

 2021

# Almanaque Astronômico Brasileiro



Herança do  
ANO INTERNACIONAL DA  
ASTRONOMIA

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(Org.)



Crédito Foto: NASA, ESA, and C. Robert O'Dell (Vanderbilt University).

# **ALMANAQUE ASTRONÔMICO BRASILEIRO**

## **2021**

**Ano XVIII**

Dezembro - 2020

**Capa:** M 57 – Nebulosa do Anel - Crédito da foto: NASA, ESA, and C. Robert O'Dell (Vanderbilt University) (NASA, ESA, AND C. ROBERT O'DELL (VANDERBILT UNIVERSITY), 2013. (Fonte: <<https://www.spacetelescope.org/images/heic1310a/>>.) – Acesso em 24 Set. 2020).

## I - Definição

**ALMANAQUE** – s.m. (Do árabe. Al-manach.) 1. Anuário que contém informações variadas. – 2. Calendário que comporta indicações astronômicas e/ou meteorológicas.

**ASTRONÔMICO** – adj. (Do grego. Astronomikos.) 1. Relativo a astronomia: descobertas astronômicas. – 2. Figurativo. De grandes proporções; exagerado, exorbitante.

**BRASILEIRO** – [Do top. Brasil + -eiro.] Adj. 1. De, ou pertencente ou relativo ao Brasil. s. m. 2. O natural ou habitante do Brasil.

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### **III - Apresentação**

Nobres amigos (as),

A busca da qualidade e pontualidade das informações são objetivos perenes e deles não abrimos mão. Desta forma, as mudanças que ocorrem anualmente nesta publicação refletem a necessidade observacional, sendo apontadas pelos diversos observadores com quem temos a oportunidade de trocar ideias e correspondências. Isso vem demonstrando também o quanto esta é uma publicação útil e dinâmica.

Chega-se então ao marco de 18 anos de edições contínuas, quando em 2003 foi lançada a sua primeira edição, trazendo sempre como escopo a disseminação da Ciência Astronômica em seu aspecto simples. Assim, continuam inseridos os fenômenos que ocorrerão na abóbada celeste, sendo que neste ano novamente foram introduzidas algumas sugestões por parte dos integrantes da Turma Áquila (5<sup>a</sup> turma do GREC - Grupo de Reconhecimento e Estudos do Céu) que conta com associados recém-ingressos no CEAMIG e que buscam elevar seus conhecimentos sobre a esfera celeste.

Como de praxe, são vislumbrados, de forma bem eclética, os feriados para o ano de 2021. Assim, constam nesta publicação as datas fixas, as móveis e também algumas de caráter eclesiástico, bem como as comemorativas (fixas e móveis). Reforço o pedido a todos aqueles que conheçam outras datas igualmente importantes e sugestivas, que nos as envie com uma pequena sinopse para o CEAMIG/GREC (Centro de Estudos Astronômicos de Minas Gerais), para que possamos incluí-las nas edições que certamente ocorrerão nos próximos anos.

Incluíram-se também dados para as observações da Lua e Sol. Os eclipses que ocorrerão este ano foram tratados de uma maneira mais técnica (sob o ponto de vista observacional). Para os planetas do sistema solar (incluindo também os planetas menores 1 Ceres e 134340 Plutão), são mencionados, como também apresentados, os diagramas para os satélites galileanos. Buscamos também contemplar os asteroides em oposição que estejam com suas elongações favoráveis e cometas cuja magnitude esteja no limite visual 12.5. Além disso, foram inseridas também as ocorrências das principais chuvas de meteoros.

As informações do nascer e ocaso do Sol provocados pela rotação da Terra serão válidas somente para as capitais dos estados do Brasil, onde foram utilizadas as coordenadas geográficas descritas abaixo das respectivas localidades, bem como seu respectivo fuso horário, vigente conforme legislação em vigor.

Encontram-se ainda para utilização em nosso dia a dia as tabelas com fusos horários de diversas nações às quais o Brasil possui relações diplomáticas, bem como a tabela de conversão de pesos e medidas, os pesos e medidas brasileiras, as unidades de medidas legais no Brasil, as medidas de superfície mais usadas no Brasil, o alfabeto grego, a magnitude limite de um telescópio (texto), a resolução, o limite de aumento e MALE para pequenos instrumentos, os símbolos utilizados em astronomia e os símbolos e abreviaturas utilizados neste almanaque.

Nesta edição do 18º (décimo oitavo) ano de circulação contínua desta publicação, nossa capa conta com a magnífica imagem de M57, Nebulosa do Anel como uma homenagem a todos os integrantes do GREC (Grupo de Reconhecimento e Estudos do Céu) que mesmo diante de diversos óbices ocorridos em 2020, propuseram novos desafios quando ele então experimenta crescimento para além das fronteiras do Brasil. Assim, no limiar de sua circulação novo motivo de júbilo se refaz, visto que sua finalidade primordial é e sempre será tornar-se uma ferramenta útil e presente como coadjuvante na disseminação perene da ciência astronômica.

Noites estreladas!

# IV - Calendário 2021

## Feriados

Confraternização Universal	01 Janeiro	Carnaval	16 Fevereiro
Domingo de Ramos	28 Março	Sexta-feira da Paixão	02 Abril
Páscoa	04 Abril	Tiradentes	21 Abril
Dia de trabalho	01 Maio	Dia de Nossa Senhora	15 Agosto
Corpus Christi	03 Junho	Nossa Senhora Aparecida	12 Outubro
Independência do Brasil	07 Setembro	Proclamação da República	15 Novembro
Finados	02 Novembro	Natal	25 Dezembro

## Calendário Gregoriano e Datas Comemorativas

### Janeiro

Seg	Ter	Qua	Qui	Sex	Sab	Dom
				01	02	03
04	05	06	07	08	09	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

- |    |                                    |    |   |
|----|------------------------------------|----|---|
| 01 | Dia Mundial da Paz                 | 21 | Dia Mundial da Religião                         |
| 03 | Dia da Abreugrafia                 | 24 | Dia Nacional dos Aposentados                    |
| 05 | Criação da 1ª tipografia do Brasil |    | Dia da Instituição do Casamento Civil no Brasil |
| 06 | Dia da Gratidão                    | 25 | Dia do Carteiro                                 |
| 07 | Dia da liberdade de cultos         | 27 | Dia da Elevação do Brasil à Vice-Reinado (1763) |
| 08 | Dia do Fotógrafo                   | 28 | Dia da Abertura dos Portos no Brasil (1808)     |
| 09 | Dia do Fico (1822)                 | 30 | Dia da Saudade                                  |
| 14 | Dia do Enfermo                     |    | Dia da Não-Violência                            |
| 18 | Dia Nacional do Krav Maga          |    | Dia Nacional das Histórias em quadrinhos        |
| 20 | Dia do Farmacêutico                |    |   |

### Fevereiro

Seg	Ter	Qua	Qui	Sex	Sab	Dom
01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

- |    |                                 |    |  |
|----|---------------------------------|----|--|
| 02 | Dia do Agente Fiscal            | 16 | Dia do Repórter                            |
| 05 | Dia do Datiłoscopista           | 19 | Dia do Esportista                          |
| 07 | Dia do Gráfico                  | 21 | Dia da Conquista de Monte Castelo (1945)   |
| 09 | Dia Nacional do Cerco da Lapa   | 23 | Dia do Rotaryano                           |
| 11 | Dia do Zelador                  | 24 | Promulgação da 1ª Constituição Republicana |
|    | Dia da Criação da Casa da Moeda | 25 | Dia do Ministério das Comunicações         |
| 13 | Dia do Ministério Público       | 27 | Dia dos Idosos                             |
| 14 | Dia da Amizade                  |    |  |

