1.0550
C2460559.64444444	305.42828545	+45.75728616				807	.00	.01-	.09574	1.0550

2024 RN15

R1: .11484 R2: .11410 Quit About Open... NewObj AddObj ephem Full Herget Vaisa resid Gauss constr Epoch all\_perts Undo FilterObs NonG  
(1)Mer (2)Ven (3)Ear (4)Mar (5)Jup (6)Sat (7)Ura (8)Nep (9)Plu (0)Moo (a)Ast

Click on an observation to get information about it. Right-click to get further options. Ctrl-click to select multiple observations.

Version 2025 May 15

Using DE405/DE405; covers years 1599.9 to 2201.1

Orbital elements: [Unnamed]

Perihelion 2024 Nov 1.01841 ± 10.8 TT = 0:26:30 (JD 2460615.51841)

Epoch 2024 Sep 4.0 TT = JDT 2460557.5 Earth MOID: 0.0072 Ma: 0.0746

M 329-69925651 ± 7 (J2000 ecliptic)

MOIDs: Me 0.643134 Ve 0.240996 Ea 0.007206 Ma 0.074636

Peri 174.94873 + 190

a: 0.0746 Find Orb ver: 2025 May 15

$\pi = 1.52713608 \pm 0.445$  Node 230 13196 ± 160

Find Orb Tisserand relative to Earth: 2.95060

$\text{e} = 0.3687763 \pm 0.356$        $\text{Incl} = 1.39978 \pm 1.3$

Barbee-style encounter velocity: 6.1643 km/s

B 1.887/689 288d H 11 8

Score: 0.191644

$\tau = 0.26242343 \pm 0.353 - 0.200183473 \pm 1.14$

From 6 observations 2024 Sept. 5-6 (3.8 hr.) were residual 27.81

III.11 MM DD, DDDDD RA [02000] DEC ----- MAG PER OBS AREA IRES QLTD R

C2460599.48819444 340.47257029+04.40780373 807 .00 .00 .11484 1.120

C2460559.519444444 340.4750/881+04.4212/269 807 .00 .01- .11469 1.1206

C2460559.550694444 340.4/698140+04.434748335 807 .00 .02+ .11454 1.1204

C2460559.581944444 340.47836364+04.44820228 807 .00 .00 .11439 1.1203

C2460559.61319444 340.4/932647+04.46163948 807 .00 .01- .11425 1.1201

## 2024 SS

R1: .11922	R2: .11856	Quit	About	Open...	NewObj	AddObj	epheM	Ful	Herget	Vaisa	resID	Gauss	constr	Epoch	all_perts	Undo	FilterObs	NonG
(1)Mer	(2)Ven	(3)Ear	(4)Mar	(5)Jup	(6)Sat	(7)Ura	(8)Nep	(9)Plu	(0)Moo	(a)Ast								
Click on an observation to get information about it. Right-click to get further options. Ctrl-click to select multiple observations.																		
Version 2025 May 15																		
Using DE405/DE405; covers years 1599.9 to 2201.1																		
Orbital elements: [Unnamed]																		
Perihelion 2024 Nov 15.54095 ± 68.5 TT = 12:58:57 (JD 2460630.04095)																		
Epoch 2024 Sep 4.0 TT = JDT 2460557.5 Earth MOID: 0.0123 Find_Orb																		
M 306.20236670 ± 120																		
	(J2000 ecliptic)																	
n 0.74161746 ± 1.04																		
a 1.20878599 ± 1.16																		
e 0.2097485 ± 1.35																		
P 1.329/485.416d																		
U 12.8																		
q 0.95524490 ± 0.755																		
Q 1.46232707 ± 3.08																		
From 6 observations 2024 Sept. 5-6 (3.8 hr); mean residual 0".01																		
YYYY MM DD.DDDDD	RA (J2000)	dec	-----	mag	ref	Obs		Xres	Yres	delta	R							
C2460559.48819444	327.04010984+36.73364485					807		.01+	.00	.11922	1.0938							
C2460559.51944444	327.03363978+36.73242666					807		.01-	.01+	.11909	1.0937							
C2460559.55069444	327.02655989+36.73089259					807		.01-	.00	.11896	1.0936							
C2460559.58194444	327.01900126+36.72899633					807		.01+	.00	.11882	1.0935							
C2460559.61319444	327.01109455+36.72669949					807		.01+	.01+	.11869	1.0934							
C2460559.64444444	327.00300595+36.72396609					807		.01-	.01-	.11856	1.0933							

