

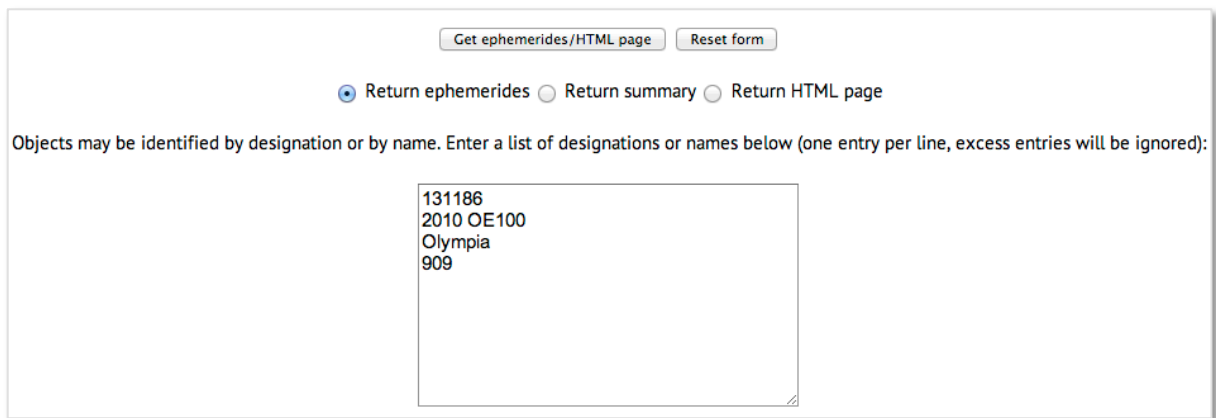
Finding precise Minor Planet ephemerides for use with *SPIRIT*

There are two on-line resources for obtaining accurate minor planet ephemerides.

1. The Minor Planet & Comet Ephemeris Service (MPES)

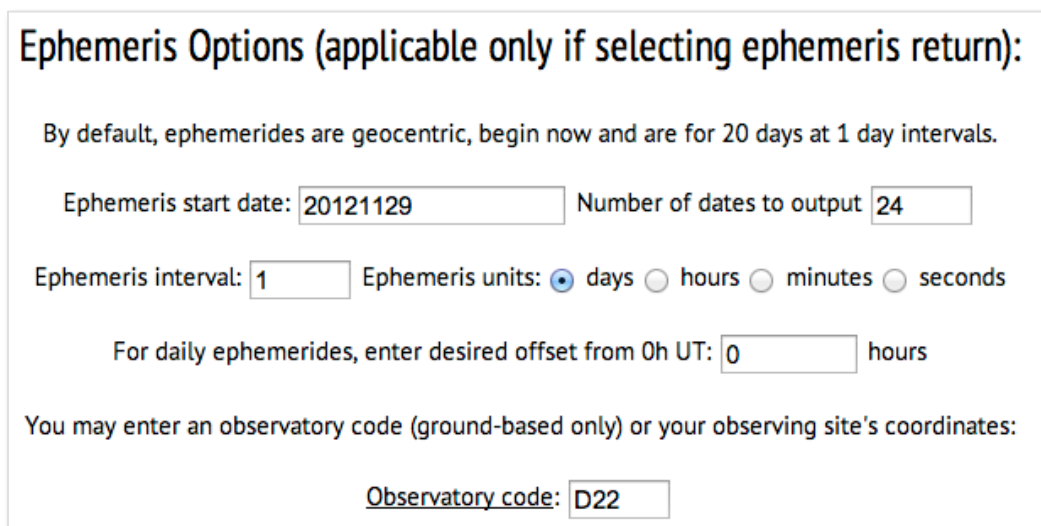
<http://www.minorplanetcenter.org/iau/MPEph/MPEph.html>

1. Enter a list of Minor Planets that you wish to observe. The MPES accepts a variety of formats.



The screenshot shows a web form with two buttons at the top: "Get ephemerides/HTML page" and "Reset form". Below the buttons are three radio buttons: "Return ephemerides" (selected), "Return summary", and "Return HTML page". A text instruction reads: "Objects may be identified by designation or by name. Enter a list of designations or names below (one entry per line, excess entries will be ignored):". A text input area contains the following text:
131186
2010 OE100
Olympia
909

2. Enter the date, number of required output dates, ephemeris interval and units. Ensure the Observatory Code is entered as D22 for *SPIRIT*.



