* NOVA *

N. 2583 - 24 GIUGNO 2024

ASSOCIAZIONE ASTROFILI SEGUSINI

EFFEMERIDI PER L'OSSERVAZIONE DEGLI ASTEROIDI 2011 UL21 E 2024 MK

Come riportato sulla Nova *n. 2582 di ieri (articolo di Albino Carbognani, tratto da* MEDIA INAF*) tra il 27 e il 29 giugno due asteroidi si troveranno alla minima distanza dalla Terra: 2011 UL21 e 2024 MK. Invisibili a occhio nudo, potranno essere visti anche con piccoli telescopi e fotografati con modesti teleobiettivi.*
In queste pagine riportiamo le effemeridi di entrambi gli asteroidi, calcolate (per le ore 23:00 CEST) dal Solar System Dynamics Group del Jet Propulsion Laboratory per il nostro Grange Observatory.

ASTEROIDE 2011 UL21

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Ephemeris / WWW_USER Sun Jun 23 09:27:24 2024 Pasadena, USA      / Horizons
*******************************************************************************
Target body name: 415029 (2011 UL21)              {source: JPL#280}
Center body name: Earth (399)                     {source: DE441}
Center-site name: Grange Observatory, Bussoleno
*******************************************************************************
Start time      : A.D. 2024-Jun-23 21:00:00.0000 UT
Stop  time      : A.D. 2024-Jul-23 21:00:00.0000 UT
Step-size       : 1440 minutes
*******************************************************************************
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Date__(UT)__HR:MN	R.A._____(ICRF)_____DEC	Azi____(a-app)___Elev	APmag	S-brt	S-O-T /r	Sky_motion	Sky_mot_PA	RelVel-ANG
2024-Jun-23 21:00 A	08 20 35.67 -33 12 08.4	256.364461 -35.706588	14.527	n.a.	64.4809 /T	17.464148	99.136953	-52.55766
2024-Jun-24 21:00 A	08 59 51.68 -34 11 33.8	250.277834 -30.325941	13.914	n.a.	69.6115 /T	24.224419	93.670466	-44.39604
2024-Jun-25 21:00 A	09 55 19.63 -34 13 48.1	242.844354 -22.019762	13.208	n.a.	77.1098 /T	33.511259	85.849615	-32.98916
2024-Jun-26 21:00 A	11 08 22.79 -31 50 51.3	234.139017 -9.966632	12.489	n.a.	87.5873 /T	43.455389	75.819235	-17.55845
2024-Jun-27 21:00 A	12 29 09.25 -25 47 35.6	224.557339 5.123712	11.931	n.a.	100.2275 /T	47.958759	65.961572	1.0720450
2024-Jun-28 21:00 A	13 40 17.99 -17 19 32.4	214.804022 20.126379	11.690	n.a.	112.0832 /T	42.726494	59.323073	19.600560
2024-Jun-29 21:00 A	14 33 34.66 -09 16 36.3	205.662961 32.028052	11.745	n.a.	120.6055 /T	32.559167	56.205694	34.824872
2024-Jun-30 21:00 A	15 11 12.42 -03 01 37.3	197.700776 40.275026	11.970	n.a.	125.7024 /T	23.356139	55.184366	46.052083
2024-Jul-01 21:00 A	15 37 54.10 +01 29 57.6	191.142916 45.745256	12.262	n.a.	128.4765 /T	16.737201	55.126926	54.098721
