Intro | Calendar | Sun | Moon | Planets | Comets | Asteroids | Meteors | Deep-Sky | Satellites

Introduction · Sat-Library · Selected Satellite · Internat. Space Station ISS · Space Shuttle | **Satellites within interval** | Tracking/Identification · (Iridium) Flares · Tumbling Iridium · Geostationary · Radio Amateurs · GPS/GLONASS · Remote Sensing (radar/optical) · Star Chart · Decaying Satellites · Sun/Moon Crossers, Occultations

→ Nightvision-Mode → E-mail & Alert Manager

**Select start of calculation:**

Date: 1 September 2014

Time: 12 : 50 : 00 . 00 ☐ in TDT Now

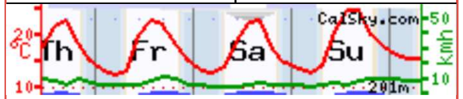
**Select duration:** 15 Minutes go!

geipan

*presly, France*

| | |
|---|---|
| Easting: | 2.3576 |
| Northing: | 47.3892 |
| Time zone: | CET/ CEST |

Astronomer




Weather · Sat-Image



# Bright Satellites

- ◉ Tracking of satellites all over the sky.
- ○ Searching for satellites found within a certain area (given by celestial coordinates and diameter). This point is taken from the last starchart geometry. To change the center and diameter, click **here** (field of view must be at least 1° and at most 90°). Satellites are sorted by ascending elongation from selected center point. For the listed events the conjunction must not take place during the selected time window, but the satellites must be within the search radius. If you are a astro photographer, you can also find the time interval where no LEO satellite will pass through your field of view.

Magnitude cutoff used for the following list: 6 Mag. ( ☐ Manual selection) go!

☑ **Visible or not:** Calculate all passes, day or night, even if not optically visible

## Monday 1 September 2014

| Time (24-hour clock) | Object (Link) | Event |
|---|---|---|

| | | | |
|---|---|---|---|
| | | Observer Site | presly, France<br>WGS84: Lon: +2d21m27.45s Lat: +47d23m21.14s Alt: 248m<br>All times in CET or CEST (during summer) |
| | 12h50m00s | Yaogan 18 (39363 2013-059-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h40m19s** 7.1mag az: 9.2° N horizon<br>**at Meridian** **12h43m57s** 5.5mag az: 0.0° N h:22.7°<br>**Culmination** **12h46m09s** **5.0mag** az:286.3° **WNW** **h:60.5°**<br>distance: 588.9km height above Earth: 518.7km elevation of Sun: +49°<br>angular velocity: 0.74°/s<br>**Disappears** **12h51m55s** 8.3mag az:203.1° SSW horizon<br> |
| | 12h50m00s | Metop A (29499 2006-044-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h41m43s** 7.7mag az: 7.6° N horizon<br>**at Meridian** **12h44m12s** 7.0mag az: 0.0° N h:10.1°<br>**Culmination** **12h49m05s** **6.1mag** az:294.9° **WNW** **h:36.7°**<br>distance: 1266.1km height above Earth: 828.3km elevation of Sun: +49°<br>angular velocity: 0.33°/s<br>**Disappears** **12h56m25s** 8.5mag az:221.8° SW horizon<br> |
| | 12h50m00s | SPOT 7 (40053 2014-034-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h41m56s** 8.0mag az: 9.9° N horizon<br>**at Meridian** **12h46m03s** 6.6mag az: 0.0° N h:23.1°<br>**Culmination** **12h48m53s** **6.1mag** az:288.6° **WNW** **h:58.5°**<br>distance: 811.9km height above Earth: 705.0km elevation of Sun: +49°<br>angular velocity: 0.53°/s<br>**Disappears** **12h55m46s** 9.1mag az:206.8° SSW horizon<br> |
| | 12h50m00s | USA 205/STSS ATRR (34903 2009-023-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h39m54s** 8.4mag az: 31.1° NNE horizon<br>**Culmination** **12h46m27s** **8.3mag** az: 86.7° **E** **h:13.9°**<br>distance: 2256.4km height above Earth: 877.4km elevation of Sun: +49°<br>angular velocity: 11.4'/s<br>**Disappears** **12h52m54s** 9.8mag az:142.1° SE horizon<br> |
| | 12h50m00s | ADEOS 2 H2A Rocket (27601 2002-056-E)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h41m16s** 5.6mag az: 19.8° NNE horizon<br>**Culmination** **12h48m24s** **5.2mag** az: 98.4° **E** **h:41.9°**<br>distance: 1079.2km height above Earth: 766.6km elevation of Sun: +49°<br> |