Ephemeris Options (applicable only if selecting ephemeris return):

By default, ephemerides are geocentric, begin now and are for 20 days at 1 day intervals.

Ephemeris start date: Number of dates to output:

Ephemeris interval: Ephemeris units: days hours minutes seconds

For daily ephemerides, enter desired offset from 0h UT: hours

You may enter an observatory code (ground-based only) or your observing site's coordinates:

Observatory code:

The previous query will return 24 entries for each object, one for each our hour starting at 00:00 hour UT for the 29th November 2012.

(582) Olympia

[Display all designations for this object](#) / [Show naming citation](#) / # of variant orbits available = 3

Perturbed ephemeris below is based on 35-opp elements from *MPO* 267708. Last observed on 2013 Aug. 10.

Discovery date : 1906 01 23

Discovery site : Heidelberg

Discoverer(s) : Kopff, A.

[Further observations?](#) None needed at this time.

00582		[H= 9.11]																	
Date	UT	R.A. (J2000)	Decl.	Delta	r	El.	Ph.	V	Sky Motion		Object		Sun	Moon					
	h m s								"/min	P.A.	Azi.	Alt.	Alt.	Phase	Dist.	Alt.			
2012 11 29	000000	17 02 07.0	-00 06 27	3.946	3.068	23.6	7.4	15.1	0.95	099.1	260	+16	+35	1.00	159	-31			
2012 11 30	000000	17 03 37.2	-00 10 00	3.948	3.069	23.5	7.3	15.1	0.95	098.9	260	+16	+35	0.98	158	-21			
2012 12 01	000000	17 05 07.4	-00 13 28	3.951	3.070	23.3	7.3	15.1	0.95	098.6	259	+17	+35	0.95	153	-11			
2012 12 02	000000	17 06 37.7	-00 16 50	3.953	3.071	23.1	7.2	15.1	0.95	098.4	259	+17	+35	0.90	145	-01			
2012 12 03	000000	17 08 07.9	-00 20 05	3.956	3.073	23.0	7.2	15.1	0.95	098.1	259	+18	+35	0.84	135	+09			
2012 12 04	000000	17 09 38.2	-00 23 15	3.958	3.074	22.8	7.1	15.1	0.95	097.9	259	+18	+35	0.76	124	+20			
2012 12 05	000000	17 11 08.5	-00 26 19	3.960	3.075	22.7	7.1	15.1	0.95	097.6	258	+19	+35	0.67	113	+30			
2012 12 06	000000	17 12 38.9	-00 29 17	3.962	3.076	22.6	7.1	15.1	0.95	097.4	258	+20	+35	0.57	102	+41			
2012 12 07	000000	17 14 09.2	-00 32 09	3.964	3.077	22.5	7.0	15.1	0.95	097.1	258	+20	+35	0.46	090	+51			
2012 12 08	000000	17 15 39.6	-00 34 55	3.966	3.079	22.5	7.0	15.1	0.94	096.9	257	+21	+35	0.36	078	+61			
2012 12 09	000000	17 17 09.9	-00 37 35	3.967	3.080	22.4	7.0	15.1	0.94	096.6	257	+21	+35	0.25	065	+68			
2012 12 10	000000	17 18 40.3	-00 40 09	3.969	3.081	22.4	7.0	15.1	0.94	096.4	257	+22	+35	0.16	053	+68			
2012 12 11	000000	17 20 10.6	-00 42 37	3.970	3.082	22.4	7.0	15.1	0.94	096.1	256	+22	+35	0.08	040	+62			
2012 12 12	000000	17 21 40.9	-00 44 59	3.971	3.083	22.3	7.0	15.1	0.94	095.9	256	+23	+35	0.03	029	+51			
2012 12 13	000000	17 23 11.2	-00 47 14	3.972	3.084	22.4	7.0	15.1	0.94	095.6	256	+23	+35	0.00	021	+38			
2012 12 14	000000	17 24 41.4	-00 49 24	3.973	3.086	22.4	7.0	15.1	0.94	095.4	255	+24	+35	0.01	022	+25			
2012 12 15	000000	17 26 11.6	-00 51 28	3.973	3.087	22.4	7.0	15.1	0.94	095.1	255	+24	+34	0.04	031	+12			
2012 12 16	000000	17 27 41.8	-00 53 25	3.974	3.088	22.5	7.0	15.1	0.94	094.9	255	+25	+34	0.10	042	-01			
2012 12 17	000000	17 29 11.9	-00 55 17	3.974	3.089	22.6	7.0	15.1	0.94	094.6	254	+25	+34	0.18	055	-14			
2012 12 18	000000	17 30 41.9	-00 57 03	3.975	3.090	22.7	7.0	15.1	0.94	094.4	254	+26	+34	0.27	067	-26			
2012 12 19	000000	17 32 11.9	-00 58 42	3.975	3.091	22.8	7.1	15.1	0.94	094.1	253	+26	+34	0.38	079	-38			
2012 12 20	000000	17 33 41.8	-01 00 16	3.975	3.092	22.9	7.1	15.1	0.93	093.9	253	+27	+34	0.48	091	-49			
2012 12 21	000000	17 35 11.7	-01 01 43	3.975	3.093	23.0	7.1	15.1	0.93	093.6	253	+27	+34	0.58	102	-59			
2012 12 22	000000	17 36 41.4	-01 03 05	3.974	3.094	23.2	7.2	15.1	0.93	093.4	252	+28	+34	0.67	113	-67			

