

HORIZONS Web-Interface

This tool provides a web-based *limited* interface to [JPL's HORIZONS system](#) which can be used to generate ephemerides for solar-system bodies. Full access to [HORIZONS](#) features is available via the primary [telnet interface](#). [HORIZONS system news](#) shows recent changes and improvements. A [web-interface tutorial](#) is available to assist new users.

Current Settings

Ephemeris Type [\[change\]](#) : **OBSERVER**

Target Body [\[change\]](#) : **Comet C/2010 X1 (Elenin)**

Observer Location [\[change\]](#) : **Geocentric [500]**

Time Span [\[change\]](#) : Start=**2011-06-07**, Stop=**2011-07-26**, Step=**1 d**

Table Settings [\[change\]](#) : *defaults*

Display/Output [\[change\]](#) : *default* (formatted HTML)

Object Data Page

```
JPL/HORIZONS                Elenin (C/2010 X1)                2011-Jun-26 07:39:06
Rec #:903811 (+COV)      Soln.date: 2011-Jun-24_15:50:21    # obs: 2145 (2010-2011)
```

```
FK5/J2000.0 helio. ecliptic osc. elements (AU, DAYS, DEG, period=Julian yrs):
```

```
EPOCH= 2455647.5 != 2011-Mar-27.0000000 (CT)      Residual RMS= .62649
EC= 1.000062507440057   QR= .4824285069612182   TP= 2455815.219249302
OM= 323.2349417132513   W= 343.7980718537987   IN= 1.839523267179
A= -7717.937361065997   MA= 359.99975619921   ADIST= 9.999999E99
PER= 9.999999E99       N= 1.454E-6           ANGMOM= .016897393
DAN= .4922             DDN= 24.33163        L= 307.0409254
B= -.5131888          TP= 2011-Sep-10.7192493
```

```
Physical & non-grav parameters (KM, SEC; A1,A2,A3=AU/d^2; DT=days):
```

```
GM= n.a.              RAD= n.a.              A1= n.a.
A2= n.a.              A3= n.a.              DT= n.a.
M1= 10.4              M2= 13.7              k1= 11.
k2= 5.                PHCOF= .030
```

COMET comments

```
1: soln ref.= JPL#28, data arc: 2010-Dec-10 to 2011-Jun-23
2: k1=11., k2=5., phase coef.=0.03;
```

Results

```

*****
Ephemeris / WWW_USER Sun Jun 26 07:39:07 2011 Pasadena, USA / Horizons
*****
Target body name: Elenin (C/2010 X1) {source: JPL#28}
Center body name: Earth (399) {source: DE405}
Center-site name: GEOCENTRIC
*****
Start time : A.D. 2011-Jun-07 00:00:00.0000 UT
Stop time : A.D. 2011-Jul-26 00:00:00.0000 UT
Step-size : 1440 minutes
*****
Target pole/equ : No model available
Target radii : (unavailable)
Center geodetic : 0.00000000,0.00000000,0.00000000 {E-lon(deg),Lat(deg),Alt(km)}
Center cylindrical: 0.00000000,0.00000000,0.00000000 {E-lon(deg),Dxy(km),Dz(km)}
Center pole/equ : High-precision EOP model {East-longitude +}
Center radii : 6378.1 x 6378.1 x 6356.8 km {Equator, meridian, pole}
Target primary : Sun {source: DE405}
Interfering body: MOON (Req= 1737.400) km {source: DE405}
Deflecting body : Sun, EARTH {source: DE405}
Deflecting GMS : 1.3271E+11, 3.9860E+05 km^3/s^2
Small perturbers: Ceres, Pallas, Vesta {source: SB405-CPV-2}
Small body GMS : 6.32E+01, 1.43E+01, 1.78E+01 km^3/s^2
Atmos refraction: NO (AIRLESS)
RA format : HMS
Time format : CAL
EOP file : eop.110624.p110915
EOP coverage : DATA-BASED 1962-JAN-20 TO 2011-JUN-24. PREDICTS-> 2011-SEP-14
Units conversion: 1 AU= 149597870.691 km, c= 299792.458 km/s, 1 day= 86400.0 s
Table cut-offs 1: Elevation (-90.0deg=NO ),Airmass (>38.000=NO), Daylight (NO )
Table cut-offs 2: Solar Elongation ( 0.0,180.0=NO )
*****
Initial FK5/J2000.0 heliocentric ecliptic osculating elements (AU, DAYS, DEG):
EPOCH= 2455647.5 != 2011-Mar-27.0000000 (CT) Residual RMS= .62649
EC= 1.000062507440057 QR= .4824285069612182 TP= 2455815.219249302