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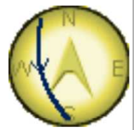
| | | | angular velocity: 0.40°/s<br>**Disappears 12h55m40s** 7.1mag az:176.5° S horizon | |
| | 12h50m00s | Cosmos 2058 (20465 1990-010-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears 12h38m48s** 8.4mag az:161.8° SSE horizon<br>**Culmination 12h44m50s 6.2mag** az: 90.3° **E h:30.1°**<br>distance: 1052.2km height above Earth: 586.5km elevation of Sun: +48°<br>angular velocity: 0.41°/s<br>**Disappears 12h50m52s** 6.8mag az: 19.0° NNE horizon |  |
| | 12h50m00s | Gravity ProbeB (28230 2004-014-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears 12h41m43s** 8.2mag az:189.5° S horizon<br>**Culmination 12h48m19s 5.1mag** az:271.9° **W h:52.1°**<br>distance: 794.2km height above Earth: 643.8km elevation of Sun: +49°<br>angular velocity: 0.54°/s<br>**Disappears 12h54m58s** 6.8mag az:354.6° N horizon |  |
| | 12h50m00s | Cosmos 2233 Rocket (22488 1993-008-B)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears 12h35m48s** 8.1mag az:222.7° SW horizon<br>**Culmination 12h44m02s 6.2mag** az:292.2° **WNW h:28.0°**<br>distance: 1767.4km height above Earth: 996.1km elevation of Sun: +48°<br>angular velocity: 0.24°/s<br>**at Meridian 12h51m40s** 7.2mag az: 0.0° N h:2.3°<br>**Disappears 12h52m18s** 7.3mag az: 2.1° N horizon |  |
| | 12h50m00s | Cosmos 1550 Rocket (14966 1984-043-B)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears 12h40m19s** 8.8mag az:211.8° SSW horizon<br>**Culmination 12h48m45s 6.4mag** az:287.8° **WNW h:38.7°**<br>distance: 1430.3km height above Earth: 979.8km elevation of Sun: +49°<br>angular velocity: 0.30°/s<br>**at Meridian 12h55m43s** 7.5mag az: 0.0° N h:5.5°<br>**Disappears 12h57m17s** 7.8mag az: 4.2° N horizon |  |
| | 12h50m00s | Cosmos 1733 (16611 1986-018-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears 12h40m35s** 7.1mag az:344.0° NNW horizon<br>**Culmination 12h46m35s 5.4mag** az:267.0° **W h:41.6°**<br>distance: 784.0km height above Earth: 545.6km elevation of Sun: +49°<br>angular velocity: 0.56°/s<br>**Disappears 12h52m30s** 8.5mag az:189.5° S horizon |  |

