Horizons Tips for Spitzer Extrasolar Planet Observers

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Many extrasolar planet observations require you to correct your observed times for the light travel time difference between Spitzer and the heliocentric frame. To do this, you need to know the heliocentric coordinates of Spitzer at the time of your observations.

The instructions below will help you to retrieve this information from the Horizons database, where Spitzer can be specified as both an observation platform, and a target body (NAIF ID -79).

There are two ways to do this, by batch job, and interactively:

#1) edit the batch file in the appendix at the end of this document to change the times, output steps, aberration corrections etc., and send this file as a plain-text message to

"horizons@ssd.jpl.nasa.gov"

. . . with subject "JOB". It will return heliocentric states of Spitzer with respect to Sun-center. Specifically, the results will include the time of the coordinate position in both Epoch Julian Date and coordinate time, the x, y and z components of the position vector (in AU), the x, y and z components of the velocity vector (in AU/day), the one way Newtonian light time (in days). The distance from the Sun-center (in AU) and the range rate with respect to the Sun-center in AU/day.

#2) To do this interactively, to understand what is going on:

```
telnet ssd.jpl.nasa.gov 6775 (command line)
telnet://ssd.jpl.nasa.gov:6775 (browser window URL)
```

type (in response to prompts):

```
-79
e
v
@10
f
2005-jan-4  <- your appropriate start date here
2005-jan-14  <- you appropriate end date here
1d
<return>
```

The results will be computed and displayed. They can be e-mailed or FTP'ed by the user as preferred.

Type ? or ?! at any prompt for an explanation of the prompt, if they wish to vary from the example above.

APPENDIX: E-MAIL BATCH REQUEST TO SEND TO HORIZONS

```
!$$SOF
!
! Example e-mail command file. If mailed to "horizons@ssd.jpl.nasa.gov"
! with subject "JOB", results will be mailed back.
!
! This example demonstrates a subset of functions. See main doc for
! full explanation. Send blank e-mail with subject "BATCH-LONG" to
! horizons@ssd.jpl.nasa.gov for complete example.
!
EMAIL_ADDR = ' ' ! Send output to this address
! (can be blank for auto-reply)
COMMAND = '-79' ! Target body, closest apparition

OBJ_DATA = 'YES' ! No summary of target body data
MAKE_EPHEM = 'YES' ! Make an ephemeris

START_TIME = '2005-Jan-04 00:00' ! Start of table (UTC default)
STOP_TIME = '2005-Jan-21 00:00' ! End of table
STEP_SIZE = '1 day' ! Table step-size

TABLE_TYPE = 'VECTOR' ! Specify VECTOR ephemeris table type
CENTER = '@10' ! Set observer (coordinate center)
REF_PLANE = 'FRAME' ! J2000 equatorial plane

VECT_TABLE = '3' ! Selects output type (3=all).

OUT_UNITS = 'KM-S' ! Vector units; KM-S, AU-D, KM-D
CSV_FORMAT = 'NO' ! Comma-separated output (YES/NO)
VEC_LABELS = 'YES' ! Label vectors in output (YES/NO)
VECT_CORR = 'NONE'
! Correct for light-time (LT),
! or lt + stellar aberration (LT+S),
! or (NONE) return geometric
! vectors only.
!$$EOF
```