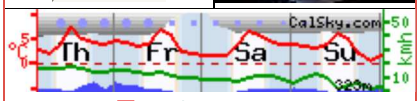
Select start of calculation:
Date: 31 December 2013
Time: 17 : 20 : 00 . 00 in TDT Now
Select duration: 15 Minutes go!

geipan
saint michel , France
Easting: 6.8879
Northing: 48.3165
Time zone: CET/ CEST
Astronomer



Weather · Sat-Image
Local Sponsors: Your name?

The Calendar-Sky

The astronomical calendar contains **thousands of events per day** for every point on Earth. We know that you only care for a very few of these events and hence we let you personalize your own Astro-Calendar. You may primarily do so by switching to your appropriate user level, and by selecting some of the three dozens categories.

In parentheses are forced limits for the maximum calculation interval. The celestial calendar is to be found further below on this page and will appear within some seconds after pressing the *Go!*-Button (depending on the complexity of your selections). The calendar is created especially for you. The higher your user level, the more complex objects you selected, the longer it does take to calculate. *Please do not press the reload-button*; the calculations will take significantly longer.

Calendar and Timekeeping
- ☐ Space Calendar: Birthdays, Rocket Launches
- ☐ Local Events (Talks, Exhibitions)
- ☐ NASA TV Guide
- ☐ Local Telescope Dealers
- ☐ Public Holidays
- ☐ Saint's Day
- ☐ Zodiac of today. Change of Zodiac
- ☐ Islamic, Indian, Persian and Hebrew Calendar
- ☐ Week Number
- ☐ Sundials / GPS Time / Current Time Definitions
- ☐ Julian Day Number
- ☐ Sidereal Time
- ☐ Local Magnetic Field

General events
- ☐ Lunar Occultations (2 months)
- ☑ Planetary Conjunctions
- ☐ Lunar Eclipses
- ☐ Solar Eclipses and Transits
- ☐ Meteor Streams
- ☑ Planetary Phenomena
- ☑ Lunar Phenomena
- ☐ The Sun
- ☑ Asteroids (6 months)
- ☐ Comets

Earth orbiting satellites
- ☑ Space Station ISS (1 month)
- ☑ short duration Flares of Iridium satellites (14 days)
- ☑ Passes of other bright satellites (*1 day*, slow!)

Daily reoccurring events
- ☑ Sun and Moon
- ☑ Planets
- ☐ Asteroids
- ☐ Comets
- ☐ Meteor Streams
- ☐ Polar Star Transits
- ☐ Weather Balloons

Dimmer and more difficult objects
- ☐ Jupiter: Great Red Spot and satellite events
- ☐ Jupiter's Satellites: position
- ☐ Saturn: Satellite events and storms
- ☐ Saturn's Satellites: position
- ☐ Zodiacal light/Gegenschein
- ☐ Variable Stars (3 months)
- ☐ Supernovae
- ☐ Binary Stars

Deep sky objects
- ☐ Milky Way
- ☐ Galaxies
- ☐ Open Star Clusters
- ☐ Globular Star Clusters
- ☐ Nebula

go!

Tuesday 31 December 2013

Time (24-hour clock)	Object (Link)	Event
	Observer Site	saint michel , France WGS84: Lon: +6d53m16.68s Lat: +48d18m59.67s Alt: 372m All times in CET or CEST (during summer)
17h20m00s	Fengyun 3B LMr (37215 2010-059-B) →Ground track →Star chart	**Appears** **17h05m32s** 7.1mag az:147.2° SSE horizon **Culmination** **17h12m59s** **3.9mag** az: 68.3° **ENE** **h:50.9°** distance: 995.0km height above Earth: 799.7km elevation of Sun: -4° angular velocity: 0.41°/s **at Meridian** **17h16m31s** 5.3mag az: 0.0° N h:19.1° **Disappears** **17h20m20s** 6.8mag az:349.7° N horizon