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|---|---|---|
| 12h50m21s | Cosmos 2428 Rocket<br>(31793 2007-029-B)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h42m52s** 5.6mag az:337.7° NNW horizon<br>**at Meridian** **12h46m52s** 4.9mag az: 0.0° N h:14.0°<br>**Culmination** **12h50m21s** **4.8mag** az: 44.6° **NE** **h:23.4°**<br>distance: 1719.6km height above Earth: 855.3km elevation of Sun: +49°<br>angular velocity: 0.26°/s<br>**Disappears** **12h57m46s** 6.8mag az:111.4° ESE horizon<br> |
| 12h50m32s | Spot 4<br>(25260 1998-017-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h43m35s** 7.5mag az: 9.1° N horizon<br>**at Meridian** **12h47m00s** 6.4mag az: 0.0° N h:16.7°<br>**Culmination** **12h50m32s** **5.6mag** az:290.5° **WNW** **h:49.4°**<br>distance: 908.7km height above Earth: 714.9km elevation of Sun: +49°<br>angular velocity: 0.47°/s<br>**Disappears** **12h57m25s** 8.5mag az:211.5° SSW horizon<br> |
| 12h51m39s | Cosmos 1943 Rocket<br>(19120 1988-039-B)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h45m25s** 5.6mag az:315.4° NW horizon<br>**Culmination** **12h51m39s** **5.3mag** az:264.5° **W** **h:12.5°**<br>distance: 2298.8km height above Earth: 851.5km elevation of Sun: +49°<br>angular velocity: 11.3'/s<br>**Disappears** **12h57m52s** 6.7mag az:213.2° SSW horizon<br> |
| 12h52m42s | Sich 1<br>(23657 1995-046-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h46m01s** 8.2mag az:187.1° S horizon<br>**at Meridian** **12h52m34s** 5.8mag az:180.0° S h:84.4°<br>**Culmination** **12h52m42s** **5.6mag** az: 98.5° **E** **h:89.2°**<br>distance: 638.0km height above Earth: 638.2km elevation of Sun: +49°<br>angular velocity: 0.67°/s<br>**Disappears** **12h59m26s** 6.9mag az: 9.9° N horizon<br> |
| 12h53m04s | Cosmos 1464 Rocket<br>(14085 1983-048-B)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h44m38s** 8.4mag az:208.8° SSW horizon<br>**Culmination** **12h53m04s** **5.9mag** az:286.5° **WNW** **h:42.4°**<br>distance: 1329.6km height above Earth: 962.2km elevation of Sun: +49°<br>angular velocity: 0.32°/s<br>**at Meridian** **12h59m41s** 6.9mag az: 0.0° N h:6.7°<br>**Disappears** **13h01m32s** 7.3mag az: 4.6° N horizon<br> |

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| 12h53m29s | USA 238-B/NOSS-3 6(B)<br>(38773 2012-048-P)<br>→Ground track →Star chart | <br>*Daylight pass*<br>**Appears** **12h43m55s** 6.9mag az:318.1° NW horizon<br>**at Meridian** **12h51m42s** 5.5mag az: 0.0° N h:38.5°<br>**Culmination** **12h53m29s** **5.7mag** az: 37.4° **NE** **h:45.8°**<br>distance: 1424.7km height above Earth: 1087.8km elevation of Sun: +49°<br>angular velocity: 0.31°/s<br>**Disappears** **13h02m46s** 8.1mag az:116.5° ESE horizon |
| 12h53m35s | USA 238/NOSS-3 6(A)<br>(38758 2012-048-A)<br>→Ground track →Star chart | <br>*Daylight pass*<br>**Appears** **12h44m00s** 6.9mag az:318.1° NW horizon<br>**at Meridian** **12h51m48s** 5.5mag az: 0.0° N h:38.3°<br>**Culmination** **12h53m35s** **5.7mag** az: 37.2° **NE** **h:45.6°**<br>distance: 1429.4km height above Earth: 1088.1km elevation of Sun: +49°<br>angular velocity: 0.31°/s<br>**Disappears** **13h02m52s** 8.1mag az:116.3° ESE horizon |
| 12h54m01s | Cosmos 921 Rocket (10096 1977-055-B)<br>→Ground track →Star chart | <br>*Daylight pass*<br>**Appears** **12h48m39s** 6.8mag az:355.9° N horizon<br>**at Meridian** **12h49m18s** 6.7mag az: 0.0° N h:2.0°<br>**Culmination** **12h54m01s** **6.4mag** az: 48.4° **NE** **h:10.9°**<br>distance: 1972.4km height above Earth: 642.9km elevation of Sun: +49°<br>angular velocity: 0.23°/s<br>**Disappears** **12h59m19s** 7.8mag az:100.9° E horizon |
| 12h55m51s | Spot 5 (27421 2002-021-A)<br>→Ground track →Star chart | <br>*Daylight pass*<br>**Appears** **12h48m26s** 7.7mag az: 7.4° N horizon<br>**at Meridian** **12h50m55s** 7.0mag az: 0.0° N h:10.1°<br>**Culmination** **12h55m50s** **6.1mag** az:294.5° **WNW** **h:37.3°**<br>distance: 1259.6km height above Earth: 832.3km elevation of Sun: +49°<br>angular velocity: 0.34°/s<br>**Disappears** **13h03m13s** 8.6mag az:221.2° SW horizon |
| 12h55m55s | Cosmos 1400 Rocket<br>(13403 1982-079-B)<br>→Ground track →Star chart | <br>*Daylight pass*<br>**Appears** **12h50m30s** 6.7mag az: 3.7° N horizon<br>**Culmination** **12h55m55s** **6.1mag** az: 65.0° **ENE** **h:15.7°**<br>distance: 1515.8km height above Earth: 564.7km elevation of Sun: +49°<br>angular velocity: 0.29°/s<br>**Disappears** **13h01m23s** 8.0mag az:125.9° SE horizon |

