



# Astrodienst Ephemeris Tables for the year 2013

tropical geocentric zodiac

contains Sun, Moon, Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Pluto, True Node, Moon's Node, Lilith, Chiron

Programming  
Dieter Koch and Alois Treindl  
based on Swiss Ephemeris  
Code D5EPH

ASTRODIENST EPHEMERIS for the year 2013  
geocentric

JANUARY 2013

00:00 UT

| Day  | Sid.t   | ☉        | ☾     | ♂     | ♀     | ♂     | ♂     | ♂     | ♂    | ♂    | ♂     | ♂      | ♂     | ♂     | ♂    | Day  |
|------|---------|----------|-------|-------|-------|-------|-------|-------|------|------|-------|--------|-------|-------|------|------|
| T 1  | 6 43 15 | 10°34'48 | 20°46 | 0°38  | 19°46 | 4°41  | 7°46  | 9°33  | 4°46 | 1°4  | 9°19  | 25°R 0 | 23°36 | 12°17 | 6°2  | T 1  |
| W 2  | 6 47 11 | 11°44'56 | 3°24  | 2°11  | 21°1  | 5°28  | 7°41  | 9°37  | 4°47 | 1°6  | 9°21  | 24°53  | 23°33 | 12°24 | 6°5  | W 2  |
| T 3  | 6 51 8  | 12°46'05 | 16°15 | 3°44  | 22°16 | 6°15  | 7°35  | 9°42  | 4°48 | 1°8  | 9°24  | 24°48  | 23°30 | 12°30 | 6°8  | T 3  |
| F 4  | 6 55 4  | 13°47'14 | 29°21 | 5°18  | 23°31 | 7°2   | 7°30  | 9°46  | 4°49 | 1°9  | 9°26  | 24°44  | 23°26 | 12°37 | 6°10 | F 4  |
| S 5  | 6 59 1  | 14°48'23 | 12°44 | 6°51  | 24°46 | 7°50  | 7°25  | 9°51  | 4°50 | 1°11 | 9°28  | 24°D43 | 23°23 | 12°44 | 6°13 | S 5  |
| S 6  | 7 2 57  | 15°49'32 | 26°26 | 8°26  | 26°1  | 8°37  | 7°20  | 9°55  | 4°51 | 1°13 | 9°30  | 24°44  | 23°20 | 12°50 | 6°16 | S 6  |
| M 7  | 7 6 54  | 16°50'42 | 10°29 | 10°0  | 27°17 | 9°24  | 7°15  | 9°59  | 4°52 | 1°14 | 9°32  | 24°45  | 23°17 | 12°57 | 6°19 | M 7  |
| T 8  | 7 10 50 | 17°51'52 | 24°51 | 11°35 | 28°32 | 10°11 | 7°11  | 10°3  | 4°54 | 1°16 | 9°34  | 24°R45 | 23°14 | 13°4  | 6°21 | T 8  |
| W 9  | 7 14 47 | 18°53'02 | 9°32  | 13°10 | 29°47 | 10°59 | 7°6   | 10°7  | 4°55 | 1°18 | 9°36  | 24°44  | 23°10 | 13°10 | 6°24 | W 9  |
| T 10 | 7 18 44 | 19°54'12 | 24°26 | 14°46 | 1°2   | 11°46 | 7°2   | 10°11 | 4°56 | 1°20 | 9°38  | 24°41  | 23°7  | 13°17 | 6°27 | T 10 |
| F 11 | 7 22 40 | 20°55'21 | 9°27  | 16°22 | 2°17  | 12°33 | 6°58  | 10°15 | 4°58 | 1°22 | 9°40  | 24°35  | 23°4  | 13°24 | 6°30 | F 11 |
| S 12 | 7 26 37 | 21°56'31 | 24°25 | 17°59 | 3°32  | 13°21 | 6°54  | 10°19 | 4°59 | 1°23 | 9°43  | 24°27  | 23°1  | 13°30 | 6°33 | S 12 |
| S 13 | 7 30 33 | 22°57'40 | 9°11  | 19°36 | 4°48  | 14°8  | 6°51  | 10°23 | 5°1  | 1°25 | 9°45  | 24°18  | 22°58 | 13°37 | 6°36 | S 13 |
| M14  | 7 34 30 | 23°58'49 | 23°38 | 21°14 | 6°3   | 14°55 | 6°47  | 10°26 | 5°2  | 1°27 | 9°47  | 24°8   | 22°55 | 13°44 | 6°39 | M14  |
| T 15 | 7 38 26 | 24°59'57 | 7°38  | 22°52 | 7°18  | 15°43 | 6°44  | 10°30 | 5°4  | 1°29 | 9°49  | 23°58  | 22°51 | 13°50 | 6°42 | T 15 |
| W16  | 7 42 23 | 26°1'05  | 21°10 | 24°30 | 8°33  | 16°30 | 6°41  | 10°33 | 5°5  | 1°31 | 9°51  | 23°51  | 22°48 | 13°57 | 6°46 | W16  |
| T 17 | 7 46 20 | 27°2'11  | 4°15  | 26°9  | 9°48  | 17°17 | 6°38  | 10°37 | 5°7  | 1°33 | 9°53  | 23°46  | 22°45 | 14°4  | 6°49 | T 17 |
| F 18 | 7 50 16 | 28°3'17  | 16°53 | 27°49 | 11°4  | 18°5  | 6°36  | 10°40 | 5°9  | 1°35 | 9°55  | 23°44  | 22°42 | 14°10 | 6°52 | F 18 |
| S 19 | 7 54 13 | 29°4'22  | 29°11 | 29°29 | 12°19 | 18°52 | 6°33  | 10°43 | 5°11 | 1°37 | 9°57  | 23°D43 | 22°39 | 14°17 | 6°55 | S 19 |
| S 20 | 7 58 9  | 0°5'26   | 11°13 | 1°10  | 13°34 | 19°40 | 6°31  | 10°46 | 5°12 | 1°39 | 9°59  | 23°43  | 22°35 | 14°24 | 6°59 | S 20 |
| M21  | 8 2 6   | 1°6'30   | 23°5  | 2°51  | 14°49 | 20°27 | 6°29  | 10°49 | 5°14 | 1°41 | 10°1  | 23°R44 | 22°32 | 14°30 | 7°2  | M21  |
| T 22 | 8 6 2   | 2°7'32   | 4°52  | 4°33  | 16°4  | 21°15 | 6°27  | 10°52 | 5°16 | 1°43 | 10°3  | 23°43  | 22°29 | 14°37 | 7°5  | T 22 |
| W23  | 8 9 59  | 3°8'34   | 16°39 | 6°15  | 17°20 | 22°2  | 6°25  | 10°55 | 5°18 | 1°45 | 10°5  | 23°40  | 22°26 | 14°44 | 7°9  | W23  |
| T 24 | 8 13 55 | 4°9'35   | 28°31 | 7°58  | 18°35 | 22°49 | 6°24  | 10°57 | 5°20 | 1°47 | 10°7  | 23°35  | 22°23 | 14°50 | 7°12 | T 24 |
| F 25 | 8 17 52 | 5°10'34  | 10°30 | 9°41  | 19°50 | 23°37 | 6°23  | 11°0  | 5°22 | 1°49 | 10°9  | 23°27  | 22°20 | 14°57 | 7°15 | F 25 |
| S 26 | 8 21 49 | 6°11'33  | 22°39 | 11°25 | 21°5  | 24°24 | 6°22  | 11°2  | 5°24 | 1°51 | 10°11 | 23°16  | 22°16 | 15°4  | 7°19 | S 26 |
| S 27 | 8 25 45 | 7°12'31  | 5°0   | 13°9  | 22°20 | 25°12 | 6°21  | 11°5  | 5°26 | 1°53 | 10°13 | 23°3   | 22°13 | 15°10 | 7°22 | S 27 |
| M28  | 8 29 42 | 8°13'28  | 17°33 | 14°54 | 23°35 | 25°59 | 6°20  | 11°7  | 5°29 | 1°55 | 10°15 | 22°50  | 22°10 | 15°17 | 7°26 | M28  |
| T 29 | 8 33 38 | 9°14'24  | 0°18  | 16°39 | 24°51 | 26°47 | 6°20  | 11°9  | 5°31 | 1°58 | 10°17 | 22°36  | 22°7  | 15°24 | 7°29 | T 29 |
| W30  | 8 37 35 | 10°15'19 | 13°14 | 18°24 | 26°6  | 27°34 | 6°D20 | 11°11 | 5°33 | 2°0  | 10°19 | 22°25  | 22°4  | 15°30 | 7°33 | W30  |
| T 31 | 8 41 31 | 11°16'13 | 26°22 | 20°10 | 27°21 | 28°21 | 6°I20 | 11°13 | 5°35 | 2°2  | 10°21 | 22°15  | 22°1  | 15°37 | 7°36 | T 31 |

Delta T = 66.91 sec

FEBRUARY 2013

00:00 UT

| Day  | Sid.t    | ☉        | ☾     | ♂      | ♀     | ♂     | ♂     | ♂      | ♂    | ♂    | ♂     | ♂      | ♂     | ♂     | ♂    | Day  |
|------|----------|----------|-------|--------|-------|-------|-------|--------|------|------|-------|--------|-------|-------|------|------|
| F 1  | 8 45 28  | 12°17'07 | 9°40  | 21°55  | 28°36 | 29°9  | 6°I20 | 11°15  | 5°38 | 2°4  | 10°22 | 22°R 9 | 21°57 | 15°43 | 7°40 | F 1  |
| S 2  | 8 49 24  | 13°18'00 | 23°10 | 23°41  | 29°51 | 29°56 | 6°20  | 11°17  | 5°40 | 2°6  | 10°24 | 22°15  | 21°54 | 15°50 | 7°44 | S 2  |
| S 3  | 8 53 21  | 14°18'52 | 6°51  | 25°26  | 1°6   | 0°44  | 6°21  | 11°19  | 5°42 | 2°8  | 10°26 | 22°4   | 21°51 | 15°57 | 7°47 | S 3  |
| M 4  | 8 57 18  | 15°19'43 | 20°45 | 27°11  | 2°22  | 1°31  | 6°22  | 11°20  | 5°45 | 2°11 | 10°28 | 22°4   | 21°48 | 16°3  | 7°51 | M 4  |
| T 5  | 9 1 14   | 16°20'33 | 4°52  | 28°56  | 3°37  | 2°18  | 6°23  | 11°22  | 5°47 | 2°13 | 10°30 | 22°4   | 21°45 | 16°10 | 7°55 | T 5  |
| W 6  | 9 5 11   | 17°21'23 | 19°12 | 0°39   | 4°52  | 3°6   | 6°24  | 11°23  | 5°50 | 2°15 | 10°32 | 22°2   | 21°41 | 16°17 | 7°58 | W 6  |
| T 7  | 9 9 7    | 18°22'12 | 3°41  | 2°21   | 6°7   | 3°53  | 6°25  | 11°24  | 5°52 | 2°17 | 10°33 | 21°57  | 21°38 | 16°23 | 8°2  | T 7  |
| F 8  | 9 13 4   | 19°23'00 | 18°17 | 4°2    | 7°22  | 4°41  | 6°27  | 11°26  | 5°55 | 2°19 | 10°35 | 21°50  | 21°35 | 16°30 | 8°6  | F 8  |
| S 9  | 9 17 0   | 20°23'46 | 2°52  | 5°41   | 8°37  | 5°28  | 6°29  | 11°27  | 5°58 | 2°22 | 10°37 | 21°40  | 21°32 | 16°37 | 8°9  | S 9  |
| S 10 | 9 20 57  | 21°24'32 | 17°20 | 7°17   | 9°53  | 6°15  | 6°31  | 11°28  | 6°0  | 2°24 | 10°39 | 21°28  | 21°29 | 16°43 | 8°13 | S 10 |
| M11  | 9 24 53  | 22°25'16 | 1°34  | 8°51   | 11°8  | 7°3   | 6°33  | 11°28  | 6°3  | 2°26 | 10°40 | 21°15  | 21°26 | 16°50 | 8°17 | M11  |
| T 12 | 9 28 50  | 23°25'58 | 15°28 | 10°21  | 12°23 | 7°50  | 6°36  | 11°29  | 6°6  | 2°28 | 10°42 | 21°3   | 21°22 | 16°57 | 8°21 | T 12 |
| W13  | 9 32 47  | 24°26'39 | 28°58 | 11°46  | 13°38 | 8°37  | 6°38  | 11°30  | 6°8  | 2°31 | 10°44 | 20°53  | 21°19 | 17°3  | 8°25 | W13  |
| T 14 | 9 36 43  | 25°27'19 | 12°4  | 13°7   | 14°53 | 9°25  | 6°41  | 11°30  | 6°11 | 2°33 | 10°45 | 20°45  | 21°16 | 17°10 | 8°28 | T 14 |
| F 15 | 9 40 40  | 26°27'57 | 24°45 | 14°23  | 16°8  | 10°12 | 6°44  | 11°31  | 6°14 | 2°35 | 10°47 | 20°41  | 21°13 | 17°17 | 8°32 | F 15 |
| S 16 | 9 44 36  | 27°28'33 | 7°6   | 15°32  | 17°23 | 10°59 | 6°47  | 11°31  | 6°17 | 2°37 | 10°49 | 20°38  | 21°10 | 17°23 | 8°36 | S 16 |
| S 17 | 9 48 33  | 28°29'07 | 19°10 | 16°35  | 18°38 | 11°47 | 6°51  | 11°31  | 6°20 | 2°40 | 10°50 | 20°D38 | 21°7  | 17°30 | 8°40 | S 17 |
| M18  | 9 52 29  | 29°29'40 | 1°11  | 17°30  | 19°53 | 12°34 | 6°54  | 11°32  | 6°22 | 2°42 | 10°52 | 20°R38 | 21°3  | 17°37 | 8°44 | M18  |
| T 19 | 9 56 26  | 0°30'11  | 12°53 | 18°17  | 21°8  | 13°21 | 6°58  | 11°R32 | 6°25 | 2°44 | 10°53 | 20°37  | 21°0  | 17°43 | 8°48 | T 19 |
| W20  | 10 0 22  | 1°30'40  | 24°41 | 18°55  | 22°24 | 14°8  | 7°2   | 11°31  | 6°28 | 2°47 | 10°55 | 20°35  | 20°57 | 17°50 | 8°51 | W20  |
| T 21 | 10 4 19  | 2°31'08  | 6°35  | 19°24  | 23°39 | 14°56 | 7°6   | 11°31  | 6°31 | 2°49 | 10°56 | 20°31  | 20°54 | 17°57 | 8°55 | T 21 |
| F 22 | 10 8 16  | 3°31'33  | 18°39 | 19°43  | 24°54 | 15°43 | 7°10  | 11°31  | 6°34 | 2°51 | 10°58 | 20°23  | 20°51 | 18°3  | 8°59 | F 22 |
| S 23 | 10 12 12 | 4°31'57  | 0°56  | 19°R52 | 26°9  | 16°30 | 7°15  | 11°31  | 6°37 | 2°53 | 10°59 | 20°13  | 20°47 | 18°10 | 9°3  | S 23 |
| S 24 | 10 16 9  | 5°32'19  | 13°28 | 19°51  | 27°24 | 17°17 | 7°19  | 11°30  | 6°40 | 2°56 | 11°0  | 20°1   | 20°44 | 18°17 | 9°7  | S 24 |
| M25  | 10 20 5  | 6°32'39  | 26°17 | 19°40  | 28°39 | 18°4  | 7°24  | 11°30  | 6°43 | 2°58 | 11°2  | 19°49  | 20°41 | 18°23 | 9°11 | M25  |
| T 26 | 10 24 2  | 7°32'57  | 9°22  | 19°19  | 29°54 | 18°51 | 7°29  | 11°29  | 6°46 | 3°0  | 11°3  | 19°36  | 20°38 | 18°30 | 9°15 | T 26 |
| W27  | 10 27 58 | 8°33'14  | 22°41 | 18°50  | 1°9   | 19°38 | 7°35  | 11°28  | 6°49 | 3°3  | 11°5  | 19°25  | 20°35 | 18°37 | 9°19 | W27  |
| T 28 | 10 31 55 | 9°33'29  | 6°12  | 18°12  | 2°24  | 20°25 | 7°I40 | 11°27  | 6°53 | 3°4  | 11°6  | 19°16  | 20°32 | 18°43 | 9°22 | T 28 |