## Março

<b>Seg</b>	<b>Ter</b>	<b>Qua</b>	<b>Qui</b>	<b>Sex</b>	<b>Sab</b>	<b>Dom</b>
01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

02	Dia Nacional do Turismo	14	Dia Nacional da Poesia
03	Dia do Meteorologista		Dia dos Animais
05	Dia do Filatelista Brasileiro	15	Dia da Escola
07	Dia dos Fuzileiros Navais	16	Dia Nacional do Teatro do Oprimido
08	Dia Internacional da Mulher	19	Dia do Carpinteiro
10	Dia do Telefone	21	Dia Universal do Teatro
12	Dia do Bibliotecário	26	Dia do Cacau

## Abril

<b>Seg</b>	<b>Ter</b>	<b>Qua</b>	<b>Qui</b>	<b>Sex</b>	<b>Sab</b>	<b>Dom</b>
			01	02	03	04
05	06	07	08	09	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

01	Dia da Mentira	20	Dia do Diplomata
07	Dia Mundial da Saúde	21	Dia do Metalúrgico
08	Dia Mundial de Combate ao Câncer	22	Dia do Descobrimento do Brasil
10	Dia da Engenharia		Dia da Força Aérea Brasileira
12	Dia da Intendência	23	Dia do Escoteiro
13	Dia do Jovem	26	Dia do Goleiro
15	Dia do Desenhista	27	Dia do Sacerdote
18	Dia de Monteiro Lobato	28	Dia da Sogra
19	Dia do Índio	30	Dia do Ferroviário

## Maio

<b>Seg</b>	<b>Ter</b>	<b>Qua</b>	<b>Qui</b>	<b>Sex</b>	<b>Sab</b>	<b>Dom</b>
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17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

02	Dia do Ex-Combatente	16	Dia do Gari
05	Dia do Pintor	21	Dia da Língua Nacional
08	Dia da Vitória	24	Dia do Vestibulado
10	Dia da Cavalaria	29	Dia do Geógrafo
13	Dia da Abolição da Escravatura	30	Dia das Bandeiras
15	Dia do Assistente Social	31	Dia do Comissário de Bordo

## **Junho**

<b>Seg</b>	<b>Ter</b>	<b>Qua</b>	<b>Qui</b>	<b>Sex</b>	<b>Sab</b>	<b>Dom</b>
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14	15	16	17	18	19	20
21	22	23	24	25	26	27
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|----|---------------------------------------|----|------------------------------------|
| 01 | Dia da 1ª transmissão de TV no Brasil | 18 | Dia do Químico                     |
| 05 | Dia da Ecologia                       | 19 | Dia dos Profissionais de Marketing |
| 07 | Dia da Liberdade de Imprensa          | 21 | Dia da Mídia                       |
| 09 | Dia Nacional do Pe. Anchieta          | 22 | Dia do Empregador Gráfico          |
| 11 | Dia da Marinha Brasileira             | 27 | Dia Nacional do Progresso          |
| 12 | Dia dos Namorados                     | 28 | Dia da Renovação Espiritual        |
| 13 | Dia do Turista                        | 29 | Dia da Telefonista                 |

## **Julho**

<b>Seg</b>	<b>Ter</b>	<b>Qua</b>	<b>Qui</b>	<b>Sex</b>	<b>Sab</b>	<b>Dom</b>
			01	02	03	04
05	06	07	08	09	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

- |    |                                |    |   |
|----|--------------------------------|----|---|
| 01 | Dia da Vacina BCG              | 17 | Dia do Protetor de florestas            |
| 02 | Dia do Hospital                | 19 | Dia da Caridade                         |
| 06 | Criação do IBGE                |    | Dia Nacional do Futebol                 |
| 10 | Dia da Pizza                   | 20 | Dia do Amigo e Internacional da Amizade |
| 14 | Dia da Liberdade de Pensamento | 25 | Dia do Motorista                        |
| 15 | Dia Nacional dos Clubes        |    | Dia do Escritor                         |
| 16 | Dia do Comerciante             | 26 | Dia da Vovó                             |

## **Agosto**

<b>Seg</b>	<b>Ter</b>	<b>Qua</b>	<b>Qui</b>	<b>Sex</b>	<b>Sab</b>	<b>Dom</b>
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02	03	04	05	06	07	08
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16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

- |    |                        |    |                            |
|----|------------------------|----|----------------------------|
| 01 | Dia Nacional do Selo   | 15 | Dia da Informática         |
| 03 | Dia do Tintureiro      | 22 | Dia do Folclore            |
| 04 | Dia do Padre           | 24 | Dia da Infância            |
| 08 | Dia dos Bandeirantes   | 25 | Dia do Exército Brasileiro |
| 11 | Dia do Estudante       | 27 | Dia do Corretor de Imóveis |
| 12 | Dia Nacional das Artes | 28 | Dia Nacional dos Bancários |
| 13 | Dia do Pensamento      | 31 | Dia do Nutricionista       |
| 14 | Dia da Unidade Humana  |    |                            |

## **Setembro**

<b>Seg</b>	<b>Ter</b>	<b>Qua</b>	<b>Qui</b>	<b>Sex</b>	<b>Sab</b>	<b>Dom</b>
		01	02	03	04	05
06	07	08	09	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

03	Dia Nacional do Biólogo	20	Dia do Funcionário Público Municipal
06	Dia do Hino Nacional	21	Dia da Árvore
08	Dia Nacional da Alfabetização	22	Dia da Juventude do Brasil
09	Dia do Administrador	27	Dia do Ancião
10	Dia da Imprensa	28	Dia da Lei do Ventre Livre
13	Dia do Agrônomo	29	Dia do Petróleo
18	Dia dos Símbolos Nacionais	30	Dia da Secretária

## **Outubro**

<b>Seg</b>	<b>Ter</b>	<b>Qua</b>	<b>Qui</b>	<b>Sex</b>	<b>Sab</b>	<b>Dom</b>
				01	02	03
04	05	06	07	08	09	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

03	Dia Mundial do Dentista	15	Dia do Professor
	Dia Nacional da Agroecologia	16	Dia da Ciência & Tecnologia
04	Dia da Natureza	18	Dia do Médico
05	Dia das Aves	19	Dia do Profissional de TI
07	Dia do Compositor	23	Dia do Aviador e da Aviação
12	Dia do Descobrimento da América	25	Dia da Democracia
	Dia das Crianças		Dia do Sapateiro
	Dia do Mar	30	Dia do Comerciário

## Novembro

<b>Seg</b>	<b>Ter</b>	<b>Qua</b>	<b>Qui</b>	<b>Sex</b>	<b>Sab</b>	<b>Dom</b>
01	02	03	04	05	06	07
08	09	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

03	Dia do Barbeiro	11	Dia do Armistício
04	Dia do Inventor	12	Dia do Supermercado
05	Dia Mundial do Radioamador Dia da Ciência	19 20	Dia da Bandeira Dia Nacional da Consciência Negra
08	Dia Mundial do Urbanismo	22	Dia do Músico
09	Dia do Município	25	Dia do Doador de Sangue
10	Dia do Trigo		Dia Nacional do Samba de Roda

## Dezembro

<b>Seg</b>	<b>Ter</b>	<b>Qua</b>	<b>Qui</b>	<b>Sex</b>	<b>Sab</b>	<b>Dom</b>
		01	02	03	04	05
06	07	08	09	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

01	Dia Mundial de Combate a AIDS	11	Dia do Arquiteto
02	Dia da Astronomia Lei Nº 13.556, de 21/12/2017. Dia Nacional do Samba	13	Dia do Ótico
03	Dia Nacional do Deficiente Físico Dia do Delegado de Polícia	16	Dia do Reservista
04	Dia do Orientador Profissional	19	Dia do Atleta Profissional
09	Dia da Criança Defeituosa	20	Dia do Mecânico
10	Dia da Declaração dos Direitos Humanos Dia do Palhaço	23	Dia do Vizinho
		28	Dia do Salva Vidas

# Calendário Juliano - 2021

Dias Julianos (Dias Astronômicos) iniciados às 12:00 GMT, sendo numerados consecutivamente a partir de 1º de Janeiro de 4713 A.C. Dia Juliano 2459215.5 = 1º de Janeiro de 2021.