(316258) 2010 OE100

[Display all designations for this object](#) / # of variant orbits available = 3

Perturbed ephemeris below is based on 5-opp elements from *MPO* 219041. Last observed on 2012 Jan. 29.

Discovery date : 2010 07 20

Discovery site : Shenton Park

Discoverer(s) : Lucas, P.

[Further observations?](#) None needed at this time.

V6258		[H=16.5]																	
Date	UT	R.A. (J2000)	Decl.	Delta	r	El.	Ph.	V	Sky Motion		Object		Sun	Moon					
	h m s								"/min	P.A.	Azi.	Alt.	Alt.	Phase	Dist.	Alt.			
2012 11 29	000000	11 04 19.5	+17 41 39	2.969	3.076	86.8	18.7	22.3	0.47	091.4	158	+38	+35	1.00	089	-31			
2012 11 30	000000	11 05 07.9	+17 41 27	2.955	3.075	87.6	18.7	22.2	0.47	090.8	157	+37	+35	0.98	078	-21			
2012 12 01	000000	11 05 55.3	+17 41 23	2.940	3.075	88.4	18.7	22.2	0.46	090.2	156	+37	+35	0.95	067	-11			
2012 12 02	000000	11 06 42.0	+17 41 26	2.926	3.075	89.2	18.7	22.2	0.45	089.5	156	+37	+35	0.90	056	-01			
2012 12 03	000000	11 07 27.8	+17 41 37	2.911	3.074	90.0	18.7	22.2	0.44	088.8	155	+36	+35	0.84	045	+09			
2012 12 04	000000	11 08 12.7	+17 41 55	2.897	3.074	90.9	18.7	22.2	0.43	088.1	154	+36	+35	0.76	034	+20			
2012 12 05	000000	11 08 56.7	+17 42 21	2.882	3.074	91.7	18.7	22.2	0.42	087.3	153	+36	+35	0.67	024	+30			
2012 12 06	000000	11 09 39.8	+17 42 56	2.867	3.073	92.6	18.7	22.2	0.41	086.5	152	+36	+35	0.57	017	+41			
2012 12 07	000000	11 10 21.9	+17 43 38	2.853	3.073	93.4	18.7	22.2	0.40	085.6	151	+35	+35	0.46	018	+51			
2012 12 08	000000	11 11 03.1	+17 44 28	2.838	3.073	94.3	18.6	22.2	0.40	084.7	150	+35	+35	0.36	026	+61			
2012 12 09	000000	11 11 43.4	+17 45 27	2.824	3.072	95.1	18.6	22.1	0.39	083.7	150	+35	+35	0.25	038	+68			
2012 12 10	000000	11 12 22.7	+17 46 34	2.809	3.072	96.0	18.6	22.1	0.38	082.7	149	+34	+35	0.16	051	+68			