2024-Jul-02 21:00 A	15 57 21.91 +04 45 38.1	185.948174 49.406052	12.566	n.a.	129.9089 /T	12.263441	55.483274	59.935576
2024-Jul-03 21:00 A	16 12 00.93 +07 09 11.5	181.944042 51.933964	12.860	n.a.	130.5998 /T	9.2393130	56.028596	64.279034
2024-Jul-04 21:00 A	16 23 22.67 +08 57 02.2	178.925596 53.747705	13.135	n.a.	130.8786 /T	7.1511202	56.680598	67.600495
2024-Jul-05 21:00 A	16 32 25.56 +10 19 55.1	176.703626 55.099441	13.390	n.a.	130.9228 /T	5.6700565	57.415518	70.204379
2024-Jul-06 21:00 A	16 39 47.89 +11 24 53.8	175.120263 56.142169	13.626	n.a.	130.8293 /T	4.5914071	58.233007	72.289856
2024-Jul-07 21:00 A	16 45 55.50 +12 16 41.3	174.049573 56.970646	13.845	n.a.	130.6526 /T	3.7865905	59.141525	73.990297
2024-Jul-08 21:00 Am	16 51 06.33 +12 58 31.8	173.392902 57.645033	14.049	n.a.	130.4240 /T	3.1731081	60.152124	75.397273
2024-Jul-09 21:00 Am	16 55 33.16 +13 32 41.5	173.073283 58.204511	14.238	n.a.	130.1623 /T	2.6966953	61.275672	76.575172
2024-Jul-10 21:00 Am	16 59 25.32 +14 00 48.5	173.030453 58.675227	14.416	n.a.	129.8786 /T	2.3207572	62.521486	77.570252
2024-Jul-11 21:00 Am	17 02 49.75 +14 24 04.9	173.216856 59.075033	14.583	n.a.	129.5800 /T	2.0200238	63.896549	78.416375
2024-Jul-12 21:00 Am	17 05 51.72 +14 43 24.9	173.594568 59.416385	14.741	n.a.	129.2709 /T	1.7766577	65.404949	79.138754
2024-Jul-13 21:00 Am	17 08 35.29 +14 59 29.6	174.132999 59.708146	14.890	n.a.	128.9541 /T	1.5778097	67.047430	79.756448
2024-Jul-14 21:00 Am	17 11 03.65 +15 12 51.1	174.807167 59.956750	15.031	n.a.	128.6313 /T	1.4140485	68.821039	80.284081
2024-Jul-15 21:00 Am	17 13 19.32 +15 23 54.8	175.596420 60.166954	15.166	n.a.	128.3037 /T	1.2783287	70.718907	80.733046
2024-Jul-16 21:00 Am	17 15 24.34 +15 33 00.7	176.483476 60.342342	15.295	n.a.	127.9721 /T	1.1652998	72.730233	81.112371
2024-Jul-17 21:00 Am	17 17 20.34 +15 40 25.3	177.453708 60.485672	15.418	n.a.	127.6368 /T	1.0708345	74.840510	81.429346
2024-Jul-18 21:00 Am	17 19 08.67 +15 46 21.9	178.494596 60.599104	15.536	n.a.	127.2982 /T	0.9917023	77.032027	81.689975
2024-Jul-19 21:00 Am	17 20 50.44 +15 51 01.4	179.595316 60.684373	15.649	n.a.	126.9564 /T	0.9253416	79.284595	81.899296
2024-Jul-20 21:00 Am	17 22 26.60 +15 54 33.0	180.746419 60.742899	15.758	n.a.	126.6116 /T	0.8696981	81.576392	82.061601
2024-Jul-21 21:00 Am	17 23 57.91 +15 57 04.5	181.939588 60.775876	15.864	n.a.	126.2637 /T	0.8231088	83.884780	82.180583
2024-Jul-22 21:00 Am	17 25 25.03 +15 58 42.3	183.167439 60.784334	15.965	n.a.	125.9128 /T	0.7842163	86.186995	82.259440
2024-Jul-23 21:00 Am	17 26 48.55 +15 59 32.0	184.423375 60.769181	16.064	n.a.	125.5589 /T	0.7519025	88.460674	82.300974