Mês / Dia	Jan	Fev	Mar	Abr	Mai	Jun
1	2459215.5	2459246.5	2459274.5	2459305.5	2459335.5	2459366.5
2	2459216.5	2459247.5	2459275.5	2459306.5	2459336.5	2459367.5
3	2459217.5	2459248.5	2459276.5	2459307.5	2459337.5	2459368.5
4	2459218.5	2459249.5	2459277.5	2459308.5	2459338.5	2459369.5
5	2459219.5	2459250.5	2459278.5	2459309.5	2459339.5	2459370.5
6	2459220.5	2459251.5	2459279.5	2459310.5	2459340.5	2459371.5
7	2459221.5	2459252.5	2459280.5	2459311.5	2459341.5	2459372.5
8	2459222.5	2459253.5	2459281.5	2459312.5	2459342.5	2459373.5
9	2459223.5	2459254.5	2459282.5	2459313.5	2459343.5	2459374.5
10	2459224.5	2459255.5	2459283.5	2459314.5	2459344.5	2459375.5
11	2459225.5	2459256.5	2459284.5	2459315.5	2459345.5	2459376.5
12	2459226.5	2459257.5	2459285.5	2459316.5	2459346.5	2459377.5
13	2459227.5	2459258.5	2459286.5	2459317.5	2459347.5	2459378.5
14	2459228.5	2459259.5	2459287.5	2459318.5	2459348.5	2459379.5
15	2459229.5	2459260.5	2459288.5	2459319.5	2459349.5	2459380.5
16	2459230.5	2459261.5	2459289.5	2459320.5	2459350.5	2459381.5
17	2459231.5	2459262.5	2459290.5	2459321.5	2459351.5	2459382.5
18	2459232.5	2459263.5	2459291.5	2459322.5	2459352.5	2459383.5
19	2459233.5	2459264.5	2459292.5	2459323.5	2459353.5	2459384.5
20	2459234.5	2459265.5	2459293.5	2459324.5	2459354.5	2459385.5
21	2459235.5	2459266.5	2459294.5	2459325.5	2459355.5	2459386.5
22	2459236.5	2459267.5	2459295.5	2459326.5	2459356.5	2459387.5
23	2459237.5	2459268.5	2459296.5	2459327.5	2459357.5	2459388.5
24	2459238.5	2459269.5	2459297.5	2459328.5	2459358.5	2459389.5
25	2459239.5	2459270.5	2459298.5	2459329.5	2459359.5	2459390.5
26	2459240.5	2459271.5	2459299.5	2459330.5	2459360.5	2459391.5
27	2459241.5	2459272.5	2459300.5	2459331.5	2459361.5	2459392.5
28	2459242.5	2459273.5	2459301.5	2459332.5	2459362.5	2459393.5
29	2459243.5		2459302.5	2459333.5	2459363.5	2459394.5
30	2459244.5		2459303.5	2459334.5	2459364.5	2459395.5
31	2459245.5		2459304.5		2459365.5	

Mês / Dia	Jul	Ago	Set	Out	Nov	Dez
1	2459396.5	2459427.5	2459458.5	2459488.5	2459519.5	2459549.5
2	2459397.5	2459428.5	2459459.5	2459489.5	2459520.5	2459550.5
3	2459398.5	2459429.5	2459460.5	2459490.5	2459521.5	2459551.5
4	2459399.5	2459430.5	2459461.5	2459491.5	2459522.5	2459552.5
5	2459400.5	2459431.5	2459462.5	2459492.5	2459523.5	2459553.5
6	2459401.5	2459432.5	2459463.5	2459493.5	2459524.5	2459554.5
7	2459402.5	2459433.5	2459464.5	2459494.5	2459525.5	2459555.5
8	2459403.5	2459434.5	2459465.5	2459495.5	2459526.5	2459556.5
9	2459404.5	2459435.5	2459466.5	2459496.5	2459527.5	2459557.5
10	2459405.5	2459436.5	2459467.5	2459497.5	2459528.5	2459558.5
11	2459406.5	2459437.5	2459468.5	2459498.5	2459529.5	2459559.5
12	2459407.5	2459438.5	2459469.5	2459499.5	2459530.5	2459560.5
13	2459408.5	2459439.5	2459470.5	2459500.5	2459531.5	2459561.5
14	2459409.5	2459440.5	2459471.5	2459501.5	2459532.5	2459562.5
15	2459410.5	2459441.5	2459472.5	2459502.5	2459533.5	2459563.5
16	2459411.5	2459442.5	2459473.5	2459503.5	2459534.5	2459564.5
17	2459412.5	2459443.5	2459474.5	2459504.5	2459535.5	2459565.5
18	2459413.5	2459444.5	2459475.5	2459505.5	2459536.5	2459566.5
19	2459414.5	2459445.5	2459476.5	2459506.5	2459537.5	2459567.5
20	2459415.5	2459446.5	2459477.5	2459507.5	2459538.5	2459568.5
21	2459416.5	2459447.5	2459478.5	2459508.5	2459539.5	2459569.5
22	2459417.5	2459448.5	2459479.5	2459509.5	2459540.5	2459570.5
23	2459418.5	2459449.5	2459480.5	2459510.5	2459541.5	2459571.5
24	2459419.5	2459450.5	2459481.5	2459511.5	2459542.5	2459572.5
25	2459420.5	2459451.5	2459482.5	2459512.5	2459543.5	2459573.5
26	2459421.5	2459452.5	2459483.5	2459513.5	2459544.5	2459574.5
27	2459422.5	2459453.5	2459484.5	2459514.5	2459545.5	2459575.5
28	2459423.5	2459454.5	2459485.5	2459515.5	2459546.5	2459576.5
29	2459424.5	2459455.5	2459486.5	2459516.5	2459547.5	2459577.5
30	2459425.5	2459456.5	2459487.5	2459517.5	2459548.5	2459578.5
31	2459426.5	2459457.5		2459518.5		2459579.5