17h20m00s	USA 144 Deb (25746 1999-028-C) →Ground track →Star chart	**Appears** **16h40m58s** 7.8mag az:319.4° NW horizon **Culmination** **17h02m21s** **6.4mag** az:239.6° **WSW** **h:72.8°** distance: 3247.6km height above Earth: 3150.7km elevation of Sun: -3° angular velocity: 7.03'/s **at Meridian** **17h06m52s** 6.5mag az:180.0° S h:57.0° **Disappears** **17h23m21s** 7.8mag az:157.8° SSE horizon
17.3h	♀Venus	Magnitude=-4.4mag Best seen from 9.2h -18.2h (h_{top}=23° at S at 13.7h) (in constellation Sagittarius) RA=19h53m25s Dec=-18°19.2' (J2000) Distance=0.281AU Elongation= 17° Phase k=4% Diameter=59.4"
17.3h	♀Venus	Magnitude=-4.4mag Best seen from 9.3h -18.3h (h_{top}=23° at S at 13.8h) (in constellation Sagittarius) RA=19h53m25s Dec=-18°19.2' (J2000) Distance=0.281AU Elongation= 17° Phase k=4% Diameter=59.4"
17.3h	♃Jupiter	Magnitude=-2.7mag Best seen from 17.2h - 8.4h (h_{top}=64° at S at 1.0h) (in constellation Gemini) RA= 7h09m18s Dec=+22°36.3' (J2000) Distance=4.213AU Elongation=174° Diameter=46.7"
17h20m07s	ADEOS 2 (27597 2002-056-A) →Ground track →Star chart	**Appears** **17h13m04s** 5.8mag az:131.3° SE horizon **Culmination** **17h20m07s** **3.6mag** az: 62.6° **ENE** **h:28.9°** distance: 1446.6km height above Earth: 810.2km elevation of Sun: -5° angular velocity: 0.29°/s **at Meridian** **17h25m33s** 5.3mag az: 0.0° N h:6.1° **Disappears** **17h27m10s** 5.8mag az:354.4° N horizon
17h20m23s	Cosmos 1461 (14064 1983-044-A) →Ground track →Star chart	**Appears** **17h13m54s** 7.4mag az:325.2° NW horizon **at Meridian** **17h18m42s** 5.1mag az: 0.0° N h:22.9° **Culmination** **17h20m23s** **4.5mag** az: 38.5° **NE** **h:29.9°** distance: 1068.9km height above Earth: 594.8km elevation of Sun: -5° angular velocity: 0.42°/s **Disappears** **17h26m29s** 6.7mag az:112.5° ESE horizon
17h21m08s	Iridium 12	Flare from MMA0 (Front antenna) **Magnitude= 3.6mag** Azimuth=281.1° W altitude= 22.6° in constellation Hercules RA=18h00.5m Dec=+23°56' Flare angle=2.43° **Flare center line, closest point** →MapIt: Longitude=4.793°E Latitude=+48.613° (WGS84) **Distance=157.8 km** Azimuth=282.8° WNW Peak Magnitude=-6.4mag Satellite above: longitude=11.5°W latitude=+49.3° height above Earth=784.2 km distance to satellite=1627.4 km Altitude of Sun=-5.6°
17h22m27s	Cosmos 1758 (16791 1986-046-A) →Ground track →Star chart	**Appears** **17h16m11s** 7.4mag az:349.0° N horizon **Culmination** **17h22m27s** **4.4mag** az:262.1° **W** **h:81.0°** distance: 576.3km height above Earth: 570.2km elevation of Sun: -6° angular velocity: 0.78°/s **at Meridian** **17h23m56s** 5.6mag az:180.0° S h:38.8° **Disappears** **17h28m44s** 8.2mag az:174.8° S horizon
17h22m33s	NOSS 4 (E) (13844 1983-008-E) →Ground track →Star chart	**Appears** **17h17m15s** 11.7mag az:211.9° SSW horizon **at Meridian** **17h21m56s** 6.5mag az:180.0° S h:49.4° **Culmination** **17h22m33s** **5.7mag** az:127.4° **SE** **h:62.8°** distance: 484.5km height above Earth: 435.0km elevation of Sun: -6° angular velocity: 0.93°/s **Disappears** **17h26m34s** 8.2mag az: 45.0° NE h:6.7°