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Column meaning: v. pagine 2-3
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La *Nova* è pubblicazione telematica aperiodica dell'A.A.S. - Associazione Astrofili Segusini APS di Susa (TO) riservata a Soci e Simpatizzanti.
È pubblicata senza alcuna periodicità regolare (v. Legge 7 marzo 2001, n. 62, art. 1, comma 3) e pertanto non è sottoposta agli obblighi previsti della Legge 8 febbraio 1948, n. 47, art. 5.
I dati personali utilizzati per l'invio telematico della *Nova* sono trattati dall'AAS secondo i principi del *Regolamento generale sulla protezione dei dati* (GDPR - Regolamento UE 2016/679).

ASTEROIDE 2024 MK

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*******************************************************************************
Ephemeris / WWW_USER Sun Jun 23 09:23:08 2024 Pasadena, USA      / Horizons
*******************************************************************************
Target body name: (2024 MK)                       {source: JPL#5}
Center body name: Earth (399)                     {source: DE441}
Center-site name: Grange Observatory, Bussoleno
*******************************************************************************
Start time      : A.D. 2024-Jun-23 21:00:00.0000 UT
Stop  time      : A.D. 2024-Jul-23 21:00:00.0000 UT
Step-size       : 1440 minutes
*******************************************************************************
```

Date__(UT)__HR:MN	R.A._____(ICRF)_____DEC	Azi____(a-app)___Elev	APmag	S-brt	S-O-T /r	Sky_motion	Sky_mot_PA	RelVel-ANG
2024-Jun-23 21:00 A	13 13 46.44 -45 56 19.2	204.144075 -6.541642	16.431	n.a.	117.2669 /T	0.7836052	94.202379	-88.17531
2024-Jun-24 21:00 A	13 18 01.67 -46 08 39.7	204.007204 -6.704833	16.017	n.a.	117.2921 /T	1.3960949	96.195476	-87.31633
2024-Jun-25 21:00 A	13 24 44.12 -46 26 24.9	203.444944 -6.775788	15.492	n.a.	117.7425 /T	2.6067416	97.122082	-86.04600
2024-Jun-26 21:00 A	13 36 37.05 -46 53 25.9	202.005262 -6.643401	14.782	n.a.	119.0782 /T	5.4791482	96.776599	-83.90204
2024-Jun-27 21:00 A	14 02 43.13 -47 34 53.0	198.223860 -5.934037	13.704	n.a.	122.7949 /T	14.887759	93.600855	-79.38503
2024-Jun-28 21:00 A	15 35 07.06 -46 59 04.7	183.658295 -2.332173	11.581	n.a.	137.5762 /T	78.693674	77.944577	-63.80798
2024-Jun-29 21:00 A	21 38 57.28 +16 25 23.3	81.940652 15.484888	10.959	n.a.	120.2550 /L	237.36926	43.580879	37.407695
2024-Jun-30 21:00 A	23 43 43.27 +38 48 46.0	46.376316 12.505038	14.426	n.a.	85.8883 /L	31.555022	57.463409	72.346525
2024-Jul-01 21:00 A	00 15 07.73 +42 00 33.4	40.173444 11.647333	15.865	n.a.	79.8900 /L	11.405262	61.268324	79.091120
2024-Jul-02 21:00 A	00 28 47.35 +43 09 07.1	38.013151 11.472515	16.714	n.a.	77.8928 /L	6.0006975	62.318161	81.832586
2024-Jul-03 21:00 A	00 36 24.24 +43 43 45.1	37.114930 11.539917	17.300	n.a.	77.1567 /L	3.7850777	62.422731	83.305585
2024-Jul-04 21:00 A	00 41 16.35 +44 04 35.9	36.767018 11.720811	17.742	n.a.	76.9748 /L	2.6549995	62.129726	84.217066
2024-Jul-05 21:00 A	00 44 40.27 +44 18 33.1	36.706046 11.964829	18.091	n.a.	77.0847 /L	1.9966401	61.657870	84.830067
2024-Jul-06 21:00 A	00 47 11.76 +44 28 35.1	36.812259 12.248321	18.378	n.a.	77.3666 /L	1.5772609	61.109930	85.264756
2024-Jul-07 21:00 A	00 49 09.68 +44 36 10.9	37.023454 12.558738	18.619	n.a.	77.7584 /L	1.2924272	60.538323	85.583931
2024-Jul-08 21:00 Am	00 50 44.92 +44 42 10.0	37.304163 12.888819	18.825	n.a.	78.2243 /L	1.0893908	59.970077	85.823763
2024-Jul-09 21:00 Am	00 52 04.19 +44 47 02.0	37.632727 13.234084	19.005	n.a.	78.7426 /L	0.9390561	59.418014	86.006723
2024-Jul-10 21:00 Am	00 53 11.81 +44 51 05.7	37.995208 13.591634	19.163	n.a.	79.2994 /L	0.8242406	58.886490	86.147674
2024-Jul-11 21:00 Am	00 54 10.70 +44 54 33.7	38.382271 13.959520	19.304	n.a.	79.8851 /L	0.7342297	58.374645	86.256976
2024-Jul-12 21:00 Am	00 55 02.89 +44 57 34.5	38.787462 14.336395	19.430	n.a.	80.4933 /L	0.6620397	57.878334	86.342195
2024-Jul-13 21:00 Am	00 55 49.79 +45 00 14.2	39.206209 14.721308	19.543	n.a.	81.1194 /L	0.6029487	57.391280	86.409079
2024-Jul-14 21:00 Am	00 56 32.44 +45 02 37.4	39.635210 15.113579	19.647	n.a.	81.7599 /L	0.5536641	56.905693	86.462156