# V - Aspecto e os fenômenos do Céu – Janeiro a Dezembro

**Aspecto do Céu em Belo Horizonte – MG, Brasil  
15 Jan – 0h:00m (TU).**

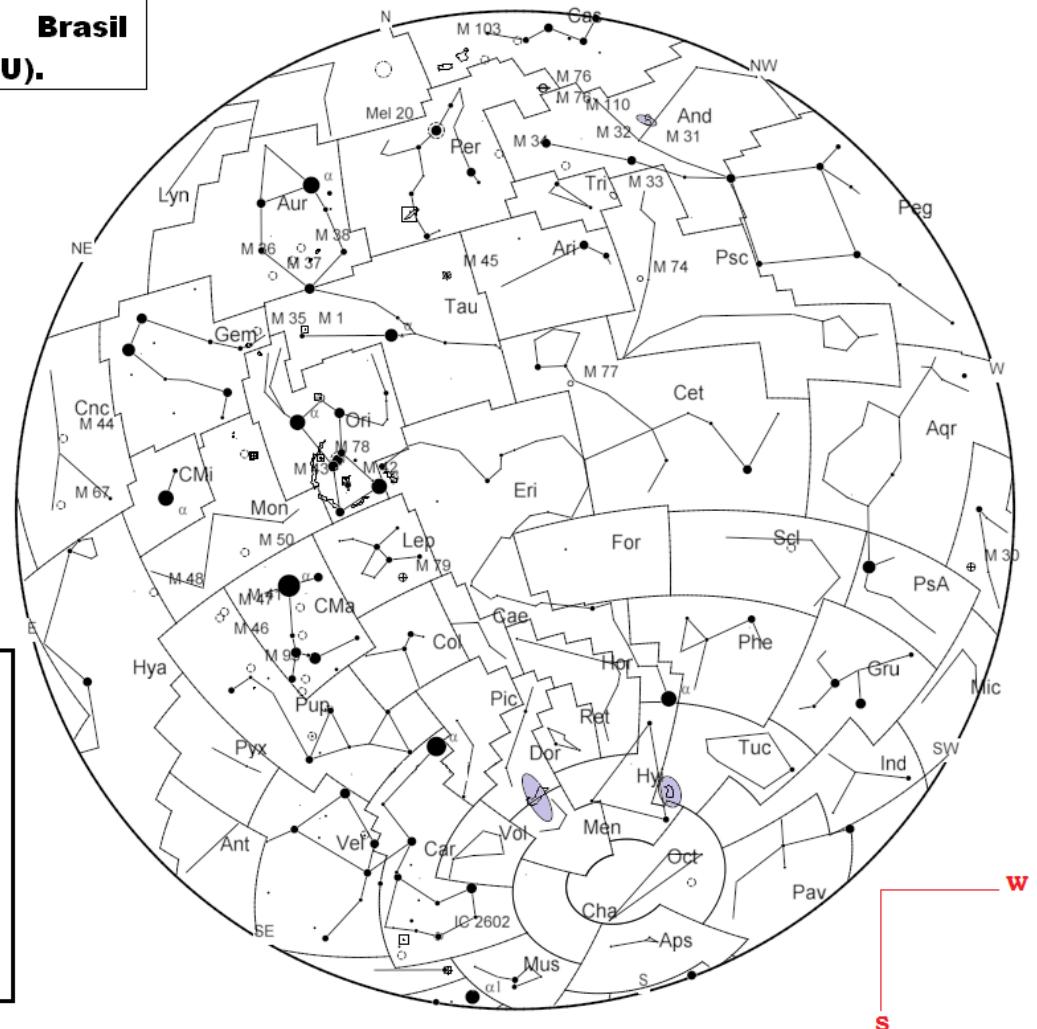
## Legenda

-1 0 1 2 3 4

Gde. N. Magalhães

Peq. N. Magalhães

M 31



Janeiro 2021  
00:00 (Tempo Universal)

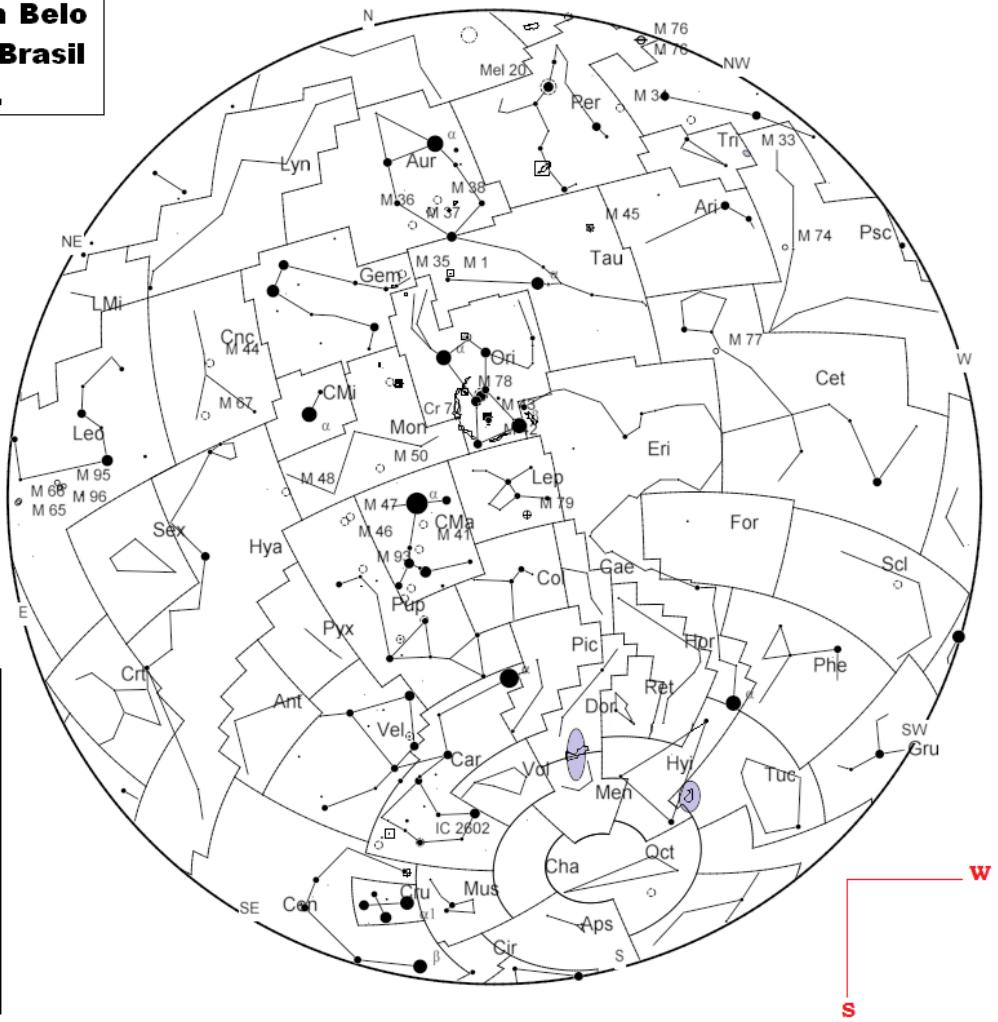
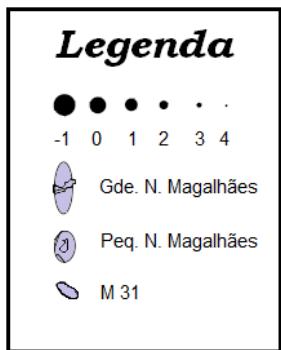
Dia	Hora	Evento	Dia	Hora	Evento
2	13:50	Terra no periélio (Dist. ao Sol = 0.98325 u.a)	17	09:00	Netuno 4.1°N da Lua
3	01:00	Regulus (Mv= 1.41) 4.5°S da Lua	20	20:00	Marte 1.6°N de Urano
5	00:00	Mercurio 0.9°S de (134340) Plutão	21	02:00	Lua Crescente
6	09:37	Lua Minguante	21	09:00	Marte 4.6°N da Lua
9	15:40	Lua no perigeu (Dist. a Terra = 367.389 km)	13:12		Lua no Apogeu (Dist. a Terra = 404.360 km)
10	03:00	Mercurio 1.6°S de Saturno	23	20:00	Mercurio em máxima elongação E (19°)
	04:00	Antares (Mv= 1.07) 5.4°S da Lua (-24.9°)	24	03:00	Aldebaran (Mv= 0.99) 4.7°S da Lua
11	17:00	Mercurio 1.4°S de Júpiter	03:00		Saturno em conjunção
	20:00	Vênus 1.5°N da Lua	26	15:00	Lua em máxima declinação Norte (24.9°)
12	08:00	Lua em máxima declinação Sul (-24.9°)	27	15:00	Pollux (Mv= 1.22) 3.8°N da Lua
13	05:00	Lua Nova (Lun. 1213), dur. = 29d 14h 05m	28	16:00	Vênus 0.7°N de (134340) Plutão
	07:00	(134340) Plutão 1.8°N da Lua	19:16		Lua Cheia
	22:00	Saturno 3.2°N da Lua	29	01:00	Júpiter em conjunção
14	02:00	Júpiter 3.2°N da Lua	30	00:00	Mercurio estacionário
	09:00	Mercurio 2.3°N da Lua	08:00		Regulus (Mv= 1.41) 4.3°S da Lua
	13:00	Urano estacionário			
	14:00	(134340) Plutão em conjunção			