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| 12h56m51s | Kompsat 2 Rocket (29269 2006-031-B)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h50m02s** 7.9mag az: 9.6° N horizon<br>**at Meridian** **12h53m53s** 6.6mag az: 0.0° N h:21.1°<br>**Culmination** **12h56m51s** **6.1mag** az:288.8° **WNW** **h:56.3°**<br>distance: 811.0km height above Earth: 689.1km elevation of Sun: +49°<br>angular velocity: 0.53°/s<br>**Disappears** **13h03m39s** 9.1mag az:207.7° SSW horizon<br> |
| 12h58m07s | ARGOS (25634 1999-008-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h50m25s** 6.7mag az: 10.6° N horizon<br>**at Meridian** **12h54m47s** 5.4mag az: 0.0° N h:22.6°<br>**Culmination** **12h58m07s** **5.0mag** az:290.6° **WNW** **h:55.8°**<br>distance: 989.3km height above Earth: 840.2km elevation of Sun: +49°<br>angular velocity: 0.43°/s<br>**Disappears** **13h05m45s** 7.8mag az:210.2° SSW horizon<br> |
| 12h58m48s | Cosmos 220 Rocket (03230 1968-040-B)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h52m24s** 8.7mag az:217.1° SW horizon<br>**Culmination** **12h58m48s** **5.8mag** az:297.6° **WNW** **h:45.3°**<br>distance: 816.1km height above Earth: 604.2km elevation of Sun: +49°<br>angular velocity: 0.54°/s<br>**at Meridian** **13h01m13s** 6.3mag az: 0.0° N h:22.5°<br>**Disappears** **13h05m21s** 7.8mag az: 18.2° NNE horizon<br> |
| 12h59m36s | Cosmos 1803 (17177 1986-094-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h48m12s** 8.4mag az:211.2° SSW horizon<br>**Culmination** **12h59m36s** **6.3mag** az:289.3° **WNW** **h:46.1°**<br>distance: 1932.3km height above Earth: 1506.1km elevation of Sun: +49° angular velocity: 0.21°/s<br>**at Meridian** **13h07m28s** 6.8mag az: 0.0° N h:12.1°<br>**Disappears** **13h11m06s** 7.3mag az: 8.2° N horizon<br> |
| 12h59m47s | Cosmos 1072 Rocket (11239 1979-003-B)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h51m32s** 8.8mag az:214.7° SW horizon<br>**Culmination** **12h59m47s** **6.5mag** az:289.1° **WNW** **h:35.3°**<br>distance: 1496.1km height above Earth: 966.4km elevation of Sun: +49°<br>angular velocity: 0.28°/s<br>**at Meridian** **13h06m54s** 7.6mag az: 0.0° N h:4.5°<br> |