# 2024 RJ16

R1: .12610 R2: .12536 [Quit](#) [About](#) [Open...](#) [NewObj](#) [AddObj](#) [ephem](#) [Full](#) [Herget](#) [Vaisa](#) [resID](#) [Gauss](#) [constr](#) [Epoch](#) [all\\_perts](#) [Undo](#) [FilterObs](#) [NonGr](#)  
(1)Mer (2)Ven (3)Ear (4)Mar (5)Jup (6)Sat (7)Ura (8)Nep (9)Plu (0)Moo (a)Ast  
Click on an observation to get information about it. Right-click to get further options. Ctrl-click to select multiple observations.  
Version 2025 May 15  
Using DE405/DE405; covers years 1599.9 to 2201.1

Orbital elements: [Unnamed]  
Perihelion 2024 Oct 13.89287 ± 38 TT = 21:25:44 (JD 2460597.39287)  
Epoch 2024 Sep 4.0 TT = JDT 2460557.5 Earth MOID: 0.0373 Ma: 0.0924  
M 348.16435480 ± 22 (J2000 ecliptic) Find\_Orb  
n 0.29668571 ± 0.845 Peri. 202.23166 ± 120  
a 2.22640906 ± 4.37 Node 181.51192 ± 46  
e 0.5366250 ± 1.12 Incl. 2.50142 ± 5.0  
P 3.32206 U 12.6  
q 1.03166223 ± 0.535 Q 3.42115589 ± 9.27  
From 6 observations 2024 Sept. 5-6 (3.8 hr); mean residual 0".01

YYYY MM DD.DDDD	RA (J2000)	dec	mag	ref	Obs	Xres	Yres	delta	R
C2460559.48819444	331.09270825	-03.91603501			807	.01-	.00	.12610	1.1308
C2460559.51944444	331.10919337	-03.91341790			807	.02+	.00	.12595	1.1307
C2460559.55069444	331.12521723	-03.91076527			807	.01-	.00	.12580	1.1305
C2460559.58194444	331.14089232	-03.90807008			807	.00	.01+	.12565	1.1304
C2460559.61319444	331.15631635	-03.90534241			807	.00	.01-	.12551	1.1302
C2460559.64444444	331.17160429	-03.90255817			807	.00	.00	.12536	1.1301

# 2024 RO2

R1: .14690 R2: .14589 Quit About Open... NewObj AddObj ephem Full Herget Vaisa resiD Gauss constr Epoch all\_perts Undo FilterObs NonGrav  
(1)Mer (2)Ven (3)Ear (4)Mar (5)Jup (6)Sat (7)Ura (8)Nep (9)Plu (0)Moo (a)Ast

Click on an observation to get information about it. Right-click to get further options. Ctrl-click to select multiple observations.

Version 2025 May 15

Using DE405/DE405; covers years 1599.9 to 2201.1

Orbital elements: [Unnamed]

Perihelion 2024 Nov 1.07702 ± 8.42 TT = 1:50:54 (JD 2460615.57702)