2024-Jul-15 21:00 Am	00 57 11.60 +45 04 47.1	40.072049 15.512721	19.741	n.a.	82.4124 /L	0.5118271	56.412530	86.505119
2024-Jul-16 21:00 Am	00 57 47.81 +45 06 45.9	40.514942 15.918386	19.828	n.a.	83.0751 /L	0.4757058	55.901502	86.541093
2024-Jul-17 21:00 Am	00 58 21.47 +45 08 35.6	40.962568 16.330332	19.908	n.a.	83.7466 /L	0.4439970	55.360943	86.572845
2024-Jul-18 21:00 Am	00 58 52.89 +45 10 17.6	41.413957 16.748403	19.982	n.a.	84.4259 /L	0.4156940	54.777646	86.602951
2024-Jul-19 21:00 Am	00 59 22.27 +45 11 52.9	41.868410 17.172506	20.050	n.a.	85.1122 /L	0.3899965	54.136775	86.633958
2024-Jul-20 21:00 Am	00 59 49.74 +45 13 22.2	42.325452 17.602609	20.115	n.a.	85.8051 /L	0.3662496	53.421927	86.668503
2024-Jul-21 21:00 Am	01 00 15.39 +45 14 46.0	42.784792 18.038720	20.174	n.a.	86.5043 /L	0.3439051	52.615295	86.709385
2024-Jul-22 21:00 Am	01 00 39.24 +45 16 04.5	43.246297 18.480884	20.230	n.a.	87.2095 /L	0.3225010	51.697732	86.759569
2024-Jul-23 21:00 Am	01 01 01.28 +45 17 17.6	43.709973 18.929174	20.283	n.a.	87.9207 /L	0.3016535	50.648308	86.822085

Column meaning:

TIME

Times PRIOR to 1962 are UT1, a mean-solar time closely related to the prior but now-deprecated GMT. Times AFTER 1962 are in UTC, the current civil or "wall-clock" time-scale. UTC is kept within 0.9 seconds of UT1 using integer leap-seconds for 1972 and later years.

Conversion from the internal Barycentric Dynamical Time (TDB) of solar system dynamics to the non-uniform civil UT time-scale requested for output has not been determined for UTC times after the next July or January 1st. Therefore, the last known leap-second is used as a constant over future intervals.

Time tags refer to the UT time-scale conversion from TDB on Earth regardless of observer location within the solar system, although clock rates may differ due to the local gravity field and no analog to "UT" may be defined for that location.

Any 'b' symbol in the 1st-column denotes a B.C. date. First-column blank (" ") denotes an A.D. date.

CALENDAR SYSTEM

Mixed calendar mode was active such that calendar dates after AD 1582-Oct-15 (if any) are in the modern Gregorian system. Dates prior to 1582-Oct-5 (if any) are in the Julian calendar system, which is automatically extended for dates prior to its adoption on 45-Jan-1 BC. The Julian calendar is useful for matching historical dates. The Gregorian calendar more accurately corresponds to the Earth's orbital motion and seasons. A "Gregorian-only" calendar mode is available if such physical events are the primary interest.

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

SOLAR PRESENCE (OBSERVING SITE)

Time tag is followed by a blank, then a solar-presence symbol:

- '*' Daylight (refracted solar upper-limb on or above apparent horizon)
- 'C' Civil twilight/dawn
- 'N' Nautical twilight/dawn
- 'A' Astronomical twilight/dawn
- ' ' Night OR geocentric ephemeris

LUNAR PRESENCE (OBSERVING SITE)

The solar-presence symbol is immediately followed by a lunar-presence symbol:

- 'm' Refracted upper-limb of Moon on or above apparent horizon
- ' ' Refracted upper-limb of Moon below apparent horizon OR geocentric ephemeris

'R.A._____(ICRF)_____DEC' =

Astrometric right ascension and declination of the target center with respect to the observing site (coordinate origin) in the reference frame of the planetary ephemeris (ICRF). Compensated for down-leg light-time delay aberration.

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  Units: RA  in hours-minutes-seconds of time,    HH MM SS.ff{ffff}
         DEC in degrees-minutes-seconds of arc,  sDD MN SC.f{ffff}

 'Azi____(a-app)___Elev' =

  Airless apparent azimuth and elevation of target center. Compensated for light-time, the gravitational deflection
of light, stellar aberration, precession and nutation. Azimuth is measured clockwise from north:

  North(0) -> East(90) -> South(180) -> West(270) -> North (360)

Elevation angle is with respect to a plane perpendicular to the reference surface local zenith direction. TOPOCENTRIC
ONLY.  Units: DEGREES


 'APmag   S-brt' =