```

OM= 323.2349417132513 W= 343.7980718537987 IN= 1.839523267179
 Comet physical & dynamic parameters (KM, SEC; A1,A2,A3=AU/d^2; DT=days):
 GM= n.a. RAD= n.a. A1= n.a.
 A2= n.a. A3= n.a. DT= n.a.
 M1= 10.4 M2= 13.7 k1= 11.
 k2= 5. PHCOF= .030

 Date__(UT)__HR:MN R.A.__(ICRF/J2000.0)_DEC T-mag N-mag delta deldot S-O-T /r S-T-O

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Date__(UT)__HR:MN	R.A.__(ICRF/J2000.0)_DEC	T-mag	N-mag	delta	deldot	S-O-T /r	S-T-O
2011-Jun-07 00:00	10 28 27.14 +08 07 36.7	14.87	17.38	1.83158923950194	-1.3377926	80.0484 /T	31.1103
2011-Jun-08 00:00	10 28 45.61 +08 06 02.5	14.83	17.37	1.83075785371966	-1.5422802	79.1721 /T	31.2906
2011-Jun-09 00:00	10 29 05.80 +08 04 18.0	14.79	17.35	1.82980605145645	-1.7546863	78.3038 /T	31.4674
2011-Jun-10 00:00	10 29 27.68 +08 02 23.5	14.75	17.34	1.82872935463590	-1.9746778	77.4433 /T	31.6409
2011-Jun-11 00:00	10 29 51.25 +08 00 18.8	14.71	17.33	1.82752347846220	-2.2019209	76.5906 /T	31.8112
2011-Jun-12 00:00	10 30 16.50 +07 58 04.0	14.67	17.31	1.82618432744910	-2.4360970	75.7458 /T	31.9787
2011-Jun-13 00:00	10 30 43.42 +07 55 39.1	14.63	17.30	1.82470798137280	-2.6769209	74.9086 /T	32.1433
2011-Jun-14 00:00	10 31 12.00 +07 53 04.3	14.58	17.28	1.82309067053611	-2.9241591	74.0791 /T	32.3053
2011-Jun-15 00:00	10 31 42.22 +07 50 19.4	14.54	17.27	1.82132874203044	-3.1776422	73.2572 /T	32.4648
2011-Jun-16 00:00	10 32 14.09 +07 47 24.4	14.50	17.25	1.81941862144874	-3.4372672	72.4428 /T	32.6220
2011-Jun-17 00:00	10 32 47.59 +07 44 19.5	14.45	17.23	1.81735677628709	-3.7029897	71.6360 /T	32.7771
2011-Jun-18 00:00	10 33 22.73 +07 41 04.5	14.41	17.22	1.81513968687421	-3.9748066	70.8365 /T	32.9303
2011-Jun-19 00:00	10 33 59.48 +07 37 39.5	14.36	17.20	1.81276382812709	-4.2527363	70.0445 /T	33.0817
2011-Jun-20 00:00	10 34 37.86 +07 34 04.4	14.32	17.18	1.81022566209094	-4.5368026	69.2598 /T	33.2314
2011-Jun-21 00:00	10 35 17.86 +07 30 19.2	14.27	17.16	1.80752163864742	-4.8270226	68.4825 /T	33.3797
2011-Jun-22 00:00	10 35 59.47 +07 26 24.0	14.22	17.14	1.80464820075888	-5.1234027	67.7125 /T	33.5268
2011-Jun-23 00:00	10 36 42.69 +07 22 18.6	14.18	17.12	1.80160179095170	-5.4259383	66.9497 /T	33.6728
2011-Jun-24 00:00	10 37 27.51 +07 18 03.1	14.13	17.10	1.79837885677711	-5.7346172	66.1943 /T	33.8180
2011-Jun-25 00:00	10 38 13.95 +07 13 37.4	14.08	17.08	1.79497585412719	-6.0494234	65.4462 /T	33.9626
2011-Jun-26 00:00	10 39 01.98 +07 09 01.5	14.03	17.06	1.79138924824455	-6.3703410	64.7052 /T	34.1067
2011-Jun-27 00:00	10 39 51.62 +07 04 15.3	13.97	17.04	1.78761551299362	-6.6973563	63.9716 /T	34.2506
2011-Jun-28 00:00	10 40 42.86 +06 59 18.9	13.92	17.02	1.78365112952552	-7.0304573	63.2452 /T	34.3945
2011-Jun-29 00:00	10 41 35.69 +06 54 12.2	13.87	17.00	1.77949258590705	-7.3696312	62.5261 /T	34.5387
2011-Jun-30 00:00	10 42 30.12 +06 48 55.2	13.82	16.97	1.77513637954234	-7.7148572	61.8142 /T	34.6834
2011-Jul-01 00:00	10 43 26.15 +06 43 27.8	13.76	16.95	1.77057902413017	-8.0660980	61.1096 /T	34.8289
2011-Jul-02 00:00	10 44 23.77 +06 37 50.1	13.70	16.92	1.76581706225469	-8.4232891	60.4122 /T	34.9754
2011-Jul-03 00:00	10 45 22.98 +06 32 01.9	13.65	16.90	1.76084708342544	-8.7863314	59.7222 /T	35.1232
2011-Jul-04 00:00	10 46 23.78 +06 26 03.2	13.59	16.87	1.75566574568379	-9.1550867	59.0394 /T	35.2727
2011-Jul-05 00:00	10 47 26.18 +06 19 54.1	13.53	16.85	1.75026979739075	-9.5293814	58.3639 /T	35.4242
2011-Jul-06 00:00	10 48 30.16 +06 13 34.5	13.47	16.82	1.74465609520062	-9.9090163	57.6958 /T	35.5779
2011-Jul-07 00:00	10 49 35.73 +06 07 04.3	13.41	16.80	1.73882161484392	-10.2937808	57.0349 /T	35.7343