Delta T = 66.94 sec

## ASTRODIENST EPHEMERIS for the year 2013

geocentric

MARCH 2013

00:00 UT

| Day  | Sid.t    | ☉                      | ☽                   | ♀                   | ♂                  | ♂                   | ♂                   | ♂                   | ♂                  | ♂                  | ♂                   | ♂                   | ♂                   | ♂                   | ♂                   | Day  |
|------|----------|------------------------|---------------------|---------------------|--------------------|---------------------|---------------------|---------------------|--------------------|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|------|
| F 1  | 10 35 51 | 10 <sup>h</sup> 33'42" | 19 <sup>h</sup> 54' | 17°R27              | 3 <sup>h</sup> 38' | 21 <sup>h</sup> 12' | 7 <sup>h</sup> 45'  | 11°R26              | 6 <sup>h</sup> 56' | 3 <sup>h</sup> 7'  | 11 <sup>h</sup> 7'  | 19°R10              | 20 <sup>h</sup> 28' | 18 <sup>h</sup> 50' | 9 <sup>h</sup> 26'  | F 1  |
| S 2  | 10 39 48 | 11°33'54"              | 3 <sup>h</sup> 43'  | 16 <sup>h</sup> 35' | 4°53'              | 21°59'              | 7°51'               | 11 <sup>h</sup> 25' | 6°59'              | 3°9'               | 11°8'               | 19 <sup>h</sup> 7'  | 20°25'              | 18°57'              | 9°30'               | S 2  |
| S 3  | 10 43 44 | 12°34'04"              | 17°39'              | 15°39'              | 6°8'               | 22°46'              | 7°57'               | 11°24'              | 7°2'               | 3°12'              | 11°10'              | 19°D 6              | 20°22'              | 19°3'               | 9°34'               | S 3  |
| M 4  | 10 47 41 | 13°34'13"              | 1 <sup>h</sup> 39'  | 14°40'              | 7°23'              | 23°33'              | 8°3'                | 11°22'              | 7°5'               | 3°14'              | 11°11'              | 19°6'               | 20°19'              | 19°10'              | 9°38'               | M 4  |
| T 5  | 10 51 38 | 14°34'20"              | 15°44'              | 13°38'              | 8°38'              | 24°20'              | 8°9'                | 11°21'              | 7°9'               | 3°16'              | 11°12'              | 19°R 6              | 20°16'              | 19°17'              | 9°42'               | T 5  |
| W 6  | 10 55 34 | 15°34'26"              | 29°52'              | 12°36'              | 9°53'              | 25°7'               | 8°16'               | 11°20'              | 7°12'              | 3°18'              | 11°13'              | 19°5'               | 20°13'              | 19°23'              | 9°46'               | W 6  |
| T 7  | 10 59 31 | 16°34'30"              | 14 <sup>h</sup> 2'  | 11°36'              | 11°8'              | 25°54'              | 8°22'               | 11°18'              | 7°15'              | 3°21'              | 11°14'              | 19°2'               | 20°9'               | 19°30'              | 9°50'               | T 7  |
| F 8  | 11 3 27  | 17°34'33"              | 28°13'              | 10°37'              | 12°23'             | 26°41'              | 8°29'               | 11°16'              | 7°18'              | 3°23'              | 11°15'              | 18°57'              | 20°6'               | 19°37'              | 9°53'               | F 8  |
| S 9  | 11 7 24  | 18°34'34"              | 12 <sup>h</sup> 20' | 9°42'               | 13°38'             | 27°27'              | 8°36'               | 11°14'              | 7°22'              | 3°25'              | 11°17'              | 18°49'              | 20°3'               | 19°43'              | 9°57'               | S 9  |
| S 10 | 11 11 20 | 19°34'33"              | 26°21'              | 8°51'               | 14°53'             | 28°14'              | 8°43'               | 11°13'              | 7°25'              | 3°27'              | 11°18'              | 18°39'              | 20°0'               | 19°50'              | 10°1'               | S 10 |
| M 11 | 11 15 17 | 20°34'31"              | 10 <sup>h</sup> 10' | 8°5'                | 16°8'              | 29°1'               | 8°50'               | 11°11'              | 7°28'              | 3°29'              | 11°19'              | 18°29'              | 19°57'              | 19°57'              | 10°5'               | M 11 |
| T 12 | 11 19 13 | 21°34'26"              | 23°44'              | 7°25'               | 17°22'             | 29°47'              | 8°57'               | 11°9'               | 7°31'              | 3°32'              | 11°20'              | 18°20'              | 19°53'              | 20°3'               | 10°9'               | T 12 |
| W 13 | 11 23 10 | 22°34'20"              | 6 <sup>h</sup> 59'  | 6°51'               | 18°37'             | 0 <sup>h</sup> 34'  | 9°4'                | 11°6'               | 7°35'              | 3°34'              | 11°21'              | 18°11'              | 19°50'              | 20°10'              | 10°13'              | W 13 |
| T 14 | 11 27 7  | 23°34'11"              | 19°55'              | 6°24'               | 19°52'             | 1°21'               | 9°12'               | 11°4'               | 7°38'              | 3°36'              | 11°21'              | 18°5'               | 19°47'              | 20°17'              | 10°16'              | T 14 |
| F 15 | 11 31 3  | 24°34'01"              | 2 <sup>h</sup> 32'  | 6°3'                | 21°7'              | 2°7'                | 9°20'               | 11°2'               | 7°41'              | 3°38'              | 11°22'              | 18°2'               | 19°44'              | 20°23'              | 10°20'              | F 15 |
| S 16 | 11 35 0  | 25°33'48"              | 14°51'              | 5°48'               | 22°22'             | 2°54'               | 9°28'               | 10°59'              | 7°45'              | 3°40'              | 11°23'              | 18°D 0              | 19°41'              | 20°30'              | 10°24'              | S 16 |
| S 17 | 11 38 56 | 26°33'33"              | 26°56'              | 5°40'               | 23°36'             | 3°40'               | 9°36'               | 10°57'              | 7°48'              | 3°42'              | 11°24'              | 18°1'               | 19°38'              | 20°37'              | 10°28'              | S 17 |
| M 18 | 11 42 53 | 27°33'16"              | 8 <sup>h</sup> 51'  | 5°D38               | 24°51'             | 4°27'               | 9°44'               | 10°54'              | 7°52'              | 3°45'              | 11°25'              | 18°2'               | 19°34'              | 20°43'              | 10°31'              | M 18 |
| T 19 | 11 46 49 | 28°32'57"              | 20°41'              | 5°42'               | 26°6'              | 5°13'               | 9°52'               | 10°51'              | 7°55'              | 3°47'              | 11°26'              | 18°3'               | 19°31'              | 20°50'              | 10°35'              | T 19 |
| W 20 | 11 50 46 | 29°32'36"              | 2 <sup>h</sup> 31'  | 5°52'               | 27°21'             | 6°0'                | 10°0'               | 10°49'              | 7°58'              | 3°49'              | 11°26'              | 18°R 3              | 19°28'              | 20°57'              | 10°39'              | W 20 |
| T 21 | 11 54 42 | 0 <sup>h</sup> 32'12"  | 14°26'              | 6°7'                | 28°35'             | 6°46'               | 10°9'               | 10°46'              | 8°2'               | 3°51'              | 11°27'              | 18°2'               | 19°25'              | 21°3'               | 10°43'              | T 21 |
| F 22 | 11 58 39 | 1°31'46"               | 26°31'              | 6°27'               | 29°50'             | 7°33'               | 10°18'              | 10°43'              | 8°5'               | 3°53'              | 11°28'              | 17°59'              | 19°22'              | 21°10'              | 10°46'              | F 22 |
| S 23 | 12 2 36  | 2°31'18"               | 8 <sup>h</sup> 51'  | 6°52'               | 1°Y 5              | 8°19'               | 10°26'              | 10°40'              | 8°9'               | 3°55'              | 11°28'              | 17°54'              | 19°18'              | 21°17'              | 10°50'              | S 23 |
| S 24 | 12 6 32  | 3°30'47"               | 21°29'              | 7°22'               | 2°19'              | 9°5'                | 10°35'              | 10°37'              | 8°12'              | 3°57'              | 11°29'              | 17°47'              | 19°15'              | 21°23'              | 10°54'              | S 24 |
| M 25 | 12 10 29 | 4°30'14"               | 4 <sup>h</sup> 28'  | 7°56'               | 3°34'              | 9°51'               | 10°44'              | 10°34'              | 8°15'              | 3°59'              | 11°30'              | 17°40'              | 19°12'              | 21°30'              | 10°57'              | M 25 |
| T 26 | 12 14 25 | 5°29'39"               | 17°47'              | 8°35'               | 4°48'              | 10°37'              | 10°54'              | 10°30'              | 8°19'              | 4°1'               | 11°30'              | 17°32'              | 19°9'               | 21°37'              | 11°1'               | T 26 |
| W 27 | 12 18 22 | 6°29'02"               | 1 <sup>h</sup> 25'  | 9°17'               | 6°3'               | 11°24'              | 11°3'               | 10°27'              | 8°22'              | 4°3'               | 11°31'              | 17°26'              | 19°6'               | 21°43'              | 11°4'               | W 27 |
| T 28 | 12 22 18 | 7°28'23"               | 15°20'              | 10°3'               | 7°18'              | 12°10'              | 11°12'              | 10°24'              | 8°26'              | 4°5'               | 11°31'              | 17°21'              | 19°3'               | 21°50'              | 11°8'               | T 28 |
| F 29 | 12 26 15 | 8°27'42"               | 29°28'              | 10°52'              | 8°32'              | 12°56'              | 11°22'              | 10°20'              | 8°29'              | 4°7'               | 11°32'              | 17°17'              | 18°59'              | 21°57'              | 11°12'              | F 29 |
| S 30 | 12 30 11 | 9°26'59"               | 13 <sup>h</sup> 45' | 11°44'              | 9°47'              | 13°42'              | 11°31'              | 10°17'              | 8°33'              | 4°9'               | 11°32'              | 17°D16              | 18°56'              | 22°3'               | 11°15'              | S 30 |
| S 31 | 12 34 8  | 10°Y26'14"             | 28 <sup>h</sup> 5'  | 12 <sup>h</sup> 40' | 11°Y 1             | 14°Y28              | 11 <sup>h</sup> 41' | 10 <sup>h</sup> 13' | 8°Y36              | 4 <sup>h</sup> 11' | 11 <sup>h</sup> 33' | 17 <sup>h</sup> 17' | 18 <sup>h</sup> 53' | 22 <sup>h</sup> 10' | 11 <sup>h</sup> 19' | S 31 |