Epoch 2024 Sep 4.0 TT = JDT 2460557.5 Earth MOID: 0.0001 Find\_Orb

M 335.59883034 ± 50 (J2000 ecliptic)

n 0.42015190 ± 0.8 Peri. 218.35073 ± 110

a 1.76548956 ± 2.11 Node 189.40761 ± 70

e 0.4722454 ± 0.963 Incl. 7.54355 ± 17

P 2.346/856.817d U 12.6

q 0.93174522 ± 0.508 Q 2.59923391 ± 4.72

From 6 observations 2024 Sept. 5-6 (3.8 hr); mean residual 0".01

MOIDs: Me 0.614560 Ve 0.212068 Ea 0.000132 Ma 0.155973

MOIDs: Ju 2.816258 Sa 7.214503 Ur 15.926688 Ne 27.732812

Find\_Orb ver: 2025 May 15

Tisserand relative to Earth: 2.88858

Earth encounter velocity 10.0137 km/s

Barbee-style encounter velocity: 9.5991 km/s

Score: 0.250774

YYYY MM DD.DDDDD	RA (J2000)	dec	-----	mag	ref	Obs	Xres	Yres	delta	R
C2460559.48819444	332.58427078+17.56999751					807	.00	.02-	.14690	1.1410
C2460559.51944444	332.58373494+17.57716557					807	.01+	.03+	.14669	1.1408
C2460559.55069444	332.58274282+17.58421235					807	.01-	.00	.14649	1.1406
C2460559.58194444	332.58138594+17.59113821					807	.00	.01-	.14629	1.1404
C2460559.61319444	332.57975475+17.59791878					807	.01+	.03-	.14609	1.1402
C2460559.64444444	332.57794646+17.60455823					807	.00	.02+	.14589	1.1400

# 2024 SH7

R1: .16274 R2: .16189 [Quit](#) [About](#) [Open...](#) [NewObj](#) [AddObj](#) [ephem](#) [Full](#) [Herget](#) [Vaisa](#) [resID](#) [Gauss](#) [constr](#) [Epoch](#) [all\\_perts](#) [Undo](#) [FilterObs](#) [NonGrav](#)  
(1)Mer (2)Ven (3)Ear (4)Mar (5)Jup (6)Sat (7)Ura (8)Nep (9)Plu (0)Moo (a)Ast

Click on an observation to get information about it. Right-click to get further options. Ctrl-click to select multiple observations.

Version 2025 May 15

Using DE405/DE405; covers years 1599.9 to 2201.1

Orbital elements: [Unnamed]

Perihelion 2024 Oct 11.78036 ± 26.7 TT = 18:43:42 (JD 2460595.28036)

Epoch 2024 Sep 4.0 TT = JDT 2460557.5 Earth MOID: 0.0248 [Find\\_Orb](#)

M 340.51744353 ± 120

(J2000 ecliptic)

n 0.51567952 ±

Peri. 189.05200 ± 200

a 1.54010189 ±

Node 190.54074 ± 190

e 0.3363007 ± 2.74

Incl. 16.64297 ± 100

P 1.911/698.095d U 13.4

q 1.02216443 ± 0.421 Q 2.05803936 ± 12.1

From 6 observations 2024 Sept. 5-6 (3.8 hr); mean residual 0".01

MOIDs: Me 0.680220 Ve 0.297014 Ea 0.024843 Ma 0.351863

MOIDs: Ju 3.396333 Sa 7.447726 Ur 16.271920 Ne 28.232729

[Find\\_Orb](#) ver: 2025 May 15

Tisserand relative to Earth: 2.88884

Earth encounter velocity 10.0023 km/s

Barbee-style encounter velocity: 10.1388 km/s

Score: 0.174550

YYYY MM DD.DDDDD	RA (J2000)	dec	-----	mag	ref	Obs	Xres	Yres	delta	R
C2460559.48819444	300.53781645	+49.51598658				807	.00	.01+	.16274	1.0798
C2460559.51944444	300.54183710	+49.51800304				807	.00	.01-	.16257	1.0797
C2460559.55069444	300.54563646	+49.51966004				807	.01+	.00	.16240	1.0796
C2460559.58194444	300.54935331	+49.52092377				807	.00	.00	.16223	1.0795
C2460559.61319444	300.55314860	+49.52180060				807	.00	.01+	.16206	1.0794
C2460559.64444444	300.55717380	+49.52228643				807	.00	.01-	.16189	1.0793

## 2024 SR4

R1: .19531 R2: .19421 Quit About Open... NewObj AddObj ephem Full Herget Vaisa resiD Gauss constr Epoch all\_perts Undo FilterObs NonGrav  
 (1)Mer (2)Ven (3)Ear (4)Mar (5)Jup (6)Sat (7)Ura (8)Nep (9)Plu (0)Moo (a)Ast

Click on an observation to get information about it. Right-click to get further options. Ctrl-click to select multiple observations.