2012 12 11	000000	11 13 01.0	+17 47 50	2.795	3.072	96.8	18.6	22.1	0.37	081.6	148	+34	+35	0.08	064	+62			
2012 12 12	000000	11 13 38.3	+17 49 14	2.780	3.071	97.7	18.5	22.1	0.36	080.4	147	+33	+35	0.03	079	+51			
2012 12 13	000000	11 14 14.5	+17 50 46	2.766	3.071	98.6	18.5	22.1	0.35	079.2	146	+33	+35	0.00	093	+38			
2012 12 14	000000	11 14 49.7	+17 52 28	2.751	3.070	99.4	18.4	22.1	0.34	077.9	145	+33	+35	0.01	108	+25			
2012 12 15	000000	11 15 23.9	+17 54 18	2.737	3.070	100.3	18.4	22.1	0.33	076.5	145	+32	+34	0.04	122	+12			
2012 12 16	000000	11 15 57.0	+17 56 17	2.723	3.070	101.2	18.3	22.1	0.32	075.0	144	+32	+34	0.10	135	-01			
2012 12 17	000000	11 16 29.0	+17 58 25	2.708	3.069	102.1	18.3	22.0	0.31	073.4	143	+31	+34	0.18	148	-14			
2012 12 18	000000	11 16 59.9	+18 00 41	2.694	3.069	103.0	18.2	22.0	0.31	071.7	142	+31	+34	0.27	158	-26			
2012 12 19	000000	11 17 29.6	+18 03 07	2.680	3.068	103.9	18.1	22.0	0.30	069.9	142	+30	+34	0.38	163	-38			
2012 12 20	000000	11 17 58.3	+18 05 42	2.666	3.068	104.8	18.1	22.0	0.29	068.0	141	+30	+34	0.48	159	-49			
2012 12 21	000000	11 18 25.8	+18 08 26	2.652	3.068	105.7	18.0	22.0	0.28	065.9	140	+29	+34	0.58	150	-59			
2012 12 22	000000	11 18 52.1	+18 11 18	2.638	3.067	106.6	17.9	22.0	0.27	063.7	139	+29	+34	0.67	140	-67			

2. The JPL Small-Body Database

<http://ssd.jpl.nasa.gov/horizons.cgi>

1. Enter details for Target Body, Observer Location and Time Span by selecting **change** for each item.

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 [\[change\]](#) : **Asteroid 1196 Sheba (1931 KE)**
 Observer Location [\[change\]](#) : **UWA Observatory, Crawley [D22] (115°49'00.0"E, 31°58'44.0"S, 24.4 m)**
 Time Span [\[change\]](#) : **Start=2012-11-29, Stop=2012-11-30, Step=1 h**
 Table Settings [\[change\]](#) : *defaults*
 Display/Output [\[change\]](#) : *default (formatted HTML)*