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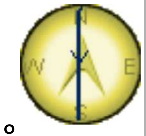
| | | **Disappears** **13h08m12s** 7.8mag az: 3.7° N horizon |
| 12h59m54s | Cosmos 1181 Rocket (11804 1980-039-B)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h51m17s** 8.9mag az:209.6° SSW horizon<br>**Culmination** **12h59m54s** **6.5mag** az:286.9° **WNW** **h:41.9°**<br>distance: 1387.6km height above Earth: 999.3km elevation of Sun: +49°<br>angular velocity: 0.30°/s<br>**at Meridian** **13h06m42s** 7.5mag az: 0.0° N h:6.8°<br>**Disappears** **13h08m34s** 7.8mag az: 4.7° N horizon<br> |
| 13h00m04s | SAR Lupe 2 Rocket (31798 2007-030-B)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h56m28s** 6.4mag az:353.1° N horizon<br>**Culmination** **13h00m04s** **5.3mag** az:295.0° **WNW** **h:11.5°**<br>distance: 1057.8km height above Earth: 290.9km elevation of Sun: +49°<br>angular velocity: 0.42°/s<br>**Disappears** **13h03m37s** 7.2mag az:236.6° WSW horizon<br> |
| 13h00m47s | Cosmos 1092 Rocket (11327 1979-030-B)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h52m06s** 7.3mag az:349.3° N horizon<br>**Culmination** **13h00m47s** **6.3mag** az:264.5° **W** **h:76.1°**<br>distance: 987.0km height above Earth: 962.2km elevation of Sun: +49°<br>angular velocity: 0.44°/s<br>**at Meridian** **13h07m13s** 8.6mag az:180.0° S h:8.6°<br>**Disappears** **13h09m21s** 8.9mag az:179.0° S horizon<br> |
| 13h01m22s | Nadezhda 4 Rocket (23180 1994-041-B)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h52m41s** 7.3mag az:347.9° NNW horizon<br>**Culmination** **13h01m21s** **6.1mag** az:267.0° **W** **h:61.1°**<br>distance: 1087.6km height above Earth: 970.9km elevation of Sun: +49°<br>angular velocity: 0.40°/s<br>**Disappears** **13h09m52s** 8.8mag az:185.5° S horizon<br> |
| 13h02m19s | NOSS 3-6 Rocket (38770 2012-048-N)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h57m24s** 5.2mag az:303.0° WNW horizon<br>**Culmination** **13h02m19s** **4.9mag** az:248.3° **WSW** **h:12.3°**<br>distance: 1667.5km height above Earth: 547.8km elevation of Sun: +50°<br>angular velocity: 0.27°/s<br>**Disappears** **13h07m28s** 6.6mag az:194.3° SSW horizon<br> |