## Objetos de Céu Profundo

M 35 / NGC 2168 - Aglomerado Aberto  
M 41 / NGC 2287 – Aglomerado Aberto

[M 1 / NGC 1952 - Nebulosa do Caranguejo](#)  
NGC 5128 - Galáxia Centaurus A

**Aspecto do Céu em Belo  
Horizonte – MG, Brasil  
15 Fev – 0h:00m (TU).**



Dia	Hora	Evento
3	19:34	Lua no perigeu (Dist. a Terra = 370.126 km)
4	17:37	Lua Minguante
6	07:00	Vênus 0.4°S de Saturno
	10:00	Antares (Mv= 1.07) 5.3°S da Lua
8	13:00	Mercúrio em conjunção inferior
	15:00	Lua em máxima declinação Sul (-25.0°)
9	17:00	(134340) Plutão 1.9°N da Lua
10	12:00	Saturno 3.4°N da Lua
	22:00	Vênus 3.1°N da Lua
	23:00	Júpiter 3.6°N da Lua
11	15:00	Vênus 0.4°S de Júpiter
	19:06	Lua Nova (Lun. 1214), dur. = 29d 15h 15m
13	08:00	Mercúrio 4.5°N de Vênus

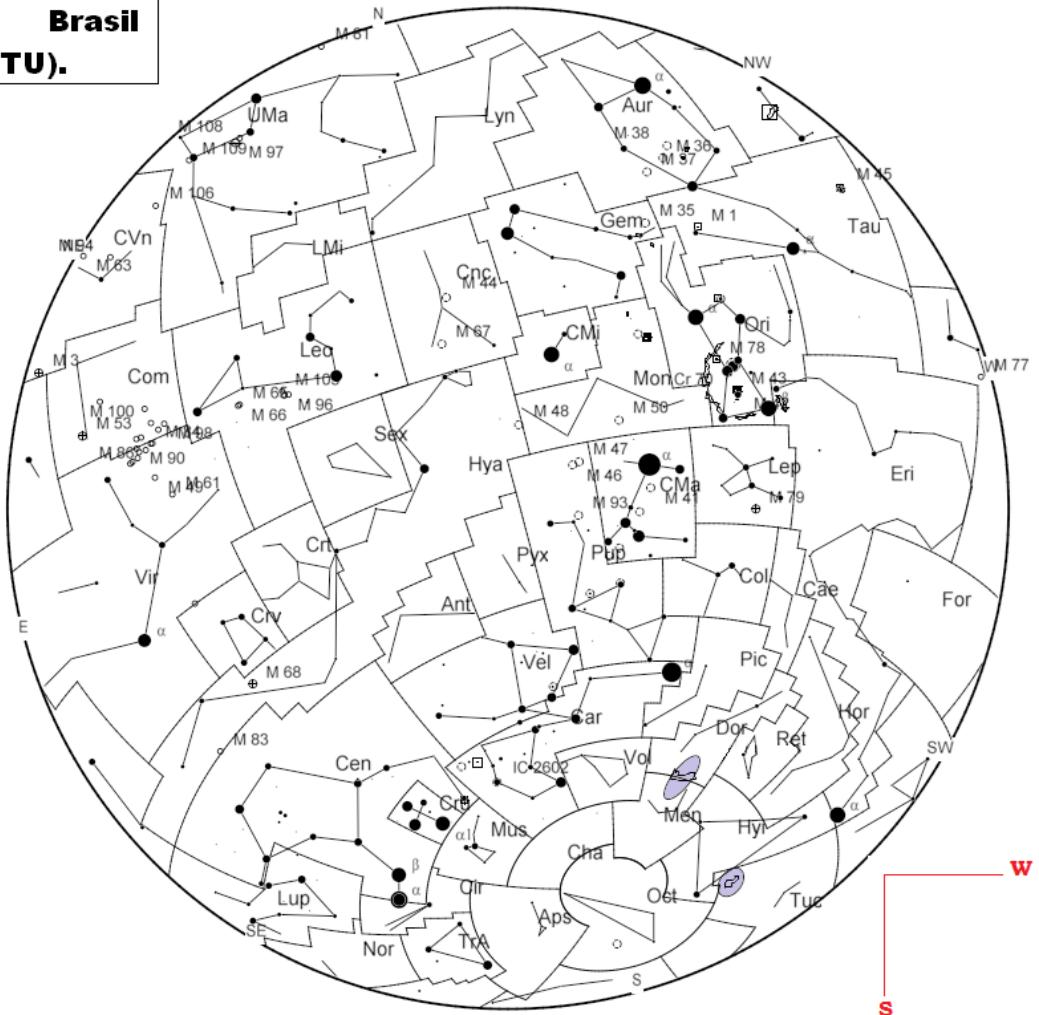
Dia	Hora	Evento
13	20:00	Netuno 3.9°N da Lua
15	02:00	Mercúrio 3.8°N de Júpiter
17	17:00	Urano 2.8°N da Lua
18	10:23	Lua no Apogeu (Dist. a Terra = 404.465 km)
19	00:00	Marte 3.5°N da Lua
	18:47	Lua Crescente
20	12:00	Aldebaran (Mv= 0.99) 4.9°S da Lua
	14:00	Mercúrio estacionário
23	00:00	Lua em máxima declinação Norte (25.1°)
24	00:00	Pollux (Mv= 1.22) 3.6°N da Lua
26	17:00	Regulus (Mv= 1.41) 4.3°S da Lua
27	08:17	Lua Cheia

**Objetos de Céu Profundo**

M 80 / NGC 6093 – Aglomerado Globular  
M 82 / NGC 3034 – Galáxia Irregular

[NGC 2264 - Árvore de Natal e a Nebulosa do Cone](#)  
[M 5 / NGC 5904 – Aglomerado Globular](#)