Delta T = 66.97 sec

APRIL 2013

00:00 UT

| Day  | Sid.t    | ☉                     | ☽                   | ♀                   | ♂                  | ♂                  | ♂                   | ♂                  | ♂      | ♂                  | ♂                   | ♂                   | ♂                   | ♂                   | ♂                   | Day  |
|------|----------|-----------------------|---------------------|---------------------|--------------------|--------------------|---------------------|--------------------|--------|--------------------|---------------------|---------------------|---------------------|---------------------|---------------------|------|
| M 1  | 12 38 4  | 11°Y25'27"            | 12 <sup>h</sup> 25' | 13 <sup>h</sup> 38' | 12°Y16             | 15°Y14             | 11 <sup>h</sup> 51' | 10°R 9             | 8°Y39  | 4 <sup>h</sup> 13' | 11 <sup>h</sup> 33' | 17°R18              | 18 <sup>h</sup> 50' | 22 <sup>h</sup> 17' | 11 <sup>h</sup> 22' | M 1  |
| T 2  | 12 42 1  | 12°24'39"             | 26°41'              | 14°40'              | 13°30'             | 16°0'              | 12°1'               | 10 <sup>h</sup> 6' | 8°43'  | 4°15'              | 11°33'              | 17°19'              | 18°47'              | 22°23'              | 11°25'              | T 2  |
| W 3  | 12 45 58 | 13°23'49"             | 10 <sup>h</sup> 52' | 15°43'              | 14°45'             | 16°45'             | 12°11'              | 10°2'              | 8°46'  | 4°17'              | 11°34'              | 17°R20              | 18°44'              | 22°30'              | 11°29'              | W 3  |
| T 4  | 12 49 54 | 14°22'57"             | 24°56'              | 16°50'              | 15°59'             | 17°31'             | 12°21'              | 9°58'              | 8°50'  | 4°19'              | 11°34'              | 17°20'              | 18°40'              | 22°37'              | 11°32'              | T 4  |
| F 5  | 12 53 51 | 15°22'04"             | 8 <sup>h</sup> 52'  | 17°59'              | 17°14'             | 18°17'             | 12°31'              | 9°54'              | 8°53'  | 4°20'              | 11°34'              | 17°18'              | 18°37'              | 22°43'              | 11°36'              | F 5  |
| S 6  | 12 57 47 | 16°21'08"             | 22°37'              | 19°10'              | 18°28'             | 19°3'              | 12°42'              | 9°50'              | 8°57'  | 4°22'              | 11°34'              | 17°14'              | 18°34'              | 22°50'              | 11°39'              | S 6  |
| S 7  | 13 1 44  | 17°20'11"             | 6 <sup>h</sup> 12'  | 20°23'              | 19°42'             | 19°48'             | 12°52'              | 9°46'              | 9°0'   | 4°24'              | 11°35'              | 17°10'              | 18°31'              | 22°57'              | 11°42'              | S 7  |
| M 8  | 13 5 40  | 18°19'12"             | 19°34'              | 21°38'              | 20°57'             | 20°34'             | 13°3'               | 9°42'              | 9°3'   | 4°26'              | 11°35'              | 17°5'               | 18°28'              | 23°3'               | 11°46'              | M 8  |
| T 9  | 13 9 37  | 19°18'11"             | 2°Y42               | 22°55'              | 22°11'             | 21°20'             | 13°13'              | 9°38'              | 9°7'   | 4°28'              | 11°35'              | 17°1'               | 18°24'              | 23°10'              | 11°49'              | T 9  |
| W 10 | 13 13 33 | 20°17'08"             | 15°36'              | 24°15'              | 23°26'             | 22°5'              | 13°24'              | 9°34'              | 9°10'  | 4°29'              | 11°35'              | 16°57'              | 18°21'              | 23°17'              | 11°52'              | W 10 |
| T 11 | 13 17 30 | 21°16'03"             | 28°15'              | 25°36'              | 24°40'             | 22°51'             | 13°35'              | 9°30'              | 9°13'  | 4°31'              | 11°35'              | 16°55'              | 18°18'              | 23°23'              | 11°55'              | T 11 |
| F 12 | 13 21 27 | 22°14'56"             | 10 <sup>h</sup> 40' | 26°59'              | 25°54'             | 23°36'             | 13°46'              | 9°26'              | 9°17'  | 4°33'              | 11°35'              | 16°53'              | 18°15'              | 23°30'              | 11°58'              | F 12 |
| S 13 | 13 25 23 | 23°13'48"             | 22°52'              | 28°24'              | 27°9'              | 24°21'             | 13°57'              | 9°21'              | 9°20'  | 4°34'              | 11°R35              | 16°D53              | 18°12'              | 23°37'              | 12°2'               | S 13 |
| S 14 | 13 29 20 | 24°12'37"             | 4 <sup>h</sup> 53'  | 29°50'              | 28°23'             | 25°7'              | 14°8'               | 9°17'              | 9°24'  | 4°36'              | 11°35'              | 16°54'              | 18°9'               | 23°43'              | 12°5'               | S 14 |
| M 15 | 13 33 16 | 25°11'23"             | 16°47'              | 1°Y19               | 29°37'             | 25°52'             | 14°19'              | 9°13'              | 9°27'  | 4°38'              | 11°35'              | 16°56'              | 18°5'               | 23°50'              | 12°8'               | M 15 |
| T 16 | 13 37 13 | 26°10'08"             | 28°37'              | 2°49'               | 0 <sup>h</sup> 51' | 26°37'             | 14°31'              | 9°8'               | 9°30'  | 4°39'              | 11°35'              | 16°58'              | 18°2'               | 23°57'              | 12°11'              | T 16 |
| W 17 | 13 41 9  | 27°8'51"              | 10 <sup>h</sup> 52' | 4°21'               | 2°6'               | 27°23'             | 14°42'              | 9°4'               | 9°34'  | 4°41'              | 11°35'              | 16°59'              | 17°59'              | 24°3'               | 12°14'              | W 17 |
| T 18 | 13 45 6  | 28°7'31"              | 22°22'              | 5°54'               | 3°20'              | 28°8'              | 14°54'              | 9°0'               | 9°37'  | 4°42'              | 11°35'              | 17°0'               | 17°56'              | 24°10'              | 12°17'              | T 18 |
| F 19 | 13 49 2  | 29°6'09"              | 4 <sup>h</sup> 26'  | 7°30'               | 4°34'              | 28°53'             | 15°5'               | 8°55'              | 9°40'  | 4°44'              | 11°35'              | 17°R 0              | 17°53'              | 24°17'              | 12°20'              | F 19 |
| S 20 | 13 52 59 | 0 <sup>h</sup> 4'45"  | 16°46'              | 9°7'                | 5°48'              | 29°38'             | 15°17'              | 8°51'              | 9°43'  | 4°45'              | 11°34'              | 16°59'              | 17°49'              | 24°23'              | 12°23'              | S 20 |
| S 21 | 13 56 56 | 1°3'19"               | 29°23'              | 10°45'              | 7°2'               | 0 <sup>h</sup> 23' | 15°28'              | 8°46'              | 9°47'  | 4°47'              | 11°34'              | 16°58'              | 17°46'              | 24°30'              | 12°25'              | S 21 |
| M 22 | 14 0 52  | 2°1'50"               | 12 <sup>h</sup> 23' | 12°25'              | 8°16'              | 1°8'               | 15°40'              | 8°42'              | 9°50'  | 4°48'              | 11°34'              | 16°56'              | 17°43'              | 24°37'              | 12°28'              | M 22 |
| T 23 | 14 4 49  | 3°0'19"               | 25°47'              | 14°7'               | 9°30'              | 1°53'              | 15°52'              | 8°37'              | 9°53'  | 4°50'              | 11°34'              | 16°54'              | 17°40'              | 24°43'              | 12°31'              | T 23 |
| W 24 | 14 8 45  | 3°58'46"              | 9 <sup>h</sup> 25'  | 15°51'              | 10°45'             | 2°38'              | 16°4'               | 8°33'              | 9°56'  | 4°51'              | 11°33'              | 16°52'              | 17°37'              | 24°50'              | 12°34'              | W 24 |
| T 25 | 14 12 42 | 4°57'12"              | 23°45'              | 17°36'              | 11°59'             | 3°22'              | 16°16'              | 8°28'              | 9°59'  | 4°52'              | 11°33'              | 16°51'              | 17°34'              | 24°57'              | 12°36'              | T 25 |
| F 26 | 14 16 38 | 5°55'35"              | 8 <sup>h</sup> 13'  | 19°23'              | 13°13'             | 4°7'               | 16°28'              | 8°24'              | 10°3'  | 4°54'              | 11°33'              | 16°50'              | 17°30'              | 25°3'               | 12°39'              | F 26 |
| S 27 | 14 20 35 | 6°53'57"              | 22°54'              | 21°12'              | 14°27'             | 4°52'              | 16°40'              | 8°19'              | 10°6'  | 4°55'              | 11°32'              | 16°D50              | 17°27'              | 25°10'              | 12°42'              | S 27 |
| S 28 | 14 24 31 | 7°52'17"              | 7 <sup>h</sup> 41'  | 23°2'               | 15°41'             | 5°36'              | 16°52'              | 8°14'              | 10°9'  | 4°56'              | 11°32'              | 16°51'              | 17°24'              | 25°17'              | 12°44'              | S 28 |
| M 29 | 14 28 28 | 8°50'35"              | 22°27'              | 24°54'              | 16°55'             | 6°21'              | 17°5'               | 8°10'              | 10°12' | 4°58'              | 11°31'              | 16°51'              | 17°21'              | 25°23'              | 12°47'              | M 29 |
| T 30 | 14 32 25 | 9 <sup>h</sup> 48'52" | 7 <sup>h</sup> 5'   | 26°Y48              | 18 <sup>h</sup> 9' | 7 <sup>h</sup> 6'  | 17 <sup>h</sup> 17' | 8 <sup>h</sup> 5'  | 10°Y15 | 4 <sup>h</sup> 59' | 11 <sup>h</sup> 31' | 16 <sup>h</sup> 52' | 17 <sup>h</sup> 18' | 25 <sup>h</sup> 30' | 12 <sup>h</sup> 49' | T 30 |