2. Select **Generate Ephemeris**.

The above example gives the following:

```

*****
Date__ (UT)  __HR:MN   R.A._ (ICRF/J2000.0) _DEC   APmag   S-brt      delta      deldot      S-O-T /r      S-T-O
*****
$$SOE
2012-Nov-29  00:00 *   14 24 06.82 +00 21 27.5   16.31   6.14 3.83581910984943 -14.8820762   35.8532 /L  10.7712
2012-Nov-29  01:00 *   14 24 10.13 +00 21 13.1   16.31   6.14 3.83546197203282 -14.7979112   35.8782 /L  10.7777
2012-Nov-29  02:00 *   14 24 13.45 +00 20 58.6   16.31   6.14 3.83510696849478 -14.7058245   35.9032 /L  10.7843
2012-Nov-29  03:00 *   14 24 16.76 +00 20 44.2   16.31   6.14 3.83475420675105 -14.6127750   35.9282 /L  10.7908
2012-Nov-29  04:00 *   14 24 20.08 +00 20 29.7   16.31   6.14 3.83440362509382 -14.5257874   35.9530 /L  10.7973
2012-Nov-29  05:00 *   14 24 23.40 +00 20 15.3   16.31   6.14 3.83405499681543 -14.4514716   35.9778 /L  10.8039
2012-Nov-29  06:00 *   14 24 26.72 +00 20 00.9   16.31   6.14 3.83370794571861 -14.3955704   36.0026 /L  10.8105
2012-Nov-29  07:00 *   14 24 30.06 +00 19 46.4   16.31   6.14 3.83336197185105 -14.3625673   36.0274 /L  10.8170
2012-Nov-29  08:00 *   14 24 33.40 +00 19 32.0   16.31   6.14 3.83301648570445 -14.3553792   36.0522 /L  10.8236
2012-Nov-29  09:00 *   14 24 36.75 +00 19 17.6   16.31   6.14 3.83267084853806 -14.3751574   36.0771 /L  10.8303
2012-Nov-29  10:00 *   14 24 40.11 +00 19 03.2   16.31   6.14 3.83232441606836 -14.4212087   36.1021 /L  10.8369
2012-Nov-29  11:00 *   14 24 43.47 +00 18 48.8   16.31   6.14 3.83197658253673 -14.4910428   36.1272 /L  10.8436
2012-Nov-29  12:00 Nm   14 24 46.85 +00 18 34.5   16.31   6.14 3.83162682214113 -14.5805429   36.1524 /L  10.8503
2012-Nov-29  13:00 m   14 24 50.22 +00 18 20.1   16.31   6.14 3.83127472499863 -14.6842471   36.1777 /L  10.8571
2012-Nov-29  14:00 m   14 24 53.60 +00 18 05.7   16.31   6.14 3.83092002517977 -14.7957218   36.2030 /L  10.8638
2012-Nov-29  15:00 m   14 24 56.98 +00 17 51.4   16.31   6.14 3.83056261889800 -14.9080022   36.2285 /L  10.8706
2012-Nov-29  16:00 m   14 25 00.36 +00 17 37.0   16.31   6.14 3.83020257161060 -15.0140680   36.2541 /L  10.8773
2012-Nov-29  17:00 m   14 25 03.73 +00 17 22.7   16.31   6.14 3.82984011354567 -15.1073238   36.2797 /L  10.8840
2012-Nov-29  18:00 m   14 25 07.10 +00 17 08.3   16.31   6.14 3.82947562396085 -15.1820501   36.3053 /L  10.8907
2012-Nov-29  19:00 m   14 25 10.46 +00 16 54.0   16.31   6.14 3.82910960521013 -15.2337947   36.3309 /L  10.8974
2012-Nov-29  20:00 Am   14 25 13.81 +00 16 39.7   16.31   6.14 3.82874264839158 -15.2596765   36.3565 /L  10.9041
2012-Nov-29  21:00 Cm   14 25 17.15 +00 16 25.4   16.31   6.14 3.82837539292503 -15.2585836   36.3821 /L  10.9107
2012-Nov-29  22:00 *m  14 25 20.48 +00 16 11.1   16.31   6.14 3.82800848282369 -15.2312484   36.4075 /L  10.9173
2012-Nov-29  23:00 *   14 25 23.80 +00 15 56.8   16.31   6.14 3.82764252265041 -15.1801983   36.4329 /L  10.9239
2012-Nov-30  00:00 *   14 25 27.12 +00 15 42.5   16.31   6.14 3.82727803617078 -15.1095825   36.4582 /L  10.9305
*****
$$EOE

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In both cases, the RA and Dec coordinates for the designated date and time can be used in the *SPIRIT* browser interface, or in ACP Plans. For example, if you wished to image the asteroid 1196 (Sheba) at 9pm local time, you could use the coordinates for 01:00 UT in the above table:

RA = 03 56 38.08

Dec = +00 20 30.2