**Aspecto do Céu em Belo  
Horizonte - MG, Brasil  
15 Mar - 0h:00m (TU).**



**Março 2021  
00:00 (Tempo Universal)**

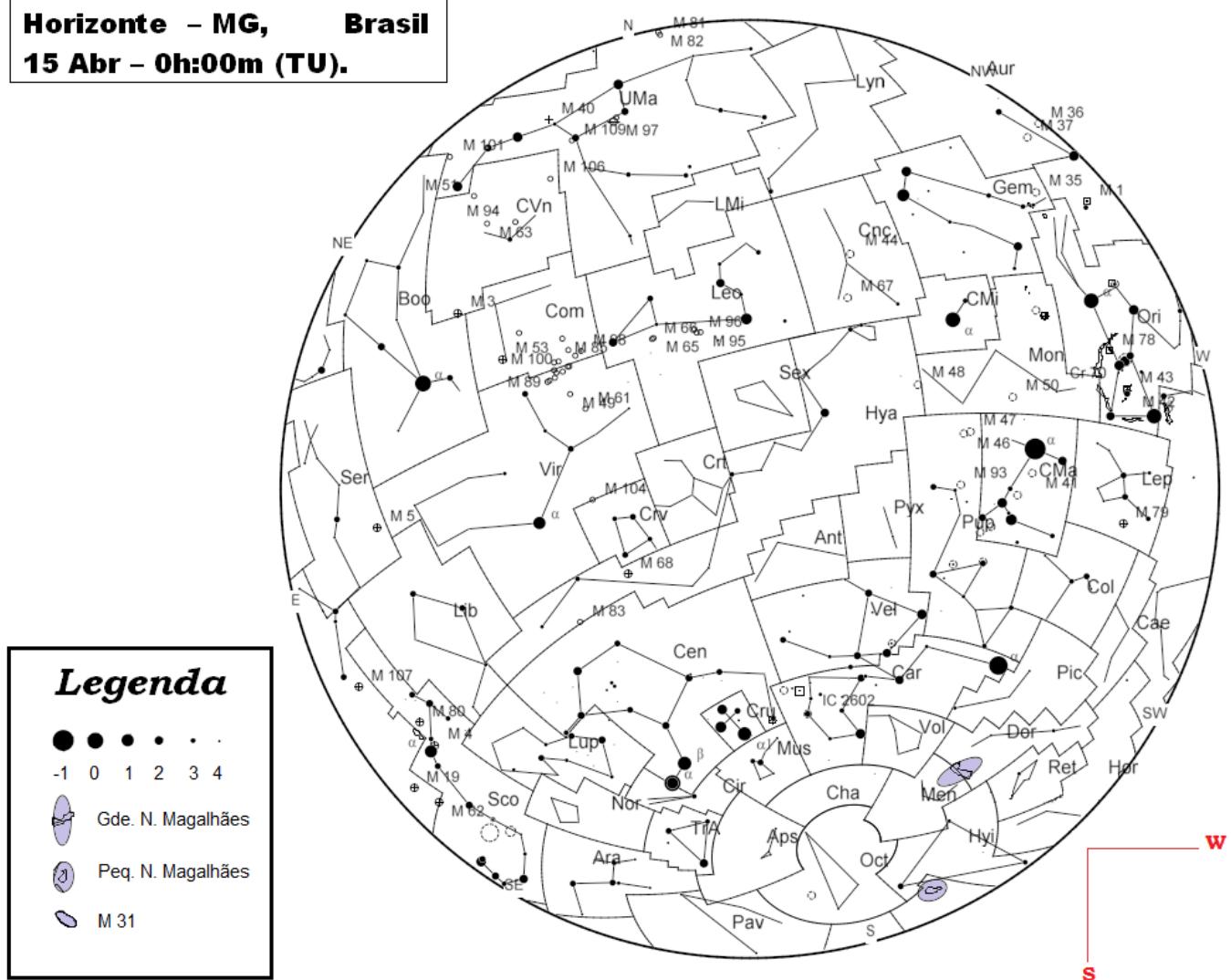
Dia	Hora	Evento	Dia	Hora	Evento
02	05:20	Lua no perigeu (Dist. a Terra = 365.421 km)	14	04:00	Vênus 0.4°S de Netuno
	10:00	Spica (Mv= 1.06) 6.0°S da Lua	17	03:00	Urano 2.5°N da Lua
05	00:00	Mercurio 0.4°N de Júpiter	18	05:05	Lua no Apogeu (Dist. a Terra = 405.252 km)
	15:00	Antares (Mv= 1.07) 5.1°S da Lua	19	18:00	Marte 1.9°N da Lua
06	01:30	Lua Minguante		20:00	Aldebaran (Mv= 0.99) 5.1°S da Lua
	15:00	Mercurio em máxima elongação W (27°)	20	09:38	Equinócio
07	21:00	Lua em máxima declinação Sul (-25.2°)	21	14:40	Lua Crescente
09	00:00	(134340) Plutão 2.0°N da Lua	22	08:00	Lua em máxima declinação Norte (25.3°)
10	0:00	Saturno 3.6°N da Lua	23	09:00	Pollux (Mv= 1.22) 3.4°N da Lua
	18:00	Júpiter 3.9°N da Lua	26	03:00	Regulus (Mv= 1.41) 4.4°S da Lua
11	00:00	Netuno em conjunção		07:00	Vênus em conjunção superior
	03:00	Mercurio 3.5°N da Lua	28	18:48	Lua Cheia
13	03:00	Vênus 3.5°N da Lua	29	20:00	Spica (Mv= 1.06) 5.9°S da Lua
	05:00	Netuno 3.9°N da Lua	30	03:00	Mercurio 1.3°S de Netuno
	10:21	Lua Nova (Lun. 1215), dur. = 29d 16h 10m		06:13	Lua no perigeu (Dist. a Terra = 360.310 km)