Delta T = 67.00 sec

# ASTRODIENST EPHEMERIS for the year 2013

## geocentric

MAY 2013

00:00 UT

| Day  | Sid.t    | ☉          | ☽      | ♀       | ♂       | ♂      | ♂       | ♂     | ♂      | ♂     | ♂      | ♂      | ♂      | ♂       | ♂      | Day  |
|------|----------|------------|--------|---------|---------|--------|---------|-------|--------|-------|--------|--------|--------|---------|--------|------|
| W 1  | 14 36 21 | 10°34'07"  | 21°31' | 28°44'  | 19°23'  | 7°50'  | 17°29'  | 8°R 1 | 10°18' | 5°H 0 | 11°R30 | 16°M52 | 17°M15 | 25°II37 | 12°H52 | W 1  |
| T 2  | 14 40 18 | 11°45'21"  | 5°34'  | 0°34'   | 20°37'  | 8°35'  | 17°42'  | 7°M56 | 10°21' | 5° 1  | 11°30' | 16°53' | 17°11' | 25°43'  | 12°54' | T 2  |
| F 3  | 14 44 14 | 12°43'33"  | 19°33' | 2°40'   | 21°50'  | 9°19'  | 17°54'  | 7°52' | 10°24' | 5° 2  | 11°29' | 16°R53 | 17° 8  | 25°50'  | 12°56' | F 3  |
| S 4  | 14 48 11 | 13°41'44"  | 3°H 8  | 4°41'   | 23° 4   | 10° 3  | 18° 7   | 7°47' | 10°27' | 5° 3  | 11°28' | 16°52' | 17° 5  | 25°57'  | 12°59' | S 4  |
| S 5  | 14 52 7  | 14°39'53"  | 16°25' | 6°43'   | 24°18'  | 10°48' | 18°19'  | 7°43' | 10°30' | 5° 4  | 11°28' | 16°52' | 17° 2  | 26° 3   | 13° 1  | S 5  |
| M 6  | 14 56 4  | 15°38'01"  | 29°26' | 8°47'   | 25°32'  | 11°32' | 18°32'  | 7°38' | 10°33' | 5° 6  | 11°27' | 16°52' | 16°59' | 26°10'  | 13° 3  | M 6  |
| T 7  | 15 0 0   | 16°36'07"  | 12°12' | 10°52'  | 26°46'  | 12°16' | 18°45'  | 7°34' | 10°36' | 5° 7  | 11°26' | 16°D52 | 16°55' | 26°17'  | 13° 5  | T 7  |
| W 8  | 15 3 57  | 17°34'12"  | 24°45' | 12°58'  | 28° 0   | 13° 0  | 18°57'  | 7°29' | 10°39' | 5° 8  | 11°26' | 16°52' | 16°52' | 26°23'  | 13° 7  | W 8  |
| T 9  | 15 7 53  | 18°32'16"  | 7°H 6  | 15° 6   | 29°14'  | 13°44' | 19°10'  | 7°25' | 10°42' | 5° 8  | 11°25' | 16°52' | 16°49' | 26°30'  | 13°10' | T 9  |
| F 10 | 15 11 50 | 19°30'18"  | 19°17' | 17°15'  | 0°II28  | 14°28' | 19°23'  | 7°20' | 10°45' | 5° 9  | 11°24' | 16°R52 | 16°46' | 26°37'  | 13°12' | F 10 |
| S 11 | 15 15 47 | 20°28'18"  | 1°II19 | 19°25'  | 1°41'   | 15°12' | 19°36'  | 7°16' | 10°48' | 5°10  | 11°23' | 16°52' | 16°43' | 26°43'  | 13°14' | S 11 |
| S 12 | 15 19 43 | 21°26'17"  | 13°15' | 21°35'  | 2°55'   | 15°56' | 19°49'  | 7°12' | 10°50' | 5°11  | 11°23' | 16°52' | 16°40' | 26°50'  | 13°16' | S 12 |
| M13  | 15 23 40 | 22°24'14"  | 25° 6  | 23°46'  | 4° 9    | 16°40' | 20° 2   | 7° 7  | 10°53' | 5°12  | 11°22' | 16°51' | 16°36' | 26°57'  | 13°17' | M13  |
| T 14 | 15 27 36 | 23°22'10"  | 6°55'  | 25°57'  | 5°23'   | 17°24' | 20°15'  | 7° 3  | 10°56' | 5°13  | 11°21' | 16°50' | 16°33' | 27° 4   | 13°19' | T 14 |
| W15  | 15 31 33 | 24°20'03"  | 18°46' | 28° 7   | 6°36'   | 18° 8  | 20°28'  | 6°59' | 10°59' | 5°14  | 11°20' | 16°49' | 16°30' | 27°10'  | 13°21' | W15  |
| T 16 | 15 35 29 | 25°17'55"  | 0°II41 | 0°II18  | 7°50'   | 18°52' | 20°41'  | 6°54' | 11° 1  | 5°14  | 11°19' | 16°48' | 16°27' | 27°17'  | 13°23' | T 16 |
| F 17 | 15 39 26 | 26°15'46"  | 12°45' | 2°28'   | 9° 4    | 19°35' | 20°54'  | 6°50' | 11° 4  | 5°15  | 11°18' | 16°48' | 16°24' | 27°24'  | 13°24' | F 17 |
| S 18 | 15 43 23 | 27°13'34"  | 25° 2  | 4°37'   | 10°17'  | 20°19' | 21° 8   | 6°46' | 11° 7  | 5°16  | 11°17' | 16°D47 | 16°21' | 27°30'  | 13°26' | S 18 |
| S 19 | 15 47 19 | 28°11'21"  | 7°H37  | 6°45'   | 11°31'  | 21° 2  | 21°21'  | 6°42' | 11° 9  | 5°16  | 11°16' | 16°47' | 16°17' | 27°37'  | 13°28' | S 19 |
| M20  | 15 51 16 | 29° 9'06"  | 20°32' | 8°51'   | 12°45'  | 21°46' | 21°34'  | 6°38' | 11°12' | 5°17  | 11°15' | 16°48' | 16°14' | 27°44'  | 13°29' | M20  |
| T 21 | 15 55 12 | 0°II 6'50" | 3°52'  | 10°55'  | 13°58'  | 22°29' | 21°47'  | 6°34' | 11°14' | 5°18  | 11°14' | 16°49' | 16°11' | 27°50'  | 13°31' | T 21 |
| W22  | 15 59 9  | 1° 4'32"   | 17°38' | 12°58'  | 15°12'  | 23°13' | 22° 1   | 6°30' | 11°17' | 5°18  | 11°13' | 16°50' | 16° 8  | 27°57'  | 13°32' | W22  |
| T 23 | 16 3 5   | 2° 2'13"   | 1°M51  | 14°59'  | 16°25'  | 23°56' | 22°14'  | 6°26' | 11°19' | 5°19  | 11°12' | 16°51' | 16° 5  | 28° 4   | 13°33' | T 23 |
| F 24 | 16 7 2   | 2°59'52"   | 16°27' | 16°57'  | 17°39'  | 24°39' | 22°28'  | 6°22' | 11°22' | 5°19  | 11°11' | 16°R51 | 16° 1  | 28°10'  | 13°35' | F 24 |
| S 25 | 16 10 58 | 3°57'29"   | 1°H22  | 18°53'  | 18°52'  | 25°23' | 22°41'  | 6°19' | 11°24' | 5°20  | 11°10' | 16°51' | 15°58' | 28°17'  | 13°36' | S 25 |
| S 26 | 16 14 55 | 4°55'06"   | 16°28' | 20°46'  | 20° 6   | 26° 6  | 22°54'  | 6°15' | 11°26' | 5°20  | 11° 9  | 16°50' | 15°55' | 28°24'  | 13°37' | S 26 |
| M27  | 16 18 52 | 5°52'42"   | 1°H35  | 22°36'  | 21°19'  | 26°49' | 23° 8   | 6°11' | 11°29' | 5°20  | 11° 8  | 16°48' | 15°52' | 28°30'  | 13°38' | M27  |
| T 28 | 16 22 48 | 6°50'16"   | 16°36' | 24°24'  | 22°33'  | 27°32' | 23°21'  | 6° 8  | 11°31' | 5°21  | 11° 6  | 16°45' | 15°49' | 28°37'  | 13°40' | T 28 |
| W29  | 16 26 45 | 7°47'49"   | 1°H20  | 26° 9   | 23°46'  | 28°15' | 23°35'  | 6° 4  | 11°33' | 5°21  | 11° 5  | 16°43' | 15°46' | 28°44'  | 13°41' | W29  |
| T 30 | 16 30 41 | 8°45'22"   | 15°44' | 27°52'  | 25° 0   | 28°58' | 23°49'  | 6° 1  | 11°36' | 5°21  | 11° 4  | 16°41' | 15°42' | 28°50'  | 13°42' | T 30 |
| F 31 | 16 34 38 | 9°II42'54" | 29°H43 | 29°II31 | 26°II13 | 29°H41 | 24°II 2 | 5°M57 | 11°H38 | 5°H22 | 11°H 3 | 16°M39 | 15°M39 | 28°II57 | 13°H43 | F 31 |

Delta T = 67.03 sec

JUNE 2013

00:00 UT

| Day  | Sid.t    | ☉           | ☽       | ♀      | ♂       | ♂       | ♂       | ♂     | ♂      | ♂     | ♂      | ♂      | ♂      | ♂       | ♂      | Day  |
|------|----------|-------------|---------|--------|---------|---------|---------|-------|--------|-------|--------|--------|--------|---------|--------|------|
| S 1  | 16 38 34 | 10°II40'24" | 13°H17  | 1°H 8  | 27°II26 | 0°II24  | 24°II16 | 5°R54 | 11°H40 | 5°H22 | 11°R 2 | 16°D39 | 15°M36 | 29°II 4 | 13°H43 | S 1  |
| S 2  | 16 42 31 | 11°37'55"   | 26°28'  | 2°41'  | 28°40'  | 1° 7    | 24°29'  | 5°M51 | 11°42' | 5°22  | 11°H 0 | 16°M40 | 15°33' | 29°10'  | 13°44' | S 2  |
| M 3  | 16 46 27 | 12°35'24"   | 9°H18   | 4°12'  | 29°53'  | 1°49'   | 24°43'  | 5°47' | 11°44' | 5°22  | 10°59' | 16°41' | 15°30' | 29°17'  | 13°45' | M 3  |
| T 4  | 16 50 24 | 13°32'53"   | 21°50'  | 5°39'  | 1°H 7   | 2°32'   | 24°57'  | 5°44' | 11°46' | 5°22  | 10°58' | 16°43' | 15°27' | 29°24'  | 13°46' | T 4  |
| W 5  | 16 54 21 | 14°30'20"   | 4°H 8   | 7° 4   | 2°20'   | 3°15'   | 25°10'  | 5°41' | 11°48' | 5°22  | 10°56' | 16°44' | 15°23' | 29°30'  | 13°46' | W 5  |
| T 6  | 16 58 17 | 15°27'48"   | 16°15'  | 8°25'  | 3°33'   | 3°57'   | 25°24'  | 5°38' | 11°50' | 5°22  | 10°55' | 16°R45 | 15°20' | 29°37'  | 13°47' | T 6  |
| F 7  | 17 2 14  | 16°25'14"   | 28°15'  | 9°43'  | 4°47'   | 4°40'   | 25°38'  | 5°35' | 11°52' | 5°R22 | 10°54' | 16°44' | 15°17' | 29°44'  | 13°48' | F 7  |
| S 8  | 17 6 10  | 17°22'40"   | 10°II 9 | 10°59' | 6° 0    | 5°23'   | 25°51'  | 5°33' | 11°54' | 5°22  | 10°52' | 16°42' | 15°14' | 29°51'  | 13°48' | S 8  |
| S 9  | 17 10 7  | 18°20'05"   | 21°59'  | 12°11' | 7°13'   | 6° 5    | 26° 5   | 5°30' | 11°56' | 5°22  | 10°51' | 16°38' | 15°11' | 29°57'  | 13°49' | S 9  |
| M10  | 17 14 3  | 19°17'29"   | 3°H49   | 13°19' | 8°26'   | 6°47'   | 26°19'  | 5°27' | 11°57' | 5°22  | 10°50' | 16°34' | 15° 7  | 0°H 4   | 13°49' | M10  |
| T 11 | 17 18 0  | 20°14'52"   | 15°39'  | 14°25' | 9°40'   | 7°30'   | 26°33'  | 5°25' | 11°59' | 5°22  | 10°48' | 16°28' | 15° 4  | 0°11'   | 13°49' | T 11 |
| W12  | 17 21 56 | 21°12'14"   | 27°32'  | 15°27' | 10°53'  | 8°12'   | 26°46'  | 5°22' | 12° 1  | 5°22  | 10°47' | 16°22' | 15° 1  | 0°17'   | 13°50' | W12  |
| T 13 | 17 25 53 | 22° 9'36"   | 9°H30   | 16°25' | 12° 6   | 8°54'   | 27° 0   | 5°20' | 12° 2  | 5°22  | 10°46' | 16°16' | 14°58' | 0°24'   | 13°50' | T 13 |
| F 14 | 17 29 50 | 23° 6'56"   | 21°37'  | 17°20' | 13°19'  | 9°36'   | 27°14'  | 5°17' | 12° 4  | 5°22  | 10°44' | 16°11' | 14°55' | 0°31'   | 13°50' | F 14 |
| S 15 | 17 33 46 | 24° 4'16"   | 3°H54   | 18°11' | 14°32'  | 10°19'  | 27°28'  | 5°15' | 12° 6  | 5°22  | 10°43' | 16° 7  | 14°52' | 0°37'   | 13°50' | S 15 |
| S 16 | 17 37 43 | 25° 1'34"   | 16°26'  | 18°59' | 15°45'  | 11° 1   | 27°41'  | 5°13' | 12° 7  | 5°21  | 10°41' | 16° 5  | 14°48' | 0°44'   | 13°R50 | S 16 |
| M17  | 17 41 39 | 25°58'52"   | 29°17'  | 19°42' | 16°59'  | 11°43'  | 27°55'  | 5°11' | 12° 9  | 5°21  | 10°40' | 16°D 5 | 14°45' | 0°51'   | 13°50' | M17  |
| T 18 | 17 45 36 | 26°56'09"   | 12°H30  | 20°22' | 18°12'  | 12°25'  | 28° 9   | 5° 9  | 12°10' | 5°21  | 10°38' | 16° 6  | 14°42' | 0°57'   | 13°50' | T 18 |
| W19  | 17 49 32 | 27°53'25"   | 26° 9   | 20°58' | 19°25'  | 13° 7   | 28°23'  | 5° 7  | 12°11' | 5°20  | 10°37' | 16° 7  | 14°39' | 1° 4    | 13°50' | W19  |
| T 20 | 17 53 29 | 28°50'40"   | 10°M14  | 21°29' | 20°38'  | 13°48'  | 28°36'  | 5° 5  | 12°13' | 5°20  | 10°35' | 16°R 8 | 14°36' | 1°11'   | 13°50' | T 20 |
| F 21 | 17 57 25 | 29°47'55"   | 24°45'  | 21°57' | 21°51'  | 14°30'  | 28°50'  | 5° 4  | 12°14' | 5°19  | 10°34' | 16° 8  | 14°33' | 1°17'   | 13°49' | F 21 |
| S 22 | 18 1 22  | 0°H45'09"   | 9°H39   | 22°20' | 23° 4   | 15°12'  | 29° 4   | 5° 2  | 12°15' | 5°19  | 10°33' | 16° 6  | 14°29' | 1°24'   | 13°49' | S 22 |
| S 23 | 18 5 19  | 1°42'23"    | 24°49'  | 22°38' | 24°17'  | 15°54'  | 29°18'  | 5° 0  | 12°17' | 5°19  | 10°31' | 16° 2  | 14°26' | 1°31'   | 13°49' | S 23 |
| M24  | 18 9 15  | 2°39'36"    | 10°H 6  | 22°52' | 25°30'  | 16°35'  | 29°32'  | 4°59' | 12°18' | 5°18  | 10°30' | 15°57' | 14°23' | 1°38'   | 13°48' | M24  |
| T 25 | 18 13 12 | 3°36'49"    | 25°19'  | 23° 1  | 26°42'  | 17°17'  | 29°45'  | 4°58' | 12°19' | 5°17  | 10°28' | 15°50' | 14°20' | 1°44'   | 13°48' | T 25 |
| W26  | 18 17 8  | 4°34'02"    | 10°H18  | 23° 6  | 27°55'  | 17°59'  | 29°59'  | 4°56' | 12°20' | 5°17  | 10°27' | 15°43' | 14°17' | 1°51'   | 13°48' | W26  |
| T 27 | 18 21 5  | 5°31'14"    | 24°55'  | 23°R 6 | 29° 8   | 18°40'  | 0°H13   | 4°55' | 12°21' | 5°16  | 10°25' | 15°37' | 14°13' | 1°58'   | 13°47' | T 27 |
| F 28 | 18 25 1  | 6°28'26"    | 9°H 4   | 23° 2  | 0°H21   | 19°22'  | 0°26'   | 4°54' | 12°22' | 5°16  | 10°24' | 15°32' | 14°10' | 2° 4    | 13°46' | F 28 |
| S 29 | 18 28 58 | 7°25'39"    | 22°44'  | 22°53' | 1°34    | 20° 3   | 0°40'   | 4°53' | 12°23' | 5°15  | 10°22' | 15°29' | 14° 7  | 2°11'   | 13°46' | S 29 |
| S 30 | 18 32 54 | 8°H22'51"   | 5°H56   | 22°H40 | 2°H47   | 20°II44 | 0°H54   | 4°M52 | 12°H24 | 5°H14 | 10°H21 | 15°D28 | 14°M 4 | 2°H18   | 13°H45 | S 30 |

