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## 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/2011 L4 (PANSTARRS)**  
 Observer Location [\[change\]](#) : **Geocentric [500]**  
 Time Span [\[change\]](#) : **Start=2013-03-12, Stop=2013-04-11, Step=1 d**  
 Table Settings [\[change\]](#) : *defaults*  
 Display/Output [\[change\]](#) : *default* (formatted HTML)

## Object Data Page

```

JPL/HORIZONS                PANSTARRS (C/2011 L4)                2013-Mar-12 10:50:00
Rec #:903841 (+COV)   Soln.date: 2013-Mar-02_17:50:10   # obs: 1406 (2011-2013)

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

EPOCH= 2456016.5 != 2012-Mar-30.0000000 (CT)   Residual RMS= .42277
EC= 1.00008601240538   QR= .3016097991857733   TP= 2456361.6529979268
OM= 65.66544228753845   W= 333.6425286345507   IN= 84.19941668595264
A= -3506.584868228785   MA= 359.99836171599   ADIST= 9.999999E99
PER= 9.999999E99   N= 4.747E-6   ANG MOM= .013360678
DAN= .31815   DDN= 5.80706   L= 62.798674
B= -26.2122023   TP= 2013-Mar-10.1529979268

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= 4.7   M2= 8.4   k1= 10.
k2= 5.   PHCOF= .030

COMET comments
1: soln ref.= JPL#64, data arc: 2011-May-21 to 2013-Feb-21
2: k1=10., k2=5., phase coef.=0.03;
  