2011-Jul-08 00:00	10 50 42.89 +06 00 23.5	13.35	16.77	1.73276345286315	-10.6834699	56.3814 /T	35.8937
2011-Jul-09 00:00	10 51 51.63 +05 53 32.1	13.29	16.74	1.72647881911282	-11.0778987	55.7352 /T	36.0564
2011-Jul-10 00:00	10 53 01.97 +05 46 30.1	13.22	16.71	1.71996502099102	-11.4769161	55.0964 /T	36.2229
2011-Jul-11 00:00	10 54 13.90 +05 39 17.3	13.16	16.68	1.71321944089252	-11.8804149	54.4649 /T	36.3935
2011-Jul-12 00:00	10 55 27.42 +05 31 53.7	13.09	16.65	1.70623950856738	-12.2883393	53.8407 /T	36.5688
2011-Jul-13 00:00	10 56 42.55 +05 24 19.3	13.02	16.62	1.69902267034898	-12.7006878	53.2239 /T	36.7490
2011-Jul-14 00:00	10 57 59.29 +05 16 33.9	12.95	16.59	1.69156635769298	-13.1175127	52.6144 /T	36.9348
2011-Jul-15 00:00	10 59 17.64 +05 08 37.5	12.88	16.56	1.68386795786878	-13.5389133	52.0124 /T	37.1266
2011-Jul-16 00:00	11 00 37.62 +05 00 30.0	12.81	16.53	1.67592478952337	-13.9650258	51.4177 /T	37.3248
2011-Jul-17 00:00	11 01 59.23 +04 52 11.2	12.74	16.50	1.66773408494616	-14.3960108	50.8304 /T	37.5300
2011-Jul-18 00:00	11 03 22.50 +04 43 41.2	12.67	16.46	1.65929297942026	-14.8320417	50.2507 /T	37.7429
2011-Jul-19 00:00	11 04 47.42 +04 34 59.8	12.59	16.43	1.65059850657754	-15.2732958	49.6784 /T	37.9638
2011-Jul-20 00:00	11 06 14.02 +04 26 06.9	12.51	16.39	1.64164759770371	-15.7199497	49.1136 /T	38.1936
2011-Jul-21 00:00	11 07 42.30 +04 17 02.4	12.44	16.36	1.63243708268333	-16.1721780	48.5564 /T	38.4329
2011-Jul-22 00:00	11 09 12.28 +04 07 46.2	12.36	16.32	1.62296369061226	-16.6301554	48.0069 /T	38.6824
2011-Jul-23 00:00	11 10 43.98 +03 58 18.1	12.27	16.29	1.61322404874703	-17.0940603	47.4651 /T	38.9428
2011-Jul-24 00:00	11 12 17.41 +03 48 38.2	12.19	16.25	1.60321467919673	-17.5640790	46.9310 /T	39.2149
2011-Jul-25 00:00	11 13 52.59 +03 38 46.4	12.11	16.21	1.59293199343466	-18.0404085	46.4047 /T	39.4996
2011-Jul-26 00:00	11 15 29.52 +03 28 42.4	12.02	16.17	1.58237228535694	-18.5232589	45.8863 /T	39.7979