Delta T = 67.06 sec

## ASTRODIENST EPHEMERIS for the year 2013

geocentric

JULY 2013

00:00 UT

| Day  | Sid.t    | ☉         | ☽      | ♀      | ♂     | ♂     | ♂    | ♂     | ♂      | ♂     | ♂      | ♂      | ♂     | ♂    | ♂      | Day  |
|------|----------|-----------|--------|--------|-------|-------|------|-------|--------|-------|--------|--------|-------|------|--------|------|
| M 1  | 18 36 51 | 9°20'04"  | 18°44' | 22°R23 | 3♂59  | 21♂26 | 1♂8  | 4°R52 | 12°V25 | 5°R14 | 10°R19 | 15♂28  | 14♂1  | 2♂24 | 13°R44 | M 1  |
| T 2  | 18 40 48 | 10°17'17" | 1♂10   | 22♂1   | 5°12  | 22°7  | 1°21 | 4♂51  | 12°25  | 5♂13  | 10♂18  | 15°29  | 13°58 | 2°31 | 13°K43 | T 2  |
| W 3  | 18 44 44 | 11°14'30" | 13°22' | 21°36  | 6°25  | 22°48 | 1°35 | 4°50  | 12°26  | 5°12  | 10°16  | 15°R30 | 13°54 | 2°38 | 13°42  | W 3  |
| T 4  | 18 48 41 | 12°11'43" | 25°21' | 21°8   | 7°38  | 23°29 | 1°49 | 4°50  | 12°27  | 5°11  | 10°14  | 15°29  | 13°51 | 2°44 | 13°42  | T 4  |
| F 5  | 18 52 37 | 13°8'56"  | 7♂14   | 20°36  | 8°50  | 24°10 | 2°2  | 4°50  | 12°27  | 5°10  | 10°13  | 15°27  | 13°48 | 2°51 | 13°41  | F 5  |
| S 6  | 18 56 34 | 14°6'10"  | 19°4   | 20°3   | 10°3  | 24°51 | 2°16 | 4°49  | 12°28  | 5°10  | 10°11  | 15°22  | 13°45 | 2°58 | 13°40  | S 6  |
| S 7  | 19 0 30  | 15°3'24"  | 0♂52   | 19°27  | 11°16 | 25°32 | 2°29 | 4°49  | 12°29  | 5°9   | 10°10  | 15°15  | 13°42 | 3°4  | 13°38  | S 7  |
| M 8  | 19 4 27  | 16°0'37"  | 12°43  | 18°50  | 12°28 | 26°13 | 2°43 | 4°D49 | 12°29  | 5°8   | 10°8   | 15°5   | 13°39 | 3°11 | 13°37  | M 8  |
| T 9  | 19 8 23  | 16°57'51" | 24°37  | 18°12  | 13°41 | 26°54 | 2°56 | 4°49  | 12°29  | 5°7   | 10°7   | 14°54  | 13°35 | 3°18 | 13°36  | T 9  |
| W10  | 19 12 20 | 17°55'05" | 6♂36   | 17°34  | 14°53 | 27°35 | 3°10 | 4°49  | 12°30  | 5°6   | 10°5   | 14°42  | 13°32 | 3°25 | 13°35  | W10  |
| T 11 | 19 16 17 | 18°52'19" | 18°42  | 16°57  | 16°6  | 28°16 | 3°24 | 4°49  | 12°30  | 5°5   | 10°4   | 14°31  | 13°29 | 3°31 | 13°34  | T 11 |
| F 12 | 19 20 13 | 19°49'33" | 0♂55   | 16°20  | 17°19 | 28°57 | 3°37 | 4°50  | 12°31  | 5°4   | 10°2   | 14°21  | 13°26 | 3°38 | 13°32  | F 12 |
| S 13 | 19 24 10 | 20°46'48" | 13°19  | 15°46  | 18°31 | 29°37 | 3°50 | 4°50  | 12°31  | 5°3   | 10°1   | 14°14  | 13°23 | 3°45 | 13°31  | S 13 |
| S 14 | 19 28 6  | 21°44'02" | 25°55  | 15°14  | 19°43 | 0♂18  | 4°4  | 4°51  | 12°31  | 5°2   | 10°0   | 14°8   | 13°19 | 3°51 | 13°29  | S 14 |
| M15  | 19 32 3  | 22°41'16" | 8♂46   | 14°45  | 20°56 | 0°59  | 4°17 | 4°51  | 12°31  | 5°1   | 9°58   | 14°6   | 13°16 | 3°58 | 13°28  | M15  |
| T 16 | 19 35 59 | 23°38'30" | 21°56  | 14°20  | 22°8  | 1°39  | 4°31 | 4°52  | 12°31  | 5°0   | 9°57   | 14°D5  | 13°13 | 4°5  | 13°26  | T 16 |
| W17  | 19 39 56 | 24°35'44" | 5♂27   | 13°59  | 23°21 | 2°20  | 4°44 | 4°53  | 12°31  | 4°58  | 9°55   | 14°5   | 13°10 | 4°11 | 13°25  | W17  |
| T 18 | 19 43 52 | 25°32'59" | 19°22  | 13°42  | 24°33 | 3°0   | 4°57 | 4°54  | 12°R31 | 4°57  | 9°54   | 14°R5  | 13°7  | 4°18 | 13°23  | T 18 |
| F 19 | 19 47 49 | 26°30'13" | 3♂40   | 13°30  | 25°45 | 3°40  | 5°10 | 4°55  | 12°31  | 4°56  | 9°52   | 14°4   | 13°4  | 4°25 | 13°21  | F 19 |
| S 20 | 19 51 46 | 27°27'28" | 18°22  | 13°23  | 26°57 | 4°21  | 5°24 | 4°56  | 12°31  | 4°55  | 9°51   | 14°0   | 13°0  | 4°31 | 13°20  | S 20 |
| S 21 | 19 55 42 | 28°24'44" | 3♂22   | 13°D22 | 28°10 | 5°1   | 5°37 | 4°57  | 12°31  | 4°54  | 9°49   | 13°54  | 12°57 | 4°38 | 13°18  | S 21 |
| M22  | 19 59 39 | 29°21'59" | 18°32  | 13°26  | 29°22 | 5°41  | 5°50 | 4°58  | 12°31  | 4°52  | 9°48   | 13°46  | 12°54 | 4°45 | 13°16  | M22  |
| T 23 | 20 3 35  | 0♂19'15"  | 3♂43   | 13°36  | 0♂34  | 6°22  | 6°3  | 5°0   | 12°31  | 4°51  | 9°47   | 13°36  | 12°51 | 4°52 | 13°14  | T 23 |
| W24  | 20 7 32  | 1°16'31"  | 18°43  | 13°51  | 1°46  | 7°2   | 6°16 | 5°1   | 12°30  | 4°50  | 9°45   | 13°25  | 12°48 | 4°58 | 13°12  | W24  |
| T 25 | 20 11 28 | 2°13'49"  | 3♂25   | 14°13  | 2°58  | 7°42  | 6°29 | 5°3   | 12°30  | 4°49  | 9°44   | 13°16  | 12°45 | 5°5  | 13°10  | T 25 |
| F 26 | 20 15 25 | 3°11'06"  | 17°40  | 14°40  | 4°10  | 8°22  | 6°42 | 5°5   | 12°30  | 4°47  | 9°42   | 13°8   | 12°41 | 5°12 | 13°8   | F 26 |
| S 27 | 20 19 21 | 4°8'25"   | 1°V25  | 15°14  | 5°22  | 9°2   | 6°55 | 5°6   | 12°29  | 4°46  | 9°41   | 13°2   | 12°38 | 5°18 | 13°6   | S 27 |
| S 28 | 20 23 18 | 5°5'45"   | 14°42  | 15°53  | 6°34  | 9°42  | 7°8  | 5°8   | 12°29  | 4°45  | 9°40   | 12°59  | 12°35 | 5°25 | 13°4   | S 28 |
| M29  | 20 27 15 | 6°3'06"   | 27°32  | 16°38  | 7°46  | 10°22 | 7°21 | 5°10  | 12°28  | 4°43  | 9°38   | 12°58  | 12°32 | 5°32 | 13°2   | M29  |
| T 30 | 20 31 11 | 7°0'27"   | 8♂59   | 17°29  | 8°58  | 11°2  | 7°33 | 5°12  | 12°28  | 4°42  | 9°37   | 12°57  | 12°29 | 5°38 | 13°0   | T 30 |
| W31  | 20 35 8  | 7♂57'50"  | 22♂9   | 18♂26  | 10♂10 | 11♂41 | 7♂46 | 5♂14  | 12°V27 | 4♂40  | 9♂36   | 12♂57  | 12♂25 | 5♂45 | 12♂58  | W31  |