Version 2025 May 15

Using DE405/DE405; covers years 1599.9 to 2201.1

Orbital elements: [Unnamed]  
 Perihelion 2024 Nov 8.74989 ± 162 TT = 17:59:50 (JD 2460623.24989)  
 Epoch 2024 Sep 4.0 TT = JDT 2460557.5 Earth MOID: 0.0224 Find\_Orb  
 M 332.56023017 ± 180 (J2000 ecliptic)  
 n 0.41733562 ± Peri. 227.80364 ± 1100 Tisserand relative to Earth: 2.88245  
 a 1.77342330 ± Node 187.09831 ± 520 Earth encounter velocity 10.2855 km/s  
 e 0.4738819 ± 6.8 Incl. 8.66753 ± 100 Barbee-style encounter velocity: 9.9803 km/s  
 P 2.362/862.599d U 13.7 Score: 0.249448  
 q 0.93302997 ± 5.31 Q 2.61381662 ± 22.1

From 6 observations 2024 Sept. 5-6 (3.8 hr); mean residual 0".01

YYYY MM DD.DDDDD	RA (J2000)	dec	-----	mag	ref	Obs	Xres	Yres	delta	R
C2460559.48819444	339.66795652	+14.47077161				807	.00	.00	.19531	1.1919
C2460559.51944444	339.66807512	+14.46923689				807	.00	.03+	.19509	1.1917
C2460559.55069444	339.66783556	+14.46761576				807	.02+	.01-	.19487	1.1915
C2460559.58194444	339.66726730	+14.46592011				807	.01-	.01+	.19465	1.1912
C2460559.61319444	339.66645845	+14.46411439				807	.01-	.01-	.19443	1.1910
C2460559.64444444	339.66547824	+14.46220349				807	.01+	.00	.19421	1.1908

## 2024 SD3

R1: .30513 R2: .30334 Quit About Open... NewObj AddObj ephem Full Herget Vaisa resiD Gauss constr Epoch all\_perts Undo FilterObs NonGr  
 (1)Mer (2)Ven (3)Ear (4)Mar (5)Jup (6)Sat (7)Ura (8)Nep (9)Plu (0)Moo (a)Ast

Click on an observation to get information about it. Right-click to get further options. Ctrl-click to select multiple observations.

Version 2025 May 15

Using DE405/DE405; covers years 1599.9 to 2201.1

Orbital elements: [Unnamed]

Perihelion 2024 Nov 18.89958 ± 218 TT = 21:35:24 (JD 2460633.39958)

Epoch 2024 Sep 4.0 TT = JDT 2460557.5 Earth MOID: 0.0039 Ve: 0.0709

M 335.22975061 ± 330 Ma: 0.0341 Find\_Orb

n 0.32635553 ± Peri. 68.57855 ± 360

a 2.08933811 ± Node 14.28847 ± 230

e 0.6471925 ± 4.13 Incl. 6.37845 ± 48

P 3.02004 U 13.6

q 0.73713415 ± 3.38 Q 3.44154207 ± 32.5 (J2000 ecliptic)

From 6 observations 2024 Sept. 5-6 (3.8 hr); mean residual 0".01

MOIDs: Me 0.429563 Ve 0.070858 Ea 0.003934 Ma 0.034056

MOIDs: Ju 1.896609 Sa 6.638657 Ur 15.593631 Ne 26.856910

Find\_Orb ver: 2025 May 15

Tisserand relative to Earth: 2.66879

Earth encounter velocity 17.2651 km/s

Barbee-style encounter velocity: 16.6579 km/s

Score: 0.337691

YYYY MM DD.DDDD	RA (J2000)	dec	mag	ref	Obs	Xres	Yres	delta	R
C2460559.48819444	004.98198491-11.43890137				807	.01+	.00	.30513	1.2983
C2460559.51944444	004.98269243-11.44199821				807	.03-	.00	.30477	1.2980
C2460559.55069444	004.98313986-11.44509069				807	.01+	.00	.30441	1.2976
C2460559.58194444	004.98331106-11.44817919				807	.02+	.02-	.30405	1.2973
C2460559.61319444	004.98321804-11.45123366				807	.02-	.01+	.30370	1.2970
C2460559.64444444	004.98292713-11.45426996				807	.01+	.00	.30334	1.2967