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| 13h02m38s | Cosmos 1656 (15755 1985-042-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h54m35s** 7.1mag az:332.8° NNW horizon<br>**at Meridian** **13h02m13s** 5.6mag az: 0.0° N h:75.8°<br>**Culmination** **13h02m38s** **6.1mag** az: 63.0° **ENE** **h:83.5°**<br>distance: 826.9km height above Earth: 822.4km elevation of Sun: +50°<br>angular velocity: 0.53°/s<br>**Disappears** **13h10m29s** 8.7mag az:152.9° SSE horizon  |
| 13h03m41s | Cosmos 2428 (31792 2007-029-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h57m17s** 6.1mag az:338.0° NNW horizon<br>**at Meridian** **13h00m36s** 5.7mag az: 0.0° N h:8.1°<br>**Culmination** **13h03m41s** **5.6mag** az: 30.5° **NNE** **h:11.7°**<br>distance: 2373.3km height above Earth: 863.4km elevation of Sun: +50°<br>angular velocity: 11.2'/s<br>**Disappears** **13h10m05s** 6.8mag az: 82.8° E horizon  |
| 13h03m53s | Cosmos 2034 Rocket (20150 1989-059-B)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h55m12s** 8.5mag az:206.3° SSW horizon<br>**Culmination** **13h03m53s** **6.0mag** az:285.7° **WNW** **h:46.8°**<br>distance: 1306.3km height above Earth: 1006.5km elevation of Sun: +50° angular velocity: 0.32°/s<br>**at Meridian** **13h10m20s** 6.9mag az: 0.0° N h:8.8°<br>**Disappears** **13h12m42s** 7.4mag az: 5.5° N horizon  |
| 13h04m20s | Cosmos 2322 (23704 1995-058-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h57m15s** 7.1mag az:338.2° NNW horizon<br>**at Meridian** **13h00m51s** 6.5mag az: 0.0° N h:10.8°<br>**Culmination** **13h04m20s** **6.4mag** az: 38.8° **NE** **h:17.3°**<br>distance: 2015.5km height above Earth: 857.6km elevation of Sun: +50°<br>angular velocity: 0.22°/s<br>**Disappears** **13h11m20s** 8.0mag az: 99.3° E horizon  |
| 13h04m59s | Cosmos 1346 (13120 1982-027-A)<br>→Ground track →Star chart | *Daylight pass*<br>**Appears** **12h59m23s** 7.4mag az:348.9° N horizon<br>**at Meridian** **13h04m22s** 5.1mag az: 0.0° N h:58.1°<br>**Culmination** **13h04m59s** **5.9mag** az: 78.9° **E** **h:83.1°**<br>distance: 465.2km height above Earth: 462.3km elevation of Sun: +50°<br>angular velocity: 0.96°/s  |

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| | | **Disappears** **13h10m31s** 9.1mag az:168.6° SSE horizon |

36 Items/Events: Export to Outlook/iCal Print E-mail

☐ Hide glossary

## Glossary:

**Time**

The local time in 24-hour format at which the satellite is visible at its best. The satellite may be observable *before* this time. 0:00 or 0h00m is midnight, 12h is noon, 18h is 6 pm. The time zone is the one indicated on the left of the Earth icon on top of (almost) each page. Daylight saving is applied automatically.

**Appears**

Local time at which the satellite appears visually. The first figure indicates the **visual brightness** of the object. The smaller the number, the brighter and more eye-catching it appears to an observer. The units are astronomical magnitudes [m]. **Azimuth** is given in degrees counting from geographic north clockwise to the east direction. The three-character direction code is given as well. In case the satellite exits from the Earth shadow and comes into the glare of the Sun, the elevation above horizon is given in degrees for this event. If this figure is omitted, the satellite is visible straight from the horizon.


**Culmination**

Time at which the satellite reaches his highest point in the sky as seen from the observer. For description of the figures see **Appears**.

Visually "better" passes of satellites are indicated by highlighting the information. The selection within the list of all possible transits is coupled with the observer level, the daylight, and several other conditions.

**at Meridian**

Time of the transit of the meridian, i.e. the satellite is due South or due North. At this time, the satellite will not reach its highest point of the pass. Look for culmination.

**Disappears**

Local time of visual disappearance of the satellite. This may either be the time at which the satellite moves below the observer's horizon or the entry of the object in the shadow of Earth (the elevation is given for this event). The low Earth orbiting (LEO) satellites are usually visible for about 10 seconds more than the listed time, when they start fading rapidly.

**Magnitude/Mag:**

The magnitude indicates the **visual brightness** of an object. The brightest star (Sirius) reaches -1.4m, whereas 6m is the limit of the unaided eye. Venus, the brightest planet, reaches -4m. The Moon at first quarter is -8m, about the same magnitude that the brightest Iridium flares can produce.