```

## Results

```

*****
Ephemeris / WWW_USER Tue Mar 12 10:50:00 2013 Pasadena, USA / Horizons
*****
Target body name: PANSTARRS (C/2011 L4)           {source: JPL#64}
Center body name: Earth (399)                     {source: DE405}
Center-site name: GEOCENTRIC
*****
Start time      : A.D. 2013-Mar-12 00:00:00.0000 UT
Stop time       : A.D. 2013-Apr-11 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 cylindric: 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}
Vis. interferer : MOON (R_eq= 1737.400) km         {source: DE405}
Rel. light bend : Sun, EARTH                       {source: DE405}
Rel. lght bnd GM: 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.130311.pl30602
EOP coverage   : DATA-BASED 1962-JAN-20 TO 2013-MAR-11. PREDICTS-> 2013-JUN-01
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= 2456016.5 != 2012-Mar-30.0000000 (CT)      Residual RMS= .42277
EC= 1.00008601240538      QR= .3016097991857733      TP= 2456361.6529979268
OM= 65.66544228753845      W= 333.6425286345507      IN= 84.19941668595264
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= 4.7      M2= 8.4      kl= 10.
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
*****							
\$\$\$\$SOE							
2013-Mar-12 00:00	00 27 59.39 -00 16 11.7	1.86	7.83	1.12037497862040	10.5844158	15.2238 /T	58.2394
2013-Mar-13 00:00	00 30 09.96 +02 17 09.8	1.94	7.87	1.12670268535243	11.2982440	15.4638 /T	57.5192
2013-Mar-14 00:00	00 31 51.52 +04 46 13.7	2.05	7.93	1.13339501237242	11.8540126	15.8547 /T	56.9132
2013-Mar-15 00:00	00 33 08.04 +07 10 20.5	2.18	8.01	1.14037215261169	12.2905004	16.3789 /T	56.4135
2013-Mar-16 00:00	00 34 03.48 +09 29 07.6	2.32	8.11	1.14757473685818	12.6393311	17.0170 /T	56.0010
2013-Mar-17 00:00	00 34 41.47 +11 42 26.8	2.47	8.21	1.15495932043582	12.9240732	17.7489 /T	55.6528
2013-Mar-18 00:00	00 35 05.25 +13 50 20.6	2.63	8.31	1.16249395186236	13.1612104	18.5562 /T	55.3472
2013-Mar-19 00:00	00 35 17.58 +15 52 58.7	2.78	8.42	1.17015455548233	13.3618271	19.4226 /T	55.0664
2013-Mar-20 00:00	00 35 20.77 +17 50 35.8	2.94	8.53	1.17792230528255	13.5332716	20.3342 /T	54.7967
2013-Mar-21 00:00	00 35 16.72 +19 43 28.9	3.10	8.64	1.18578186864378	13.6804800	21.2794 /T	54.5288
2013-Mar-22 00:00	00 35 06.97 +21 31 56.4	3.26	8.75	1.19372030024043	13.8069082	22.2488 /T	54.2568
2013-Mar-23 00:00	00 34 52.75 +23 16 16.5	3.41	8.85	1.20172637472261	13.9151339	23.2350 /T	53.9772
2013-Mar-24 00:00	00 34 35.07 +24 56 47.2	3.55	8.95	1.20979019397485	14.0072205	24.2319 /T	53.6882
2013-Mar-25 00:00	00 34 14.72 +26 33 45.4	3.70	9.05	1.21790295527876	14.0849223	25.2348 /T	53.3893
2013-Mar-26 00:00	00 33 52.34 +28 07 27.1	3.83	9.14	1.22605680772130	14.1497933	26.2399 /T	53.0807
2013-Mar-27 00:00	00 33 28.42 +29 38 07.0	3.97	9.23	1.23424475371945	14.2032405	27.2444 /T	52.7632
2013-Mar-28 00:00	00 33 03.36 +31 05 58.9	4.10	9.32	1.24246057268641	14.2465507	28.2459 /T	52.4377
2013-Mar-29 00:00	00 32 37.46 +32 31 15.3	4.22	9.40	1.25069875700487	14.2809089	29.2427 /T	52.1052
2013-Mar-30 00:00	00 32 10.98 +33 54 07.7	4.34	9.48	1.25895445816069	14.3074157	30.2333 /L	51.7668
2013-Mar-31 00:00	00 31 44.10 +35 14 46.9	4.46	9.56	1.26722344399070	14.3271082	31.2169 /L	51.4234
2013-Apr-01 00:00	00 31 16.95 +36 33 22.5	4.57	9.64	1.27550206754556	14.3409789	32.1925 /L	51.0761
2013-Apr-02 00:00	00 30 49.62 +37 50 03.3	4.68	9.71	1.28378724585568	14.3499901	33.1596 /L	50.7255
2013-Apr-03 00:00	00 30 22.18 +39 04 57.6	4.79	9.78	1.29207644493928	14.3550812	34.1177 /L	50.3726
2013-Apr-04 00:00	00 29 54.66 +40 18 12.8	4.90	9.85	1.30036766689906	14.3571690	35.0665 /L	50.0179
2013-Apr-05 00:00	00 29 27.08 +41 29 55.7	5.00	9.91	1.30865943589626	14.3571437	36.0059 /L	49.6620
2013-Apr-06 00:00	00 28 59.42 +42 40 12.6	5.09	9.97	1.31695078124735	14.3558634	36.9356 /L	49.3055
2013-Apr-07 00:00	00 28 31.65 +43 49 09.3	5.19	10.03	1.32524121703593	14.3541479	37.8557 /L	48.9487
2013-Apr-08 00:00	00 28 03.72 +44 56 51.0	5.28	10.09	1.33353071822364	14.3527724	38.7659 /L	48.5921
2013-Apr-09 00:00	00 27 35.57 +46 03 22.6	5.37	10.15	1.34181969336787	14.3524623	39.6664 /L	48.2359
2013-Apr-10 00:00	00 27 07.13 +47 08 48.5	5.46	10.21	1.35010895414239	14.3538875	40.5571 /L	47.8803
2013-Apr-11 00:00	00 26 38.30 +48 13 12.7	5.54	10.26	1.35839968210145	14.3576585	41.4381 /L	47.5257
\$\$\$\$SOE							
*****							

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.

Time tags refer to the same instant throughout the universe, regardless of where the observer is located.

The uniform Coordinate Time scale is used internally. It is equivalent to the current IAU definition of "TDB". 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 =  
 SPECIAL CASE: Comet C/2011 L4 (PanSTARRS) approximate apparent visual total magnitude ("T-mag") from following non-standard definition [Yoshida]:  
 Interval

(days relative to periape)	Total magnitude model
-----	-----
( , -365)	-1.8 + 5*log10(d) + 18*log10(r)
[-365, -120)	4.0 + 5*log10(d) + 10*log10(r)
[-120, 120)	5.2 + 5*log10(d) + 7.0*log10(r)
[120, )	4.0 + 5*log10(d) + 10.0*log10(r)

Nuclear magnitude ("N-mag") continues to be the IAU definition:  
 N-mag = M2 + 5\*log10(d) + k2\*log10(r) + phcof\*beta

Units: magnitudes

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 ...

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2013-Mar-12 17:50 UT  
(server date/time)



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