   The asteroids' approximate apparent airless visual magnitude and surface brightness using the standard IAU H-G
system magnitude model:

   APmag = H + 5*log10(delta) + 5*log10(r) - 2.5*log10((1-G)*phi_1 + G*phi_2)

   For solar phase angles >90 deg, the error could exceed 1 magnitude. For phase angles >120 degrees, output values
are rounded to the nearest integer to indicate error could be large and unknown. For Earth-based observers, the
estimated dimming due to atmospheric absorption (extinction) is available as a separate, requestable quantity.

   Surface brightness is the average airless visual magnitude of a square-arcsecond of the illuminated portion of
the apparent disk. It is computed only if the target radius is known.

   Units: MAGNITUDES & MAGNITUDES PER SQUARE ARCSECOND


 'S-O-T /r' =

   Sun-Observer-Target apparent SOLAR ELONGATION ANGLE seen from the observers' location at print-time.

   The '/r' column provides a code indicating the targets' apparent position relative to the Sun in the observers'
sky, as described below:

   Case A: For an observing location on the surface of a rotating body, that body rotational sense is considered:

    /T indicates target TRAILS Sun    (evening sky: rises and sets AFTER Sun)
    /L indicates target LEADS Sun     (morning sky: rises and sets BEFORE Sun)

   Case B: For an observing point that does not have a rotational model (such as a spacecraft), the "leading" and
"trailing" condition is defined by the observers' heliocentric ORBITAL motion:

    * If continuing in the observers' current direction of heliocentric        motion would encounter the targets'
apparent longitude first, followed by the Sun's, the target LEADS the Sun as seen by the observer.

    * If the Sun's apparent longitude would be encountered first, followed by the targets', the target TRAILS the
Sun.

   Two other codes can be output:
    /* indicates observer is Sun-centered    (undefined)
    /? Target is aligned with Sun center     (no lead or trail)

   The S-O-T solar elongation angle is numerically the minimum separation angle of the Sun and target in the sky in
any direction. It does NOT indicate the amount of separation in the leading or trailing directions, which would be
defined along the equator of a spherical coordinate system.

   Units: DEGREES


 'Sky_motion  Sky_mot_PA  RelVel-ANG' =

  Total apparent angular rate of the target in the plane-of-sky. "Sky_mot_PA" is the position angle of the target's
direction of motion in the plane-of-sky, measured counter-clockwise from the apparent of-date north pole direction.
"RelVel-ANG" is the flight path angle of the target's relative motion with respect to the observer's line-of-sight,
in the range [-90,+90], where positive values indicate motion away from the observer, negative values are toward the
observer:

  -90 = target is moving directly toward the observer
    0 = target is moving at right angles to the observer's line-of-sight
  +90 = target is moving directly away from the observer


UNITS:  ARCSECONDS/MINUTE, DEGREES, DEGREES


Computations by ...

    Solar System Dynamics Group, Horizons On-Line Ephemeris System
    4800 Oak Grove Drive, Jet Propulsion Laboratory
    Pasadena, CA  91109   USA

    General site: https://ssd.jpl.nasa.gov/
    Mailing list: https://ssd.jpl.nasa.gov/email_list.html
    System news : https://ssd.jpl.nasa.gov/horizons/news.html
    User Guide  : https://ssd.jpl.nasa.gov/horizons/manual.html
    Connect     : browser        https://ssd.jpl.nasa.gov/horizons/app.html#/x
                  API            https://ssd-api.jpl.nasa.gov/doc/horizons.html
                  command-line   telnet ssd.jpl.nasa.gov 6775
                  e-mail/batch   https://ssd.jpl.nasa.gov/ftp/ssd/hrzn_batch.txt
                  scripts        https://ssd.jpl.nasa.gov/ftp/ssd/SCRIPTS

    Author      : Jon.D.Giorgini@jpl.nasa.gov

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Asteroide 415029 (2011 UL21): https://ssd.jpl.nasa.gov/tools/sbdb_lookup.html#/?sstr=415029

Asteroide (2024 MK): https://ssd.jpl.nasa.gov/tools/sbdb_lookup.html#/?sstr=2024%20MK