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] : **VECTORS**
Target Body [change] : **Sun [Sol]** [10]
Coordinate Origin [change] : **Solar System Barycenter (SSB)** [500@0]
Time Span [change] : Start=**2019-04-27 00:00**, Stop=**2019-04-27 12:00**, Step=**1 d**
Table Settings [change] : *defaults*
Display/Output [change] : *default* (formatted HTML)

Object Data Page

```
Revised: July 31, 2013                 Sun                                10

PHYSICAL PROPERTIES (updated 2018-Aug-15):
 GM, km^3/s^2          = 132712440041.93938  Mass, 10^24 kg        = ~1988500
 Vol. mean radius, km  = 695700              Volume, 10^12 km^3    = 1412000
 Solar radius (IAU)    = 696000 km           Mean density, g/cm^3  = 1.408
 Radius (photosphere)  = 696500 km           Angular diam at 1 AU  = 1919.3"
 Photosphere temp., K  = 6600 (bottom)       Photosphere temp., K  = 4400(top)
 Photospheric depth    = ~500 km             Chromospheric depth   = ~2500 km
 Flatness, f           = 0.00005             Adopted sid. rot. per.= 25.38 d
 Surface gravity       =  274.0 m/s^2        Escape speed, km/s    =  617.7
 Pole (RA,DEC), deg.   = (286.13, 63.87)     Obliquity to ecliptic = 7.25 deg.
 Solar constant (1 AU) = 1367.6 W/m^2        Luminosity, 10^24 J/s = 382.8
 Mass-energy conv rate = 4.260 x 10^9 kg/s   Effective temp, K     = 5772
 Sunspot cycle         = 11.4 yr             Cycle 24 sunspot min. = 2008 A.D.

 Motion relative to nearby stars = apex : R.A.= 271 deg.; DEC.= +30 deg.
                                   speed: 19.4 km/s (0.0112 au/day)
 Motion relative to 2.73K BB/CBR = apex : l= 264.7 +- 0.8; b= 48.2 +- 0.5 deg.
                                   speed: 369 +-11 km/s
```

Results

```
*******************************************************************************
Ephemeris / WWW_USER Fri Feb  7 18:10:43 2020 Pasadena, USA      / Horizons
*******************************************************************************
Target body name: Sun (10)                        {source: DE431mx}
Center body name: Solar System Barycenter (0)     {source: DE431mx}
Center-site name: BODY CENTER
*******************************************************************************
Start time      : A.D. 2019-Apr-27 00:00:00.0000 TDB
Stop  time      : A.D. 2019-Apr-27 12:00:00.0000 TDB
Step-size       : 1440 minutes
*******************************************************************************
Center geodetic : 0.00000000,0.00000000,0.0000000 {E-lon(deg),Lat(deg),Alt(km)}
Center cylindric: 0.00000000,0.00000000,0.0000000 {E-lon(deg),Dxy(km),Dz(km)}
Center radii    : (undefined)
Output units    : AU-D
Output type     : GEOMETRIC cartesian states
Output format   : 3 (position, velocity, LT, range, range-rate)
Reference frame : ICRF/J2000.0
Coordinate systm: Ecliptic and Mean Equinox of Reference Epoch
*******************************************************************************
JDTDB
   X     Y     Z
   VX    VY    VZ
   LT    RG    RR
```

```
*******************************************************************************
$$SOE
2458600.500000000 = A.D. 2019-Apr-27 00:00:00.0000 TDB
 X =-1.699702116697901E-03 Y = 7.591941485824569E-03 Z =-3.294738263228371E-05
 VX=-8.347175817777104E-06 VY= 7.503821640682956E-07 VZ= 2.164051447319061E-07
 LT= 4.493325361850015E-05 RG= 7.779951692633689E-03 RR= 2.554956725920512E-06
$$EOE
*******************************************************************************
Coordinate system description:

  Ecliptic and Mean Equinox of Reference Epoch

    Reference epoch: J2000.0
    XY-plane: plane of the Earth's orbit at the reference epoch
              Note: obliquity of 84381.448 arcseconds wrt ICRF equator (IAU76)
    X-axis  : out along ascending node of instantaneous plane of the Earth's
              orbit and the Earth's mean equator at the reference epoch
    Z-axis  : perpendicular to the xy-plane in the directional (+ or -) sense
              of Earth's north pole at the reference epoch.

  Symbol meaning [1 au= 149597870.700 km, 1 day= 86400.0 s]:

    JDTDB    Julian Day Number, Barycentric Dynamical Time
      X      X-component of position vector (au)
      Y      Y-component of position vector (au)
      Z      Z-component of position vector (au)
      VX     X-component of velocity vector (au/day)
      VY     Y-component of velocity vector (au/day)
      VZ     Z-component of velocity vector (au/day)
      LT     One-way down-leg Newtonian light-time (day)
      RG     Range; distance from coordinate center (au)
      RR     Range-rate; radial velocity wrt coord. center (au/day)

Geometric states/elements have no aberrations applied.

 Computations by ...
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     Author     : Jon.D.Giorgini@jpl.nasa.gov
*******************************************************************************
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