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Column meaning:

TIME

Prior to 1962, times are UT1. Dates thereafter are UTC. Any 'b' symbol in the 1st-column denotes a B.C. date. First-column blank (" ") denotes an A.D. date. Calendar dates prior to 1582-Oct-15 are in the Julian calendar system. Later calendar dates are in the Gregorian system.

The uniform Coordinate Time scale is used internally. Conversion between CT and the selected non-uniform UT output scale has not been determined for UTC times after the next July or January 1st. The last known leap-second is used over any future interval.

NOTE: "n.a." in output means quantity "not available" at the print-time.

R.A._(ICRF/J2000.0)_DEC =

J2000.0 astrometric right ascension and declination of target center.
Corrected for light-time. Units: HMS (HH MM SS.ff) and DMS (DD MM SS.f)

T-mag N-mag =
 Comet's approximate apparent visual total magnitude ("T-mag") and nuclear magnitude ("N-mag") by following definitions:

$$T\text{-mag} = M1 + 5 \cdot \log_{10}(\text{delta}) + k1 \cdot \log_{10}(r)$$

$$N\text{-mag} = M2 + 5 \cdot \log_{10}(\text{delta}) + k2 \cdot \log_{10}(r) + \text{phcof} \cdot \text{beta}$$
 Units: none

delta deldot =
 Range ("delta") and range-rate ("delta-dot") of target center with respect to the observer at the instant light seen by the observer at print-time would have left the target center (print-time minus down-leg light-time); the distance traveled by a light ray emanating from the center of the target and recorded by the observer at print-time. "deldot" is a projection of the velocity vector along this ray, the light-time-corrected line-of-sight from the coordinate center, and indicates relative motion. A positive "deldot" means the target center is moving away from the observer (coordinate center). A negative "deldot" means the target center is moving toward the observer.
 Units: AU and KM/S

S-O-T /r =
 Sun-Observer-Target angle; target's apparent solar elongation seen from observer location at print-time. If negative, the target center is behind the Sun. Angular units: DEGREES.

The '/r' column is a Sun-relative code, output for observing sites with defined rotation models only.

/T indicates target trails Sun (evening sky)
 /L indicates target leads Sun (morning sky)

NOTE: The S-O-T solar elongation angle is the total separation in any direction. It does not indicate the angle of Sun leading or trailing.

S-T-O =
 Sun-Target-Observer (~ PHASE ANGLE) angle: the vertex angle at target center formed by a vector to the apparent center of the Sun and a vector intersecting the observer at print-time. This measurable angle is within 20 arcseconds (0.006 deg) of the reduced PHASE ANGLE at observer's location at print time. The difference is due to down-leg stellar aberration affecting measured target position but not apparent solar illumination direction. When computing phase, Horizons uses the true phase angle, not S-T-O, but the resulting difference

in illuminated fraction is less than 0.001%.

Units: DEGREES

Computations by ...

Solar System Dynamics Group, Horizons On-Line Ephemeris System

4800 Oak Grove Drive, Jet Propulsion Laboratory

Pasadena, CA 91109 USA

Information: <http://ssd.jpl.nasa.gov/>

Connect : <telnet://ssd.jpl.nasa.gov:6775> (via browser)

[telnet ssd.jpl.nasa.gov 6775](telnet://ssd.jpl.nasa.gov:6775) (via command-line)

Author : Jon.Giorgini@jpl.nasa.gov