**Object**

The name and identification information of the satellite. Besides the name, the number in the catalog of the USSPACECOM is given (5-digits code, called Satellite, NORAD or NASA Catalog Number and USSPACECOM object number), and the International Designator Code in the form launch year - launch number of the year - launch part (usually one launch produces several orbiting objects). The laster is also called COSPAR designation and NSSDC ID.

**Spy Satellites:**

Satellites with name **USA** are US military satellites (common names e.g., Keyhole KH, Lacrosse).

**Close to Moon/Sun**

The satellite is closer than 1.5 degrees from the center of the Moon or the Sun, but the satellite does not cross in front of the Moon/Sun. The direction and distance to the center line on Earth is given. *For the Sun, move to the indicated center line position and observer with proper equipment. By no means observe the Sun without special filters!*

**Crosses the disk of Moon/Sun:**

The satellite passes in front of the Moon or the Sun; the event may be observed using a small telescope (equipped with special mylar filters for the Sun only!), especially if the event takes place in broad daylight. The direction and distance to the center line on Earth is given. Moon phases are not checked for. The timing may slightly change due to the quality and age of the used orbital elements and active orbit maintenance. *By no means observe the Sun without special filters!* Please feel free to report successful observations!

**Separation**

Angular distance of an object (e.g., star) with regard of the reference object (e.g., main star or center of moon), measured among the center of figures. Often, this value is given for the closest distance among two objects.

**Position Angle / PA**

Angle, defining a position on an apparent disk or the position of e.g. a dimmer star (or the anti-solar point for lunar eclipses) with regard of the main star or the center of disk. It is counted around the reference points (center of disk/brighter star) from *celestial north* direction 0° to east (left) 90°, south 180° to wes t (right) 270° in counter clockwise direction.

**Position Angle rel. Vertex**

Angle, defining a position on an apparent disk. It is counted around the reference points (center of disk) from local up, *zenith* direction 0° to east (left) 90°, south 180° to wes t (right) 270° in counter clockwise direction.

**Clock-face Direction**

In a simple clock-face coordinate system with the clock face superimposed on the satellite itself, with 12:00 o'clock being at the top and 9:00 o'clock being at the left, the satellite will seem to move toward the given direction. This number is helpful when observing with binoculars.

**Daylight pass**

This satellite pass over the observer is taking place on broad daylight and cannot be observed without special equipment (automated guided telescope or radio ham equipment).

**Radio pass**
: The satellite is not outside the shadow of Earth during the whole pass (hence not lighted by the Sun) and is therefore not visible. However, using radio equipment, the satellite can be detected.

**Ascending/descending Orbit:**
: Satellites are orbiting around the earth center. Therefore the point on the Earth surface "below" the satellite (i.e., the sub-satellite point) crosses the equator twice every orbit. The part of the orbit with northernbound motion component is called ascending, and a southernbound motion is called descending.

**Rise**
: The satellites rises above the horizon of the observer (cf. **Appear** for visual rising of the satellite).

**Set**
: The satellites sets below the horizon of the observer, but may not have been visible before (cf. **Disappear**).

**Side-look**
: Time at which the observer is passing exactly at the side of the satellite (as seen from the satellite).

**Off-Nadir**
: Angle at which the observer appears from the nadir (down direction) as seen from the satellite.

**Squint angle**
: Angle relative to the satellite orbit; flight direction is 0°. The angle is counted clockwise, with ri ght looking at 90° and left looking at 270°.

**Range**
: Distance to the satellite.

**0-Doppler / Zero-Doppler**
: Time at which the range between satellite and observer does not change, i.e., the range rate is zero.

**Forecasted Decay:**
: All Earth orbiting satellites are exposed to atmospheric drag, which lowers the orbit. Usually, this is countermeasured by frequent firings of the rocket engines - as long there is propulsion available. At an altitude of about 120 km, the objects are destroyed in the atmosphere by a fiery play; the over 100 km long light trace is visible even at daylight. Predications however are difficult. CalSky calculates the evolution of the satellite elements and the time of final decay based on SatEvo by Alan Pickup.

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