Delta T = 67.09 sec

AUGUST 2013

00:00 UT

| Day  | Sid.t    | ☉         | ☽     | ♀     | ♂     | ♂     | ♂     | ♂    | ♂      | ♂     | ♂     | ♂      | ♂     | ♂    | ♂      | Day  |
|------|----------|-----------|-------|-------|-------|-------|-------|------|--------|-------|-------|--------|-------|------|--------|------|
| T 1  | 20 39 4  | 8♂55'14"  | 4♂11  | 19♂28 | 11♂22 | 12♂21 | 7♂59  | 5♂17 | 12°R26 | 4°R39 | 9°R35 | 12°R56 | 12♂22 | 5♂52 | 12°R56 | T 1  |
| F 2  | 20 43 1  | 9°52'39"  | 15°59 | 20°36 | 12°33 | 13°1  | 8°12  | 5°19 | 12°V26 | 4♂38  | 9♂33  | 12♂53  | 12°19 | 5°58 | 12°K54 | F 2  |
| S 3  | 20 46 57 | 10°50'06" | 27°47 | 21°49 | 13°45 | 13°41 | 8°24  | 5°21 | 12°25  | 4°36  | 9°32  | 12°47  | 12°16 | 6°5  | 12°51  | S 3  |
| S 4  | 20 50 54 | 11°47'33" | 9♂37  | 23°7  | 14°57 | 14°20 | 8°37  | 5°24 | 12°24  | 4°35  | 9°31  | 12°38  | 12°13 | 6°12 | 12°49  | S 4  |
| M 5  | 20 54 50 | 12°45'01" | 21°32 | 24°31 | 16°8  | 15°0  | 8°49  | 5°27 | 12°23  | 4°33  | 9°30  | 12°27  | 12°10 | 6°19 | 12°47  | M 5  |
| T 6  | 20 58 47 | 13°42'31" | 3♂32  | 25°59 | 17°20 | 15°39 | 9°2   | 5°29 | 12°22  | 4°32  | 9°28  | 12°14  | 12°6  | 6°25 | 12°44  | T 6  |
| W 7  | 21 2 44  | 14°40'01" | 15°41 | 27°32 | 18°32 | 16°19 | 9°14  | 5°32 | 12°22  | 4°30  | 9°27  | 12°0   | 12°3  | 6°32 | 12°42  | W 7  |
| T 8  | 21 6 40  | 15°37'32" | 27°58 | 29°9  | 19°43 | 16°58 | 9°26  | 5°35 | 12°21  | 4°29  | 9°26  | 11°47  | 12°0  | 6°39 | 12°39  | T 8  |
| F 9  | 21 10 37 | 16°35'05" | 10♂25 | 0♂50  | 20°55 | 17°38 | 9°39  | 5°38 | 12°20  | 4°27  | 9°25  | 11°35  | 11°57 | 6°45 | 12°37  | F 9  |
| S 10 | 21 14 33 | 17°32'38" | 23°1  | 2°35  | 22°6  | 18°17 | 9°51  | 5°41 | 12°18  | 4°25  | 9°24  | 11°25  | 11°54 | 6°52 | 12°34  | S 10 |
| S 11 | 21 18 30 | 18°30'12" | 5♂49  | 4°23  | 23°18 | 18°56 | 10°3  | 5°44 | 12°17  | 4°24  | 9°23  | 11°19  | 11°50 | 6°59 | 12°32  | S 11 |
| M12  | 21 22 26 | 19°27'47" | 18°49 | 6°14  | 24°29 | 19°35 | 10°15 | 5°47 | 12°16  | 4°22  | 9°22  | 11°15  | 11°47 | 7°5  | 12°29  | M12  |
| T 13 | 21 26 23 | 20°25'23" | 2♂14  | 8°8   | 25°40 | 20°15 | 10°27 | 5°51 | 12°15  | 4°21  | 9°21  | 11°14  | 11°44 | 7°12 | 12°27  | T 13 |
| W14  | 21 30 19 | 21°23'00" | 15°34 | 10°4  | 26°51 | 20°54 | 10°39 | 5°54 | 12°14  | 4°19  | 9°20  | 11°14  | 11°41 | 7°19 | 12°24  | W14  |
| T 15 | 21 34 16 | 22°20'38" | 29°23 | 12°2  | 28°3  | 21°33 | 10°51 | 5°58 | 12°13  | 4°18  | 9°19  | 11°13  | 11°38 | 7°26 | 12°22  | T 15 |
| F 16 | 21 38 13 | 23°18'17" | 13♂30 | 14°1  | 29°14 | 22°12 | 11°2  | 6°1  | 12°11  | 4°16  | 9°18  | 11°12  | 11°35 | 7°32 | 12°19  | F 16 |
| S 17 | 21 42 9  | 24°15'57" | 27°55 | 16°1  | 0♂25  | 22°51 | 11°14 | 6°5  | 12°10  | 4°14  | 9°17  | 11°9   | 11°31 | 7°39 | 12°16  | S 17 |
| S 18 | 21 46 6  | 25°13'38" | 12♂36 | 18°2  | 1°36  | 23°30 | 11°26 | 6°9  | 12°8   | 4°13  | 9°16  | 11°3   | 11°28 | 7°46 | 12°14  | S 18 |
| M19  | 21 50 2  | 26°11'20" | 27°27 | 20°3  | 2°47  | 24°9  | 11°37 | 6°12 | 12°7   | 4°11  | 9°15  | 10°55  | 11°25 | 7°52 | 12°11  | M19  |
| T 20 | 21 53 59 | 27°9'03"  | 12♂20 | 22°5  | 3°58  | 24°48 | 11°49 | 6°16 | 12°6   | 4°9   | 9°14  | 10°45  | 11°22 | 7°59 | 12°8   | T 20 |
| W21  | 21 57 55 | 28°6'48"  | 27°7  | 24°6  | 5°9   | 25°26 | 12°0  | 6°20 | 12°4   | 4°8   | 9°13  | 10°34  | 11°19 | 8°6  | 12°5   | W21  |
| T 22 | 22 1 52  | 29°4'33"  | 11♂39 | 26°7  | 6°19  | 26°5  | 12°11 | 6°24 | 12°2   | 4°6   | 9°12  | 10°24  | 11°16 | 8°12 | 12°3   | T 22 |
| F 23 | 22 5 48  | 0♂22      | 25°49 | 28°7  | 7°30  | 26°44 | 12°23 | 6°28 | 12°1   | 4°5   | 9°11  | 10°16  | 11°12 | 8°19 | 12°0   | F 23 |
| S 24 | 22 9 45  | 1°0'09"   | 9♂34  | 0♂7   | 8°41  | 27°22 | 12°34 | 6°33 | 11°59  | 4°3   | 9°11  | 10°10  | 11°9  | 8°26 | 11°57  | S 24 |
| S 25 | 22 13 42 | 1°58'00"  | 22°52 | 2°6   | 9°51  | 28°1  | 12°45 | 6°37 | 11°58  | 4°1   | 9°10  | 10°7   | 11°6  | 8°33 | 11°54  | S 25 |
| M26  | 22 17 38 | 2°55'52"  | 5♂44  | 4°4   | 11°2  | 28°40 | 12°56 | 6°41 | 11°56  | 4°0   | 9°9   | 10°D5  | 11°3  | 8°39 | 11°51  | M26  |
| T 27 | 22 21 35 | 3°53'46"  | 18°14 | 6°0   | 12°12 | 29°18 | 13°7  | 6°46 | 11°54  | 3°58  | 9°8   | 10°6   | 11°0  | 8°46 | 11°49  | T 27 |
| W28  | 22 25 31 | 4°51'41"  | 0♂26  | 7°56  | 13°23 | 29°57 | 13°18 | 6°50 | 11°52  | 3°56  | 9°8   | 10°R6  | 10°56 | 8°53 | 11°46  | W28  |
| T 29 | 22 29 28 | 5°49'39"  | 12°26 | 9°51  | 14°33 | 0♂35  | 13°28 | 6°55 | 11°51  | 3°55  | 9°7   | 10°6   | 10°53 | 8°59 | 11°43  | T 29 |
| F 30 | 22 33 24 | 6°47'38"  | 24°18 | 11°44 | 15°44 | 1°13  | 13°39 | 6°59 | 11°49  | 3°53  | 9°6   | 10°4   | 10°50 | 9°6  | 11°40  | F 30 |
| S 31 | 22 37 21 | 7♂45'40"  | 6♂9   | 13♂36 | 16♂54 | 1♂52  | 13♂50 | 7♂14 | 11°V47 | 3♂51  | 9♂36  | 10♂10  | 10♂47 | 9♂13 | 11°K37 | S 31 |

Delta T = 67.12 sec

# ASTRODIENST EPHEMERIS for the year 2013

## geocentric

SEPTEMBER 2013

00:00 UT

| Day  | Sid.t    | ☉        | ☽     | ♀     | ♂     | ♂     | ♂     | ♂    | ♂      | ♂     | ♂     | ♂     | ♂     | ♂     | ♂      | Day  |
|------|----------|----------|-------|-------|-------|-------|-------|------|--------|-------|-------|-------|-------|-------|--------|------|
| S 1  | 22 41 17 | 8♉43'43  | 18♏1  | 15♊27 | 18♏4  | 2♊30  | 14♏0  | 7♊9  | 11°R45 | 3°R50 | 9°R 5 | 9°R54 | 10♊44 | 9♏19  | 11°R34 | S 1  |
| M 2  | 22 45 14 | 9°41'48  | 29°59 | 17°17 | 19°14 | 3° 8  | 14°10 | 7°14 | 11°Y43 | 3°H48 | 9°Z 5 | 9♊46  | 10°41 | 9°26  | 11°H32 | M 2  |
| T 3  | 22 49 11 | 10°39'54 | 12♊7  | 19° 5 | 20°24 | 3°47  | 14°21 | 7°19 | 11°41  | 3°47  | 9° 4  | 9°36  | 10°37 | 9°33  | 11°29  | T 3  |
| W 4  | 22 53 7  | 11°38'03 | 24°26 | 20°52 | 21°34 | 4°25  | 14°31 | 7°24 | 11°39  | 3°45  | 9° 4  | 9°25  | 10°34 | 9°40  | 11°26  | W 4  |
| T 5  | 22 57 4  | 12°36'13 | 6♊57  | 22°38 | 22°44 | 5° 3  | 14°41 | 7°29 | 11°37  | 3°43  | 9° 3  | 9°15  | 10°31 | 9°46  | 11°23  | T 5  |
| F 6  | 23 1 0   | 13°34'25 | 19°40 | 24°23 | 23°54 | 5°41  | 14°51 | 7°34 | 11°35  | 3°42  | 9° 3  | 9° 5  | 10°28 | 9°53  | 11°20  | F 6  |
| S 7  | 23 4 57  | 14°32'39 | 2♊36  | 26° 7 | 25° 4 | 6°19  | 15° 0 | 7°39 | 11°33  | 3°40  | 9° 2  | 8°58  | 10°25 | 10° 0 | 11°17  | S 7  |
| S 8  | 23 8 53  | 15°30'54 | 15°43 | 27°49 | 26°13 | 6°57  | 15°10 | 7°44 | 11°31  | 3°38  | 9° 2  | 8°53  | 10°22 | 10° 6 | 11°15  | S 8  |
| M 9  | 23 12 50 | 16°29'11 | 29° 2 | 29°30 | 27°23 | 7°35  | 15°20 | 7°50 | 11°29  | 3°37  | 9° 1  | 8°51  | 10°18 | 10°13 | 11°12  | M 9  |
| T 10 | 23 16 46 | 17°27'30 | 12♊32 | 1♊10  | 28°32 | 8°12  | 15°29 | 7°55 | 11°27  | 3°35  | 9° 1  | 8°D51 | 10°15 | 10°20 | 11° 9  | T 10 |
| W11  | 23 20 43 | 18°25'50 | 26°13 | 2°49  | 29°42 | 8°50  | 15°39 | 8° 0 | 11°25  | 3°34  | 9° 1  | 8°52  | 10°12 | 10°26 | 11° 6  | W11  |
| T 12 | 23 24 39 | 19°24'11 | 10♊5  | 4°27  | 0♊51  | 9°28  | 15°48 | 8° 6 | 11°22  | 3°32  | 9° 1  | 8°53  | 10° 9 | 10°33 | 11° 3  | T 12 |
| F 13 | 23 28 36 | 20°22'35 | 24° 8 | 6° 4  | 2° 1  | 10° 6 | 15°57 | 8°12 | 11°20  | 3°31  | 9° 0  | 8°R53 | 10° 6 | 10°40 | 11° 0  | F 13 |
| S 14 | 23 32 33 | 21°21'00 | 8♊22  | 7°39  | 3°10  | 10°43 | 16° 6 | 8°17 | 11°18  | 3°29  | 9° 0  | 8°51  | 10° 2 | 10°47 | 10°58  | S 14 |
| S 15 | 23 36 29 | 22°19'26 | 22°44 | 9°14  | 4°19  | 11°21 | 16°15 | 8°23 | 11°16  | 3°27  | 9° 0  | 8°48  | 9°59  | 10°53 | 10°55  | S 15 |
| M16  | 23 40 26 | 23°17'54 | 7♊11  | 10°47 | 5°28  | 11°58 | 16°24 | 8°29 | 11°14  | 3°26  | 9° 0  | 8°43  | 9°56  | 11° 0 | 10°52  | M16  |
| T 17 | 23 44 22 | 24°16'23 | 21°38 | 12°19 | 6°37  | 12°36 | 16°33 | 8°34 | 11°11  | 3°24  | 9° 0  | 8°37  | 9°53  | 11° 7 | 10°49  | T 17 |
| W18  | 23 48 19 | 25°14'55 | 5♊59  | 13°51 | 7°45  | 13°13 | 16°41 | 8°40 | 11° 9  | 3°23  | 8°59  | 8°30  | 9°50  | 11°13 | 10°47  | W18  |
| T 19 | 23 52 15 | 26°13'27 | 20° 9 | 15°21 | 8°54  | 13°51 | 16°50 | 8°46 | 11° 7  | 3°21  | 8°59  | 8°23  | 9°47  | 11°20 | 10°44  | T 19 |
| F 20 | 23 56 12 | 27°12'02 | 4♊3   | 16°50 | 10° 3 | 14°28 | 16°58 | 8°52 | 11° 4  | 3°20  | 8°59  | 8°18  | 9°43  | 11°27 | 10°41  | F 20 |
| S 21 | 0 0 8    | 28°10'39 | 17°36 | 18°18 | 11°11 | 15° 5 | 17° 6 | 8°58 | 11° 2  | 3°18  | 8°D59 | 8°14  | 9°40  | 11°34 | 10°38  | S 21 |
| S 22 | 0 4 5    | 29° 9'18 | 0♊47  | 19°45 | 12°20 | 15°42 | 17°14 | 9° 4 | 11° 0  | 3°17  | 8°59  | 8°12  | 9°37  | 11°40 | 10°36  | S 22 |
| M23  | 0 8 2    | 0♊47     | 7°59  | 13°37 | 21°11 | 13°28 | 16°20 | 9°10 | 10°57  | 3°16  | 8°59  | 8°D12 | 9°34  | 11°47 | 10°33  | M23  |
| T 24 | 0 11 58  | 1° 6'42  | 26° 7 | 22°36 | 14°36 | 16°57 | 17°30 | 9°16 | 10°55  | 3°14  | 9° 0  | 8°13  | 9°31  | 11°54 | 10°31  | T 24 |
| W25  | 0 15 55  | 2° 5'28  | 8♊21  | 23°59 | 15°44 | 17°34 | 17°37 | 9°22 | 10°53  | 3°13  | 9° 0  | 8°15  | 9°27  | 12° 0 | 10°28  | W25  |
| T 26 | 0 19 51  | 3° 4'15  | 20°22 | 25°22 | 16°52 | 18°11 | 17°45 | 9°29 | 10°50  | 3°11  | 9° 0  | 8°17  | 9°24  | 12° 7 | 10°25  | T 26 |
| F 27 | 0 23 48  | 4° 3'05  | 2♊16  | 26°43 | 18° 0 | 18°48 | 17°52 | 9°35 | 10°48  | 3°10  | 9° 0  | 8°R17 | 9°21  | 12°14 | 10°23  | F 27 |
| S 28 | 0 27 44  | 5° 1'58  | 14° 8 | 28° 3 | 19° 7 | 19°25 | 17°59 | 9°41 | 10°45  | 3° 9  | 9° 0  | 8°17  | 9°18  | 12°20 | 10°20  | S 28 |
| S 29 | 0 31 41  | 6° 0'52  | 26° 2 | 29°22 | 20°15 | 20° 2 | 18° 6 | 9°48 | 10°43  | 3° 7  | 9° 0  | 8°15  | 9°15  | 12°27 | 10°18  | S 29 |
| M30  | 0 35 37  | 6♊59'49  | 8♊2   | 0♊40  | 21♊22 | 20♊38 | 18♊13 | 9♊54 | 10°Y41 | 3°H 6 | 9°Z 1 | 8♊12  | 9♊12  | 12♊34 | 10°H15 | M30  |