**Objetos de Céu Profundo**

[NGC 3372 – Nebulosa Carina](#)  
M 105 / NGC 3379 - Galáxia Elíptica

M 66 / NGC 3367 - Galáxia Espiral barrada  
M 61 / NGC 4303 - Galáxia Espiral

**Aspecto do Céu em Belo  
Horizonte – MG, Brasil  
15 Abr – 0h:00m (TU).**



**Abril 2021  
00:00 (Tempo Universal)**

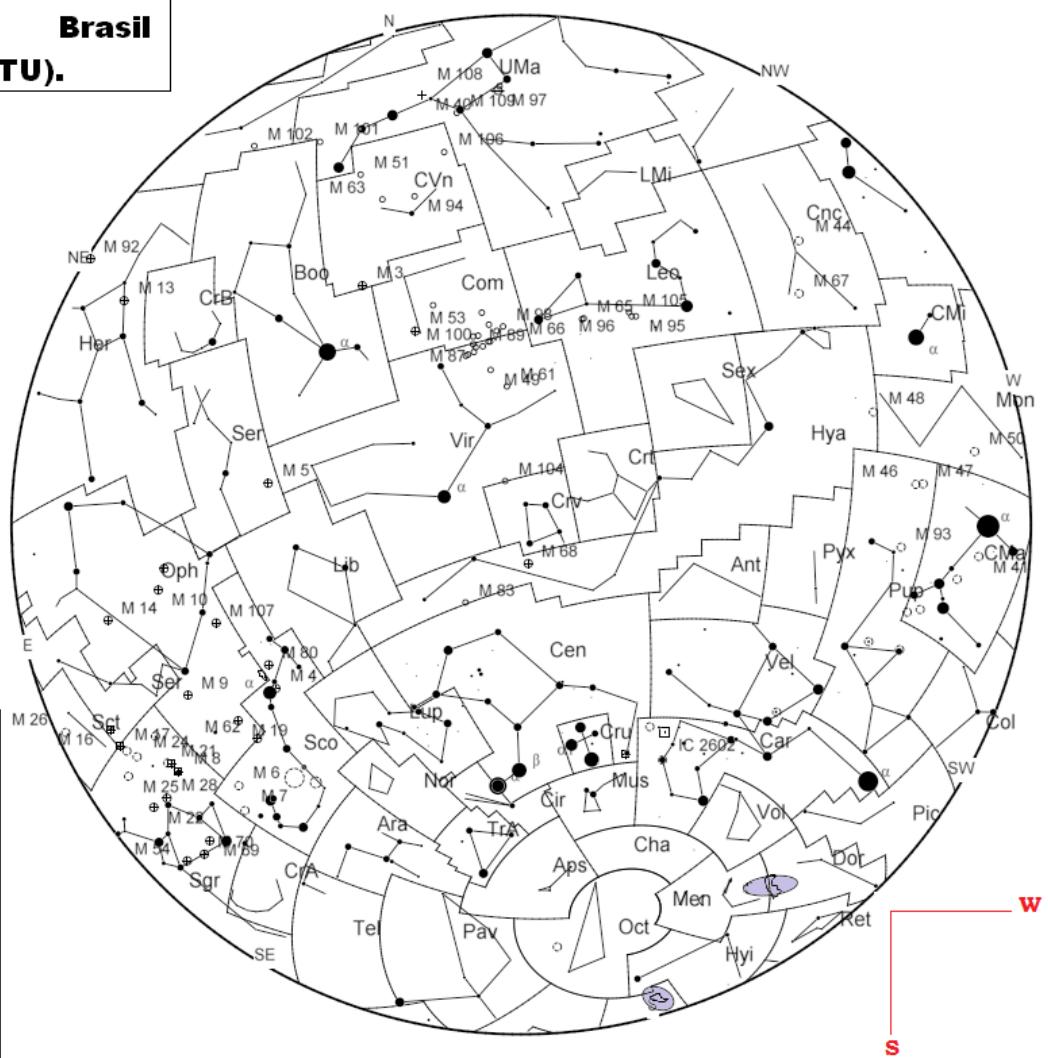
Dia	Hora	Evento	Dia	Hora	Evento
2	22:00	Antares (Mv= 1.07) 4.9°S da Lua	18	16:00	Lua em máxima declinação Norte (25.5°)
	02:00	Lua em máxima declinação Sul (-25.4°)	19	01:00	Mercúrio em conjunção superior
4	10:02	Lua Minguante		17:00	Pollux (Mv= 1.22) 3.2°N da Lua
5	07:00	(134340) Plutão 2.2°N da Lua	20	06:59	Lua Crescente
6	10:00	Saturno 3.9°N da Lua	22	13:00	Regulus (Mv= 1.41) 4.6°S da Lua
	10:00	Júpiter 4.2°N da Lua	23	01:00	Vênus 0.2°S de Urano
7	14:00	Netuno 3.9°N da Lua	24	06:00	Mercúrio 0.7°N de Vênus
9	08:00	Mercúrio 2.7°N da Lua	25	22:00	Mercúrio 1.2°N de Vênus
	12:00	Vênus 2.6°N da Lua	26	06:00	Spica (Mv= 1.06) 5.8°S da Lua
11	13:00	Urano 2.3°N da Lua	27	03:31	Lua Cheia
12	02:31	Lua Nova (Lun. 1216), dur. = 29d 16h 29m		15:25	Lua no perigeu (Dist. a Terra = 357.378 km)
13	03:00	Aldebaran (Mv= 0.99) 5.3°S da Lua	28	18:00	(134340) Plutão estacionário
	12:00	Marte 0.2°N da Lua (Ocultação)	29	07:00	Antares (Mv= 1.07) 4.7°S da Lua
14	17:48	Lua no Apogeu (Dist. a Terra = 406.119 km)	30	19:00	Urano em conjunção

**Objetos de Céu Profundo**

[NGC 4755 – Caixa de Jóias](#)  
M 51 / NGC 5194 - Galáxia do Redemoinho

M-94 / NGC 4736 - Galáxia Espiral  
M 3 / NGC 5272 - Aglomerado Globular

**Aspecto do Céu em Belo Horizonte - MG, Brasil  
15 Mai - 0h:00m (TU).**



**Maio 2021  
00:00 (Tempo Universal)**

Dia	Hora	Evento
1	10:00	Lua em máxima declinação Sul (-25.5°)
2	13:00	(134340) Plutão 2.3°N da Lua
3	19:50	Lua Minguante
	19:00	Saturno 4.0°N da Lua
5	00:00	Júpiter 4.4°N da Lua
6	21:00	Netuno 4.0°N da Lua
10	22:00	Urano 2.2°N da Lua
11	19:00	Lua Nova (Lun. 1217), dur. = 29d 15h 53m
	21:55	Lua no Apogeu (Dist. a Terra = 406.511 km)
12	22:00	Vênus 0.7°N Lua (Ocultação)
13	09:00	Aldebaran ( $M_v = 0.99$ ) 5.4°S da Lua
	18:00	Mercúrio 2.1°N da Lua
15	22:00	Lua em máxima declinação Norte (25.6°)
16	05:00	Marte 1.4S° da Lua
17	00:00	Pollux ( $M_v = 1.22$ ) 3.1°N da Lua

<b>Dia</b>	<b>Hora</b>	<b>Evento</b>
17	05:00	Mercúrio em máxima elongação E ( $22^0$ )
	07:00	Vênus $5.8^0$ N de Aldebaran ( $Mv= 0.99$ )
19	19:13	Lua Crescente
	21:00	Regulus ( $Mv= 1.41$ ) $4.7^0$ S da Lua
23	17:00	Spica ( $Mv= 1.06$ ) $5.8^0$ S da Lua
	20:00	Saturno estacionário
26	01:53	Lua no perigeu (Dist. a Terra = 357.309 km)
	11:14	Lua Cheia
	11:19	Eclipse Total da Lua
	18:00	Antares ( $Mv= 1.07$ ) $4.6^0$ S da Lua
28	19:00	Lua em máxima declinação Sul ( $-25.6^0$ )
29	04:00	Mercúrio $0.4^0$ S de Vênus
	22:00	(134340) Plutão $2.3^0$ N da Lua
30	03:00	Mercúrio estacionário
31	03:00	Saturno $4.0^0$ N da Lua

## **Objetos de Céu Profundo**

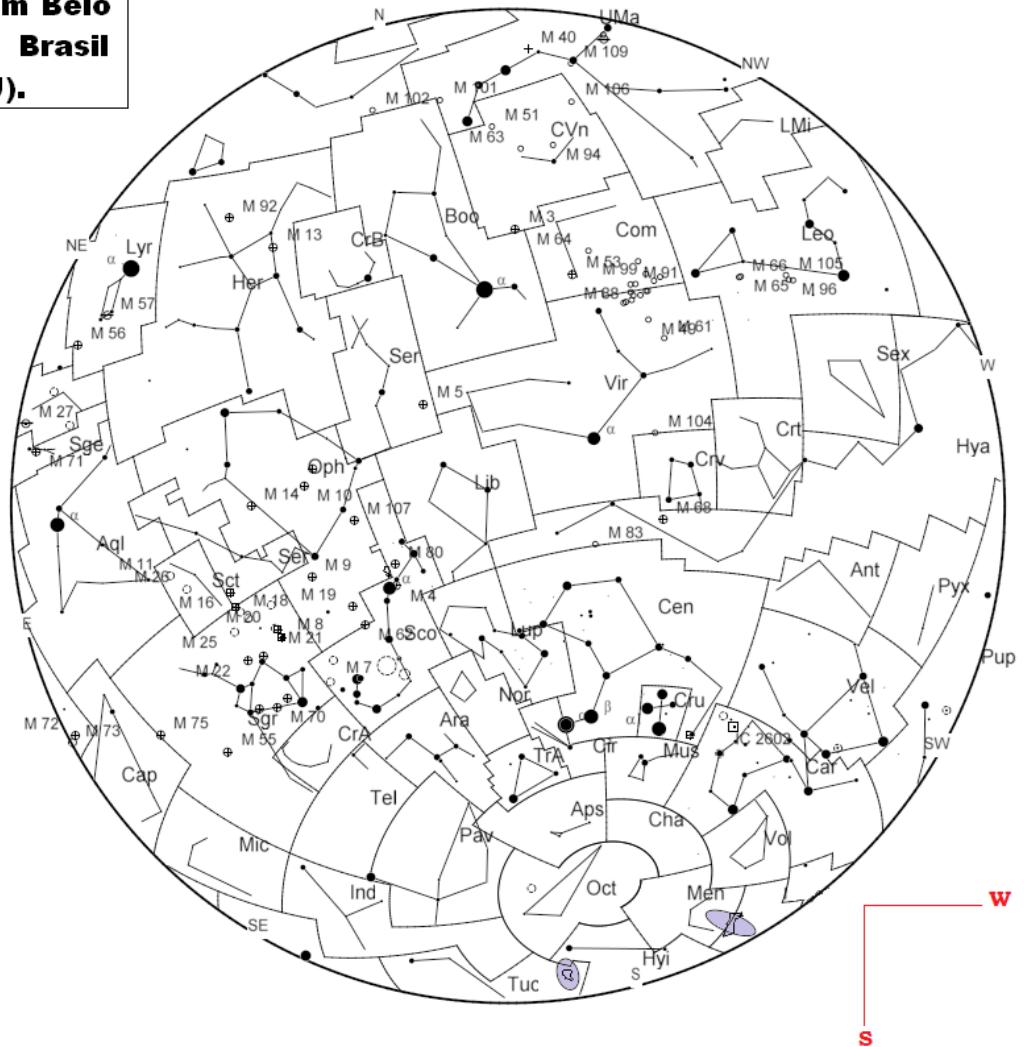
M 80 / NGC 6093 – Aglomerado Globular  
M 107 / NGC 6171 – Aglomerado Globular