## 2024 YR4

R1: .63432 R2: .63414 [Quit](#) [About](#) [Open...](#) [NewObj](#) [AddObj](#) [ephem](#) [Full](#) [Herget](#) [Vaisa](#) [resID](#) [Gauss](#) [constr](#) [Epoch](#) [all\\_perts](#) [Undo](#) [FilterObs](#) [NonGr](#)  
 (1)Mer (2)Ven (3)Ear (4)Mar (5)Jup (6)Sat (7)Ura (8)Nep (9)Plu (0)Moo (a)Ast

Click on an observation to get information about it. Right-click to get further options. Ctrl-click to select multiple observations.

Version 2025 May 15

Using DE405/DE405; covers years 1599.9 to 2201.1

Orbital elements: [Unnamed]

Perihelion 2024 Nov 22.49835 ± 700 TT = 11:57:37 (JD 2460636.99835)

Epoch 2024 Sep 4.0 TT = JDT 2460557.5 [Earth MOID: 0.0025](#) [Find\\_Orb](#)

M 340.87914729 ± 700 (J2000 ecliptic)

n 0.24051887 ± Peri. 134.53030 ± 110

a 2.56076627 ± Node 271.35128 ± 550

e 0.6667587 ± 11.9 Incl. 3.45372 ± 23

P 4.09784 U 14.3

q 0.85335299 ± 2.78 Q 4.26817954 ± 506

MOIDs: Me 0.536473 Ve 0.141567 Ea 0.002518 Ma 0.105504

MOIDs: Ju 1.180819 Sa 5.611519 Ur 14.316257 Ne 26.073934

[Find\\_Orb ver: 2025 May 15](#)

Tisserand relative to Earth: 2.77141

Tisserand relative to Jupiter: 3.07569

Earth encounter velocity 14.3434 km/s

Barbee-style encounter velocity: 13.8909 km/s

Score: 0.346815

From 6 observations 2024 Sept. 5-6 (3.8 hr); mean residual 0".01

YYYY MM DD.DDDDD	RA (J2000)	dec	-----	mag	ref Obs	Xres	Yres	delta	R
C2460559.48819444	276.21033234	-17.79589150			807	.00	.00	.63432	1.3796
C2460559.51944444	276.20419066	-17.79525758			807	.01-	.01-	.63428	1.3793
C2460559.55069444	276.19808074	-17.79458118			807	.00	.00	.63424	1.3790
C2460559.58194444	276.19202482	-17.79385896			807	.01+	.03+	.63420	1.3787
C2460559.61319444	276.18603344	-17.79312467			807	.02-	.03-	.63417	1.3784
C2460559.64444444	276.18016027	-17.79233638			807	.01+	.01+	.63414	1.3781