17h23m13s	USA 238-B/NOSS-3 6(B) (38773 2012-048-P) →Ground track →Star chart	**Appears** **17h14m05s** 9.1mag az:279.4° W horizon **Culmination** **17h23m13s** **5.8mag** az:346.8° **NNW** **h:25.6°** distance: 2060.3km height above Earth: 1123.9km elevation of Sun: -6° angular velocity: 0.20°/s **at Meridian** **17h24m15s** 5.7mag az: 0.0° N h:24.8° **Disappears** **17h30m04s** 6.3mag az: 47.0° NE h:6.4°
17h23m18s	USA 238/NOSS-3 6(A) (38758 2012-048-A) →Ground track →Star chart	**Appears** **17h14m09s** 9.1mag az:279.2° W horizon **Culmination** **17h23m18s** **5.8mag** az:346.6° **NNW** **h:25.7°** distance: 2057.3km height above Earth: 1123.8km elevation of Sun: -6° angular velocity: 0.20°/s **at Meridian** **17h24m20s** 5.7mag az: 0.0° N h:24.8° **Disappears** **17h30m08s** 6.3mag az: 46.9° NE h:6.4°
17h24m	Sun	End civil twilight
17h25m12s	Cosmos 1206 Rocket (11933 1980-069-B) →Ground track →Star chart	**Appears** **17h20m45s** 6.3mag az: 3.5° N horizon **Culmination** **17h25m12s** **4.4mag** az: 68.4° **ENE** **h:16.3°** distance: 1049.1km height above Earth: 369.1km elevation of Sun: -6° angular velocity: 0.43°/s **Disappears** **17h29m36s** 6.4mag az:133.3° SE horizon
17h25m43s	Iridium 12	Flare from MMA1 (Right antenna) **Magnitude= 1.5mag** Azimuth=227.1° SW altitude= 7.7° in constellation Capricornus RA=20h11.4m Dec=-20°25' Flare angle=1.66° (Flare center not on earth) Satellite above: longitude=11°W latitude=+31° height above Earth=780.7 km distance to satellite=2514.8 km Altitude of Sun=-6.3°
17h26m05s	NOSS 3-4 Rocket (31702 2007-027-B) →Ground track →Star chart	**Appears** **17h18m33s** 10.3mag az:251.1° WSW horizon **Culmination** **17h26m05s** **4.1mag** az:326.7° **NNW** **h:35.7°** distance: 1281.1km height above Earth: 823.4km elevation of Sun: -6° angular velocity: 0.33°/s **at Meridian** **17h27m40s** 3.9mag az: 0.0° N h:30.1° **Disappears** **17h32m34s** 5.1mag az: 37.7° NE h:5.2°
17h28m05s	Resurs 1-3 (23342 1994-074-A) →Ground track →Star chart	**Appears** **17h21m34s** 7.9mag az:153.1° SSE horizon **Culmination** **17h28m05s** **4.3mag** az: 71.4° **ENE** **h:57.4°** distance: 749.1km height above Earth: 643.1km elevation of Sun: -7° angular velocity: 0.56°/s **at Meridian** **17h30m46s** 5.8mag az: 0.0° N h:22.4° **Disappears** **17h34m40s** 7.6mag az:350.0° N horizon
17h28m17s	Cosmos 1151 Rocket (11672 1980-005-B) →Ground track →Star chart	**Appears** **17h21m50s** 6.9mag az:355.8° N horizon **at Meridian** **17h23m17s** 6.4mag az: 0.0° N h:5.8° **Culmination** **17h28m17s** **4.1mag** az: 74.5° **ENE** **h:40.2°** distance: 890.5km height above Earth: 608.5km elevation of Sun: -7° angular velocity: 0.50°/s **Disappears** **17h34m37s** 7.2mag az:153.0° SSE horizon
17h31m30s	CUSAT 1 (39266 2013-055-B) →Ground track →Star chart	**Appears** **17h22m08s** 4.4mag az:349.4° N horizon **at Meridian** **17h24m50s** 3.9mag az: 0.0° N h:5.9° **Culmination** **17h31m30s** **3.0mag** az: 43.6° **NE** **h:15.3°** distance: 2957.5km height above Earth: 1327.3km elevation of Sun: -7° angular velocity: 8.34'/s **Disappears** **17h37m38s** 3.4mag az: 89.2° E h:5.4°
17h33m23s	SJ 6C LMr Deb (29508 2006-046-D) →Ground track →Star chart	**Appears** **17h27m21s** 7.8mag az:158.7° SSE horizon **Culmination** **17h33m23s** **3.9mag** az: 73.9° **ENE** **h:68.6°** distance: 592.7km height above Earth: 555.7km elevation of Sun: -7° angular velocity: 0.71°/s

		at Meridian **17h35m03s** 5.0mag az: 0.0° N h:32.9° **Disappears** **17h39m28s** 7.4mag az:349.4° N horizon
17h34m11s	USA 173/NOSS 3-2A (28095 2003-054-A) →Ground track →Star chart	**Appears** **17h25m27s** 10.6mag az:258.9° W horizon **Culmination** **17h34m11s** **5.5mag** az:333.0° **NNW** **h:34.3°** distance: 1662.2km height above Earth: 1065.2km elevation of Sun: -7° angular velocity: 0.25°/s **at Meridian** **17h35m50s** 5.4mag az: 0.0° N h:30.7° **Disappears** **17h41m30s** 6.4mag az: 40.7° NE h:6.7°

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

Used satellite data set is from 1 January 2014

Hide glossary

Glossary:

Altitude/alt/h
Angular separation of the object from the local mathematical horizon. This accounts for refraction as well.

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.

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.

Azimuth/az
Azimuth direction of the object is given in degrees counting from geographic north (0°) clockwise to the east direction. East is 90°, south 180°, and west 270°. The three-character direction code is given as well. For example, NNW stands for north-north-west.