Delta T = 67.15 sec

OCTOBER 2013

00:00 UT

| Day  | Sid.t   | ☉        | ☽     | ♀      | ♂     | ♂     | ♂     | ♂     | ♂      | ♂     | ♂     | ♂     | ♂    | ♂     | ♂      | Day  |
|------|---------|----------|-------|--------|-------|-------|-------|-------|--------|-------|-------|-------|------|-------|--------|------|
| T 1  | 0 39 34 | 7♊58'48  | 20♊15 | 1♊56   | 22♊30 | 21♊15 | 18♊20 | 10♊0  | 10°R38 | 3°R 5 | 9°Z 1 | 8°R 7 | 9♊8  | 12♊41 | 10°R13 | T 1  |
| W 2  | 0 43 31 | 8°57'49  | 2♊41  | 3°11   | 23°37 | 21°52 | 18°27 | 10° 7 | 10°Y36 | 3°H 4 | 9° 1  | 8♊3   | 9° 5 | 12°47 | 10°H10 | W 2  |
| T 3  | 0 47 27 | 9°56'52  | 15°23 | 4°24   | 24°44 | 22°28 | 18°33 | 10°13 | 10°33  | 3° 2  | 9° 2  | 7°58  | 9° 2 | 12°54 | 10° 8  | T 3  |
| F 4  | 0 51 24 | 10°55'57 | 28°22 | 5°35   | 25°51 | 23° 5 | 18°40 | 10°20 | 10°31  | 3° 1  | 9° 2  | 7°54  | 8°59 | 13° 1 | 10° 6  | F 4  |
| S 5  | 0 55 20 | 11°55'05 | 11♊37 | 6°45   | 26°58 | 23°42 | 18°46 | 10°27 | 10°28  | 3° 0  | 9° 3  | 7°50  | 8°56 | 13° 7 | 10° 3  | S 5  |
| S 6  | 0 59 17 | 12°54'14 | 25° 8 | 7°53   | 28° 4 | 24°18 | 18°52 | 10°33 | 10°26  | 2°59  | 9° 3  | 7°48  | 8°53 | 13°14 | 10° 1  | S 6  |
| M 7  | 1 3 13  | 13°53'26 | 8♊52  | 8°58   | 29°11 | 24°54 | 18°58 | 10°40 | 10°24  | 2°58  | 9° 4  | 7°D48 | 8°49 | 13°21 | 9°59   | M 7  |
| T 8  | 1 7 10  | 14°52'39 | 22°47 | 10° 2  | 0♊17  | 25°31 | 19° 3 | 10°47 | 10°21  | 2°56  | 9° 4  | 7°49  | 8°46 | 13°28 | 9°57   | T 8  |
| W 9  | 1 11 6  | 15°51'55 | 6♊50  | 11° 3  | 1°23  | 26° 7 | 19° 9 | 10°53 | 10°19  | 2°55  | 9° 5  | 7°50  | 8°43 | 13°34 | 9°55   | W 9  |
| T 10 | 1 15 3  | 16°51'12 | 20°58 | 12° 2  | 2°29  | 26°43 | 19°14 | 11° 0 | 10°16  | 2°54  | 9° 5  | 7°51  | 8°40 | 13°41 | 9°52   | T 10 |
| F 11 | 1 18 59 | 17°50'31 | 5♊9   | 12°57  | 3°35  | 27°19 | 19°19 | 11° 7 | 10°14  | 2°53  | 9° 6  | 7°52  | 8°37 | 13°48 | 9°50   | F 11 |
| S 12 | 1 22 56 | 18°49'52 | 19°22 | 13°50  | 4°40  | 27°56 | 19°24 | 11°14 | 10°12  | 2°52  | 9° 6  | 7°R53 | 8°33 | 13°54 | 9°48   | S 12 |
| S 13 | 1 26 53 | 19°49'14 | 3♊33  | 14°39  | 5°46  | 28°32 | 19°29 | 11°21 | 10° 9  | 2°51  | 9° 7  | 7°52  | 8°30 | 14° 1 | 9°46   | S 13 |
| M14  | 1 30 49 | 20°48'38 | 17°40 | 15°25  | 6°51  | 29° 8 | 19°34 | 11°27 | 10° 7  | 2°50  | 9° 8  | 7°51  | 8°27 | 14° 8 | 9°44   | M14  |
| T 15 | 1 34 46 | 21°48'04 | 1♊42  | 16° 6  | 7°56  | 29°43 | 19°38 | 11°34 | 10° 4  | 2°49  | 9° 9  | 7°49  | 8°24 | 14°15 | 9°42   | T 15 |
| W16  | 1 38 42 | 22°47'32 | 15°34 | 16°43  | 9° 1  | 0♊19  | 19°43 | 11°41 | 10° 2  | 2°48  | 9° 9  | 7°47  | 8°21 | 14°21 | 9°41   | W16  |
| T 17 | 1 42 39 | 23°47'01 | 29°16 | 17°15  | 10° 5 | 0°55  | 19°47 | 11°48 | 10° 0  | 2°47  | 9°10  | 7°45  | 8°18 | 14°28 | 9°39   | T 17 |
| F 18 | 1 46 35 | 24°46'32 | 12♊44 | 17°41  | 11° 9 | 1°31  | 19°51 | 11°55 | 9°57   | 2°47  | 9°11  | 7°44  | 8°14 | 14°35 | 9°37   | F 18 |
| S 19 | 1 50 32 | 25°46'06 | 25°57 | 18° 2  | 12°13 | 2° 6  | 19°54 | 12° 2 | 9°55   | 2°46  | 9°12  | 7°43  | 8°11 | 14°41 | 9°35   | S 19 |
| S 20 | 1 54 28 | 26°45'41 | 8♊54  | 18°16  | 13°17 | 2°42  | 19°58 | 12° 9 | 9°53   | 2°45  | 9°13  | 7°D42 | 8° 8 | 14°48 | 9°34   | S 20 |
| M21  | 1 58 25 | 27°45'18 | 21°34 | 18°R23 | 14°21 | 3°18  | 20° 1 | 12°16 | 9°51   | 2°44  | 9°14  | 7°43  | 8° 5 | 14°55 | 9°32   | M21  |
| T 22 | 2 2 22  | 28°44'58 | 4♊0   | 18°22  | 15°24 | 3°53  | 20° 5 | 12°23 | 9°48   | 2°43  | 9°15  | 7°43  | 8° 2 | 15° 1 | 9°30   | T 22 |
| W23  | 2 6 18  | 29°44'40 | 16°11 | 18°14  | 16°27 | 4°28  | 20° 8 | 12°30 | 9°46   | 2°43  | 9°15  | 7°44  | 7°58 | 15° 8 | 9°29   | W23  |
| T 24 | 2 10 15 | 0♊44'24  | 28°13 | 17°57  | 17°30 | 5° 4  | 20°11 | 12°38 | 9°44   | 2°42  | 9°16  | 7°45  | 7°55 | 15°15 | 9°27   | T 24 |
| F 25 | 2 14 11 | 1°44'10  | 10♊7  | 17°31  | 18°33 | 5°39  | 20°13 | 12°45 | 9°42   | 2°41  | 9°17  | 7°46  | 7°52 | 15°22 | 9°26   | F 25 |
| S 26 | 2 18 8  | 2°43'58  | 21°59 | 16°55  | 19°35 | 6°14  | 20°16 | 12°52 | 9°39   | 2°41  | 9°19  | 7°46  | 7°49 | 15°28 | 9°24   | S 26 |
| S 27 | 2 22 4  | 3°43'49  | 3♊53  | 16°11  | 20°37 | 6°49  | 20°18 | 12°59 | 9°37   | 2°40  | 9°20  | 7°R46 | 7°46 | 15°35 | 9°23   | S 27 |
| M28  | 2 26 1  | 4°43'41  | 15°53 | 15°19  | 21°38 | 7°24  | 20°20 | 13° 6 | 9°35   | 2°39  | 9°21  | 7°46  | 7°43 | 15°42 | 9°22   | M28  |
| T 29 | 2 29 57 | 5°43'36  | 28° 5 | 14°18  | 22°40 | 7°59  | 20°22 | 13°13 | 9°33   | 2°39  | 9°22  | 7°46  | 7°39 | 15°48 | 9°21   | T 29 |
| W30  | 2 33 54 | 6°43'33  | 10♊32 | 13°10  | 23°41 | 8°34  | 20°24 | 13°20 | 9°31   | 2°38  | 9°23  | 7°46  | 7°36 | 15°55 | 9°19   | W30  |
| T 31 | 2 37 51 | 7♊43'32  | 23♊17 | 11♊57  | 24♊41 | 9♊9   | 20♊25 | 13♊28 | 9°Y29  | 2°H38 | 9°Z24 | 7°D46 | 7♊33 | 16♊2  | 9°H18  | T 31 |