# 2014 GL1

R1: 1.0572 R2: 1.0552 [Quit](#) [About](#) [Open...](#) [NewObj](#) [AddObj](#) [epheM](#) [Full](#) [Herget](#) [Vaisa](#) [resiD](#) [Gauss](#) [constr](#) [Epoch](#) [all\\_perts](#) [Undo](#) [FilterObs](#) [NonGrav](#)  
(1)Mer (2)Ven (3)Ear (4)Mar (5)Jup (6)Sat (7)Ura (8)Nep (9)Plu (0)Moo (a)Ast  
Click on an observation to get information about it. Right-click to get further options. Ctrl-click to select multiple observations.  
Version 2025 May 15  
Using DE405/DE405; covers years 1599.9 to 2201.1  
Orbital elements: [Unnamed]  
Perihelion 2024 Oct 15.79866 ± 724 TT = 19:10:04 (JD 2460599.29866)  
Epoch 2024 Sep 4.0 TT = JDT 2460557.5 Earth MOID: 0.0387 Ju: 0.5101  
q 0.93549582 ± 2.5 Ma: 0.0709 Sa: 0.9350 Find\_Orb  
Peri. 2.39080 ± 170  
z -1.6581367953 ± 222 Node 354.23638 ± 240  
e 2.5511800 ± 225 Incl. 5.64552 ± 18  
From 6 observations 2024 Sept. 5-6 (3.8 hr); mean residual 0".01  
MOIDs: Me 0.570998 Ve 0.214651 Ea 0.038703 Ma 0.070911  
MOIDs: Ju 0.510070 Sa 0.934967 Ur 1.590406 Ne 3.099786  
Find\_Orb ver: 2025 May 15  
Earth encounter velocity 30.4538 km/s  
Barbee-style encounter velocity: 85.5489 km/s  
Score: 1542.467335  

YYYY MM DD.DDDD	RA (J2000)	dec	-----	mag	ref	Obs	Xres	Yres	delta	R
C2460559.48819444	250.54259592	-28.82646970				807	.01-	.01+	1.0572	1.4528
C2460559.51944444	250.54553965	-28.82439333				807	.01+	.01-	1.0568	1.4521
C2460559.55069444	250.54853267	-28.82228066				807	.00	.00	1.0564	1.4515
C2460559.58194444	250.55159547	-28.82014275				807	.02-	.01-	1.0560	1.4508
C2460559.61319444	250.55475816	-28.81797001				807	.01+	.02+	1.0556	1.4502
C2460559.64444444	250.55800167	-28.81580065				807	.00	.01-	1.0552	1.4495

# Ceres

R1: 2.0698 R2: 2.0843 Quit About Open... NewObj AddObj ephem Full Herget Vaisa resID Gauss constr Epoch all\_perts Undo FilterObs NonGr  
(1)Mer (2)Ven (3)Ear (4)Mar (5)Jup (6)Sat (7)Ura (8)Nep (9)Plu (0)Moo (a)Ast

Click on an observation to get information about it. Right-click to get further options. Ctrl-click to select multiple observations.

Version 2025 May 15

Using DE405/DE405; covers years 1599.9 to 2201.1

Orbital elements: [Unnamed]

Perihelion 2024 Aug 4.13289 ± 997 TT = 3:11:21 (JD 2460526.63289)	MOIDs: Me 0.290205 Ve 0.102359 Ea 0.000030 Ma 0.024716
Epoch 2024 Sep 4.0 TT = JDT 2460557.5 Earth MOID: 0.0000 Ju: 0.6544 Find_Orb ver: 2025 May 15	MOIDs: Ju 0.654407 Sa 1.302224 Ur 2.330347 Ne 4.204585
q 0.60469685 ± 11.6 Ma: 0.0247 Find_Orb Earth encounter velocity 159.5047 km/s	Find_Orb Barbee-style encounter velocity: 123.0232 km/s
	Score: 11883.102437
z -19.6572043670 ± 529 Node 142.03077 ± 520	
e 12.8866496 ± 393 Incl. 165.51647 ± 400	

From 6 observations 2024 Sept. 5-6 (3.8 hr); mean residual 0".01

YYYY MM DD.DDDDD	RA (J2000)	dec	mag	ref Obs	Xres	Yres	delta	R
C2460559.48819444	278.64024579	-30.88552738		807	.00	.01+	2.0698	2.6415
C2460559.51944444	278.64225675	-30.88524272		807	.00	.02-	2.0727	2.6438
C2460559.55069444	278.64426953	-30.88492204		807	.01-	.00	2.0756	2.6462
C2460559.58194444	278.64630445	-30.88458832		807	.01+	.00	2.0785	2.6485
C2460559.61319444	278.64835354	-30.88423352		807	.00	.01+	2.0814	2.6509
C2460559.64444444	278.65043303	-30.88387248		807	.00	.01-	2.0843	2.6532