Best seen between / h_{max}
This is the best visibility time interval of the object, and the time is rounded to the next decimal hour; e.g. 6.4h corresponds to about 6:15 (hh:mm) to 6:20, and 18.9h to about 18:50 to 18:55. The calculation takes into account the magnitude of the object (required elevation above horizon), and the elevation of the Sun. The time is given in local civil time (LCT), i.e., the time zone and definitions as selected by you. h_{max} is the maximum altitude over the horizon, that the object reaches during this time period.

Civil Twilight
The times are the moments of beginning/end of the civil twilight, i.e., the moments the Sun reaches a depression of 6° below the horizon. On clear weather, no significant dim-out can be distinguished compared to the time of sunset/sunrise.

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.

Dec., declination, DE
One coordinate used to indicate the position on the sky. It is the angular distance of the object from the celestial equator. North pole, close to Polaris, is 90° north.

Diameter
Diameter is the geocentric apparent angular diameter of a celestial object (topocentric for artificial satellites). The value is given in seconds of arc for planets and satellites, and in minutes of arc for Sun and Moon.

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.

Elongation
The elongation is the angular separation a celestial body and the central body (Sun, for moons: Jupiter or Saturn), as seen from the Earth mass center.

Flare angle
The angle between the direction of the mirrored image of the Sun and the observer. For bright flares, this angle must be as small as possible (i.e., the observer should be as close to the center line as possible).

Flare
The communication antennas and the solar panels reflect the sunlight almost as a perfect mirror. In case the observer lays within this reflected beam, the satellite suddenly appears very bright, as bright as the Moon in the first quarter; the light is even strong enough to cast shadows. Since the sunlight is bundled, the duration of the whole event is short, and lasts about 10 seconds. The indicated time is the center of the flare event; hence the satellite can be spotted some seconds earlier. Due to the shortness of the event, it is important to look in the right direction at the right time.

Iridium
Wireless worldwide communication system, which consists of 66 satellites that are in low Earth orbits. The user who has a rather small phone directly contacts one of the satellites, i.e., one of the three **Main Mission Antennas MMA** (the three panels in the bottom of the image with a size of about 1x2m^2). The satellites constellation consists of 6 planes with 11 satellites each (and some spares). Hence, another Iridium satellite passes at about the same place in the sky every 8 minutes.

J2000, precession, nutation
The plains of ecliptic and equator shift with time by perturbations from the Sun, Moon and planets. The long-term shift is called precession; the short periodic variations are called nutation. The given celestial coordinates are referred to the true direction of the vernal equinox and the true obliquity of the ecliptic to the standard reference time 1 January 2000. For this date many star charts and coordinate tables are printed.

Magnitude/Mag
Brightness of an object considered as a point source of light, on a logarithmic scale.\ Visual limiting magnitude is about 6mag, whereas the brightest star Sirius reaches -1.4mag. The Hubble Space Telescope can image objects as dim as 29mag.

Phase
Ratio of the illuminated fraction of the apparent planetary or lunar disk to its entire area.

R.A., right ascension, RA
One coordinate used to indicate the position on the sphere. It is the angular distance of the object from the spring equinox measured along the celestial equator, expressed in hours of arc.

Sat above
Geographic coordinates of the sub-satellite point (in WGS84 coordinates). This is the point on Earth, from which the satellite is in the zenith at the indicated time. The altitude of the satellite from this point is given as "**alt**".

Time and Date
Date of validity of calculated output in local time and date, taking into account daylight saving time as well (see the current time zone on the left of the Earth icon on top right of almost all pages). The time is given as hours:minutes:seconds, or 00h00m00s. The time may also be rounded and given in decimal form, in order to correspond to the accuracy of the calculation: e.g., 10.1h means that the event will take place at about 5 minutes past 10 o'clock. This may also happen for days: 4.3d corresponds to the fourth day at around 7 o'clock. The start time is taken as selected by you, i.e., this is *not* necessarily at midnight. For intervals shorter than one day, decimal days are given. Times are given in 24 hour format (0h00m is midnight, 12h: noon, 18h: 6 pm.)

WGS84 / Geographical Coordinates
Geographical coordinates are given by the angles longitude (Lon), latitude (Lat), and altitude in meters (Alt). A place north of the equator at marked by N or +, places south of the equator by S or -. The longitude from the meridian of Greenwich is counted positive towards east (E). Places west from Greenwich are marked W or by -. The geographical coordinates refer to an ellipsoid, which fits the true shape of the Earth (geoid). The geoid corresponds to calm sea surface. The keyword "Geographic:" uses the local ellipsoid as reference system. WGS84 mark coordinates referring to the WGS84 ellipsoid. The difference in altitude to the geoid sums up to 100 meters and is called geoid undulation. This is corrected for when tagged "MSL" (mean sea level), such that the origin of the height system is at sea level.

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