Delta T = 67.19 sec

## ASTRODIENST EPHEMERIS for the year 2013

geocentric

NOVEMBER 2013

00:00 UT

| Day  | Sid.t   | ☉        | ☽     | ♀      | ♂     | ♂     | ♂      | ♂     | ♂     | ♂     | ♂     | ♂     | ♂    | ♂     | ♂     | Day  |
|------|---------|----------|-------|--------|-------|-------|--------|-------|-------|-------|-------|-------|------|-------|-------|------|
| F 1  | 2 41 47 | 8♉43'34  | 6♊24  | 10°R40 | 25♌42 | 9♍44  | 20♎27  | 13♏35 | 9°R27 | 2°R37 | 9♐25  | 7♑46  | 7♒30 | 16♓9  | 9°R17 | F 1  |
| S 2  | 2 45 44 | 9°43'37  | 19°54 | 9♍22   | 26°41 | 10°18 | 20°28  | 13°42 | 9♍25  | 2♋37  | 9°27  | 7°46  | 7°27 | 16°15 | 9♋16  | S 2  |
| S 3  | 2 49 40 | 10°43'42 | 3♌44  | 8° 6   | 27°41 | 10°53 | 20°29  | 13°49 | 9°23  | 2°37  | 9°28  | 7°R46 | 7°24 | 16°22 | 9°15  | S 3  |
| M 4  | 2 53 37 | 11°43'49 | 17°53 | 6°53   | 28°40 | 11°28 | 20°30  | 13°56 | 9°21  | 2°36  | 9°29  | 7°46  | 7°20 | 16°29 | 9°14  | M 4  |
| T 5  | 2 57 33 | 12°43'58 | 2♌16  | 5°45   | 29°39 | 12° 2 | 20°30  | 14° 3 | 9°19  | 2°36  | 9°31  | 7°46  | 7°17 | 16°35 | 9°13  | T 5  |
| W 6  | 3 1 30  | 13°44'09 | 16°48 | 4°46   | 0♌37  | 12°36 | 20°31  | 14°11 | 9°17  | 2°36  | 9°32  | 7°45  | 7°14 | 16°42 | 9°13  | W 6  |
| T 7  | 3 5 26  | 14°44'22 | 1♌23  | 3°56   | 1°35  | 13°11 | 20°R31 | 14°18 | 9°15  | 2°36  | 9°33  | 7°44  | 7°11 | 16°49 | 9°12  | T 7  |
| F 8  | 3 9 23  | 15°44'36 | 15°54 | 3°17   | 2°32  | 13°45 | 20°31  | 14°25 | 9°13  | 2°35  | 9°35  | 7°44  | 7° 8 | 16°56 | 9°11  | F 8  |
| S 9  | 3 13 20 | 16°44'51 | 0♌18  | 2°50   | 3°29  | 14°19 | 20°30  | 14°32 | 9°12  | 2°35  | 9°36  | 7°43  | 7° 4 | 17° 2 | 9°10  | S 9  |
| S 10 | 3 17 16 | 17°45'08 | 14°31 | 2°34   | 4°26  | 14°53 | 20°30  | 14°39 | 9°10  | 2°35  | 9°38  | 7°D43 | 7° 1 | 17° 9 | 9°10  | S 10 |
| M 11 | 3 21 13 | 18°45'26 | 28°30 | 2°D30  | 5°21  | 15°27 | 20°29  | 14°47 | 9° 8  | 2°35  | 9°39  | 7°43  | 6°58 | 17°16 | 9° 9  | M 11 |
| T 12 | 3 25 9  | 19°45'46 | 12♋14 | 2°36   | 6°17  | 16° 1 | 20°28  | 14°54 | 9° 7  | 2°35  | 9°40  | 7°43  | 6°55 | 17°22 | 9° 9  | T 12 |
| W 13 | 3 29 6  | 20°46'07 | 25°45 | 2°54   | 7°11  | 16°34 | 20°27  | 15° 1 | 9° 5  | 2°35  | 9°42  | 7°44  | 6°52 | 17°29 | 9° 8  | W 13 |
| T 14 | 3 33 2  | 21°46'29 | 9♍1   | 3°21   | 8° 5  | 17° 8 | 20°26  | 15° 8 | 9° 3  | 2°D35 | 9°43  | 7°46  | 6°49 | 17°36 | 9° 8  | T 14 |
| F 15 | 3 36 59 | 22°46'53 | 22° 3 | 3°56   | 8°59  | 17°42 | 20°25  | 15°15 | 9° 2  | 2°35  | 9°45  | 7°47  | 6°45 | 17°43 | 9° 8  | F 15 |
| S 16 | 3 40 55 | 23°47'19 | 4♌53  | 4°40   | 9°52  | 18°15 | 20°23  | 15°23 | 9° 0  | 2°35  | 9°47  | 7°R47 | 6°42 | 17°49 | 9° 8  | S 16 |
| S 17 | 3 44 52 | 24°47'45 | 17°31 | 5°31   | 10°44 | 18°48 | 20°21  | 15°30 | 8°59  | 2°35  | 9°48  | 7°47  | 6°39 | 17°56 | 9° 7  | S 17 |
| M 18 | 3 48 49 | 25°48'14 | 29°57 | 6°28   | 11°35 | 19°22 | 20°19  | 15°37 | 8°57  | 2°35  | 9°50  | 7°46  | 6°36 | 18° 3 | 9° 7  | M 18 |
| T 19 | 3 52 45 | 26°48'44 | 12♌12 | 7°30   | 12°26 | 19°55 | 20°17  | 15°44 | 8°56  | 2°35  | 9°51  | 7°43  | 6°33 | 18° 9 | 9° 7  | T 19 |
| W 20 | 3 56 42 | 27°49'16 | 24°18 | 8°37   | 13°16 | 20°28 | 20°14  | 15°51 | 8°55  | 2°35  | 9°53  | 7°40  | 6°30 | 18°16 | 9°D 7 | W 20 |
| T 21 | 4 0 38  | 28°49'49 | 6♌17  | 9°48   | 14° 5 | 21° 1 | 20°12  | 15°58 | 8°53  | 2°36  | 9°55  | 7°37  | 6°26 | 18°23 | 9° 7  | T 21 |
| F 22 | 4 4 35  | 29°50'24 | 18°11 | 11° 3  | 14°54 | 21°34 | 20° 9  | 16° 5 | 8°52  | 2°36  | 9°57  | 7°33  | 6°23 | 18°30 | 9° 7  | F 22 |
| S 23 | 4 8 31  | 0♌51'01  | 0♌2   | 12°21  | 15°41 | 22° 7 | 20° 6  | 16°12 | 8°51  | 2°36  | 9°58  | 7°30  | 6°20 | 18°36 | 9° 8  | S 23 |
| S 24 | 4 12 28 | 1°51'39  | 11°54 | 13°41  | 16°28 | 22°39 | 20° 3  | 16°19 | 8°50  | 2°37  | 10° 0 | 7°27  | 6°17 | 18°43 | 9° 8  | S 24 |
| M 25 | 4 16 24 | 2°52'19  | 23°52 | 15° 3  | 17°14 | 23°12 | 19°59  | 16°26 | 8°48  | 2°37  | 10° 2 | 7°26  | 6°14 | 18°50 | 9° 8  | M 25 |
| T 26 | 4 20 21 | 3°53'00  | 6♍0   | 16°27  | 17°58 | 23°44 | 19°56  | 16°33 | 8°47  | 2°37  | 10° 3 | 7°D25 | 6°10 | 18°57 | 9° 8  | T 26 |
| W 27 | 4 24 18 | 4°53'43  | 18°23 | 17°53  | 18°42 | 24°17 | 19°52  | 16°40 | 8°46  | 2°38  | 10° 5 | 7°26  | 6° 7 | 19° 3 | 9° 9  | W 27 |
| T 28 | 4 28 14 | 5°54'28  | 1♌5   | 19°20  | 19°25 | 24°49 | 19°48  | 16°47 | 8°45  | 2°38  | 10° 7 | 7°27  | 6° 4 | 19°10 | 9° 9  | T 28 |
| F 29 | 4 32 11 | 6°55'14  | 14°10 | 20°48  | 20° 6 | 25°21 | 19°44  | 16°54 | 8°44  | 2°39  | 10° 9 | 7°29  | 6° 1 | 19°17 | 9°10  | F 29 |
| S 30 | 4 36 7  | 7°56'01  | 27♌41 | 22♌16  | 20♌47 | 25♍53 | 19°39  | 17♌1  | 8°Y43 | 2♋39  | 10♌11 | 7♑30  | 5♒58 | 19♓23 | 9♋10  | S 30 |

Delta T = 67.22 sec

DECEMBER 2013

00:00 UT

| Day  | Sid.t   | ☉        | ☽     | ♀     | ♂      | ♂     | ♂      | ♂     | ♂     | ♂    | ♂     | ♂     | ♂    | ♂     | ♂    | Day  |
|------|---------|----------|-------|-------|--------|-------|--------|-------|-------|------|-------|-------|------|-------|------|------|
| S 1  | 4 40 4  | 8♉56'51  | 11♌38 | 23♌46 | 21♌26  | 26♍25 | 19°R35 | 17♌8  | 8°R42 | 2♋40 | 10♌13 | 7°R31 | 5♒55 | 19♓30 | 9♋11 | S 1  |
| M 2  | 4 44 0  | 9°57'41  | 26° 2 | 25°16 | 22° 5  | 26°57 | 19°30  | 17°15 | 8°Y42 | 2°40 | 10°14 | 7♑29  | 5°51 | 19°37 | 9°12 | M 2  |
| T 3  | 4 47 57 | 10°58'33 | 10♌46 | 26°47 | 22°41  | 27°28 | 19°25  | 17°22 | 8°41  | 2°41 | 10°16 | 7°27  | 5°48 | 19°44 | 9°13 | T 3  |
| W 4  | 4 51 53 | 11°59'26 | 25°43 | 28°18 | 23°17  | 28° 0 | 19°20  | 17°28 | 8°40  | 2°42 | 10°18 | 7°22  | 5°45 | 19°50 | 9°13 | W 4  |
| T 5  | 4 55 50 | 13° 0'20 | 10♌46 | 29°50 | 23°51  | 28°31 | 19°15  | 17°35 | 8°40  | 2°42 | 10°20 | 7°17  | 5°42 | 19°57 | 9°14 | T 5  |
| F 6  | 4 59 47 | 14° 1'15 | 25°44 | 1♌21  | 24°24  | 29° 2 | 19°10  | 17°42 | 8°39  | 2°43 | 10°22 | 7°11  | 5°39 | 20° 4 | 9°15 | F 6  |
| S 7  | 5 3 43  | 15° 2'11 | 10♌30 | 2°54  | 24°55  | 29°33 | 19° 4  | 17°49 | 8°38  | 2°44 | 10°24 | 7° 6  | 5°36 | 20°10 | 9°16 | S 7  |
| S 8  | 5 7 40  | 16° 3'07 | 24°56 | 4°26  | 25°25  | 0♌4   | 18°59  | 17°55 | 8°38  | 2°45 | 10°26 | 7° 3  | 5°32 | 20°17 | 9°17 | S 8  |
| M 9  | 5 11 36 | 17° 4'04 | 9♋0   | 5°58  | 25°53  | 0°35  | 18°53  | 18° 2 | 8°37  | 2°46 | 10°28 | 7° 1  | 5°29 | 20°24 | 9°18 | M 9  |
| T 10 | 5 15 33 | 18° 5'02 | 22°41 | 7°31  | 26°19  | 1° 6  | 18°47  | 18° 8 | 8°37  | 2°47 | 10°30 | 7°D 1 | 5°26 | 20°31 | 9°19 | T 10 |
| W 11 | 5 19 29 | 19° 6'00 | 6♍1   | 9° 3  | 26°44  | 1°36  | 18°41  | 18°15 | 8°37  | 2°47 | 10°32 | 7° 2  | 5°23 | 20°37 | 9°21 | W 11 |
| T 12 | 5 23 26 | 20° 6'59 | 19° 1 | 10°36 | 27° 6  | 2° 7  | 18°34  | 18°22 | 8°36  | 2°48 | 10°34 | 7° 3  | 5°20 | 20°44 | 9°22 | T 12 |
| F 13 | 5 27 22 | 21° 7'58 | 1♌45  | 12° 9 | 27°27  | 2°37  | 18°28  | 18°28 | 8°36  | 2°49 | 10°36 | 7°R 4 | 5°16 | 20°51 | 9°23 | F 13 |
| S 14 | 5 31 19 | 22° 8'58 | 14°16 | 13°42 | 27°46  | 3° 7  | 18°21  | 18°34 | 8°36  | 2°50 | 10°38 | 7° 4  | 5°13 | 20°57 | 9°25 | S 14 |
| S 15 | 5 35 16 | 23° 9'59 | 26°36 | 15°15 | 28° 3  | 3°37  | 18°15  | 18°41 | 8°36  | 2°51 | 10°40 | 7° 2  | 5°10 | 21° 4 | 9°26 | S 15 |
| M 16 | 5 39 12 | 24°11'00 | 8♌47  | 16°49 | 28°18  | 4° 7  | 18° 8  | 18°47 | 8°35  | 2°52 | 10°42 | 6°57  | 5° 7 | 21°11 | 9°28 | M 16 |
| T 17 | 5 43 9  | 25°12'02 | 20°52 | 18°22 | 28°30  | 4°36  | 18° 1  | 18°53 | 8°35  | 2°54 | 10°44 | 6°51  | 5° 4 | 21°18 | 9°29 | T 17 |
| W 18 | 5 47 5  | 26°13'04 | 2♌51  | 19°55 | 28°41  | 5° 6  | 17°54  | 19° 0 | 8°D35 | 2°55 | 10°46 | 6°42  | 5° 1 | 21°24 | 9°31 | W 18 |
| T 19 | 5 51 2  | 27°14'08 | 14°46 | 21°29 | 28°49  | 5°35  | 17°47  | 19° 6 | 8°35  | 2°56 | 10°48 | 6°32  | 4°57 | 21°31 | 9°32 | T 19 |
| F 20 | 5 54 58 | 28°15'11 | 26°39 | 23° 3 | 28°55  | 6° 4  | 17°40  | 19°12 | 8°35  | 2°57 | 10°50 | 6°21  | 4°54 | 21°38 | 9°34 | F 20 |
| S 21 | 5 58 55 | 29°16'16 | 8♌30  | 24°37 | 28°58  | 6°33  | 17°32  | 19°18 | 8°36  | 2°58 | 10°52 | 6°11  | 4°51 | 21°44 | 9°36 | S 21 |
| S 22 | 6 2 51  | 0♌17'21  | 20°23 | 26°11 | 28°R59 | 7° 2  | 17°25  | 19°24 | 8°36  | 3° 0 | 10°54 | 6° 2  | 4°48 | 21°51 | 9°38 | S 22 |
| M 23 | 6 6 48  | 1°18'27  | 2♍21  | 27°45 | 28°57  | 7°30  | 17°18  | 19°30 | 8°36  | 3° 1 | 10°56 | 5°56  | 4°45 | 21°58 | 9°39 | M 23 |
| T 24 | 6 10 45 | 2°19'33  | 14°26 | 29°20 | 28°54  | 7°59  | 17°10  | 19°36 | 8°36  | 3° 2 | 10°59 | 5°52  | 4°42 | 22° 5 | 9°41 | T 24 |
| W 25 | 6 14 41 | 3°20'40  | 26°44 | 0♌54  | 28°47  | 8°27  | 17° 2  | 19°42 | 8°37  | 3° 3 | 11° 1 | 5°50  | 4°38 | 22°11 | 9°43 | W 25 |
| T 26 | 6 18 38 | 4°21'48  | 9♌19  | 2°29  | 28°38  | 8°55  | 16°55  | 19°48 | 8°37  | 3° 5 | 11° 3 | 5°D49 | 4°35 | 22°18 | 9°45 | T 26 |
| F 27 | 6 22 34 | 5°22'56  | 22°16 | 4° 5  | 28°27  | 9°23  | 16°47  | 19°54 | 8°38  | 3° 6 | 11° 5 | 5°50  | 4°32 | 22°25 | 9°47 | F 27 |
| S 28 | 6 26 31 | 6°24'05  | 5♌39  | 5°40  | 28°13  | 9°50  | 16°39  | 19°59 | 8°38  | 3° 8 | 11° 7 | 5°R51 | 4°29 | 22°32 | 9°49 | S 28 |
| S 29 | 6 30 27 | 7°25'15  | 19°31 | 7°16  | 27°57  | 10°18 | 16°31  | 20° 5 | 8°39  | 3° 9 | 11° 9 | 5°50  | 4°26 | 22°38 | 9°52 | S 29 |
| M 30 | 6 34 24 | 8°26'25  | 3♌52  | 8°52  | 27°38  | 10°45 | 16°23  | 20°10 | 8°39  | 3°11 | 11°11 | 5°47  | 4°22 | 22°45 | 9°54 | M 30 |
| T 31 | 6 38 20 | 9♌27'36  | 18♌40 | 10♌28 | 27♌17  | 11♌12 | 16°35  | 20♌16 | 8°Y40 | 3♋12 | 11♌13 | 5♒41  | 4♒19 | 22♓52 | 9♋56 | T 31 |

Delta T = 67.25 sec