## NGC 5139 – Aglomerado Globular Omega Centauri M 5 / NGC 5904 – Aglomerado Globular

**Aspecto do Céu em Belo  
Horizonte - MG, Brasil**  
**15 Jun - 0h:00m (TU).**

**Legenda**

- ● ● ● ●
- 1 0 1 2 3 4
- Gde. N. Magalhães
- Peq. N. Magalhães
- M 31



**Junho 2021  
00:00 (Tempo Universal)**

Dia	Hora	Evento
1	00:00	Marte 5.3°S de Pollux (Mv= 1.22)
	12:00	Júpiter 4.3°N da Lua
2	07:24	Lua Minguante
3	04:00	Netuno 4.1°N da Lua
7	07:00	Urano 2.0°N da Lua
8	02:28	Lua no Apogeu (Dist. a Terra = 406.228 km)
9	15:00	Aldebaran (Mv= 0.99) 5.4°S da Lua
10	10:43	Eclipse Anular do Sol
	10:53	Lua Nova (Lun. 1218), dur. = 29d 14h 24m
	12:00	Mercúrio 3.9°S da Lua
11	01:00	Mercúrio em conjunção inferior
12	03:00	Lua em máxima declinação Norte (25.6°)
	06:00	Vênus 1.4°S da Lua
13	05:00	Pollux (Mv= 1.22) 3.1°N da Lua
	21:00	Marte 2.7°S da Lua
16	03:00	Regulus (Mv= 1.41) 4.7°S da Lua

Dia	Hora	Evento
18	03:54	Lua Crescente
20	02:00	Spica (Mv= 1.06) 5.8°S da Lua
21	03:33	Solstício
	04:00	Júpiter estacionário
	20:00	Vênus 5.2°S de Pollux (Mv= 1.22)
22	20:00	Mercúrio estacionário
23	05:00	Antares (Mv= 1.07) 4.6°S da Lua
	09:59	Lua no perigeu (Dist. a Terra = 359.959 km)
24	18:40	Lua Cheia
25	05:00	Lua em máxima declinação Sul (-25.6°)
26	07:00	(134340) Plutão 2.1°N da Lua
	09:00	Netuno estacionário
27	11:00	Saturno 3.8°N da Lua
28	21:00	Júpiter 4.2°N da Lua
30	12:00	Netuno 3.9°N da Lua

**Objetos de Céu Profundo**

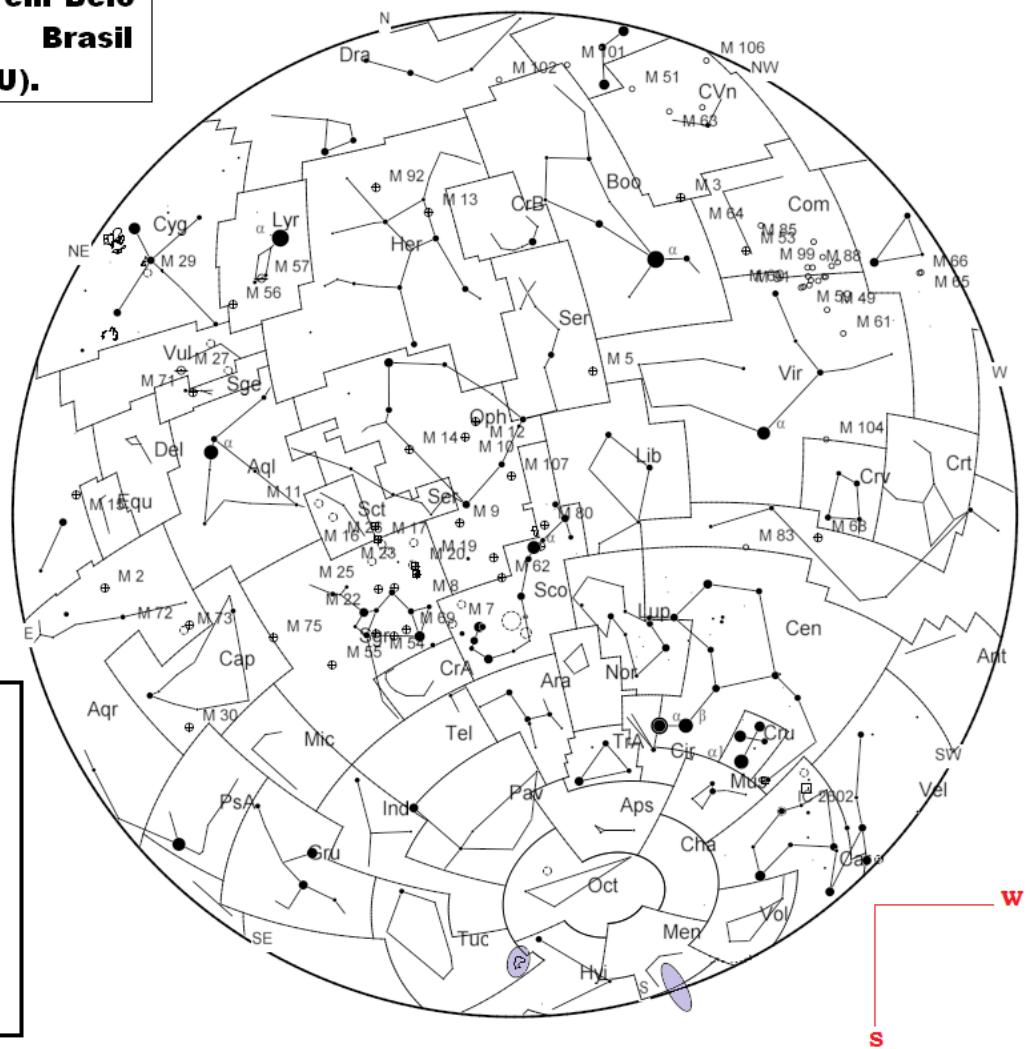
- M 20 / NGC 6523 – Nebulosa da Lagoa  
M 7 / NGC 6475 - Aglomerado de Ptolomeu

[M 104 / NGC 4594 - Galáxia do Sombrero](#)  
[M 6 / NGC 6405 - Aglomerado da Borboleta](#)

**Aspecto do Céu em Belo Horizonte - MG, Brasil  
15 Jul - 0h:00m (TU).**

**Legenda**

- -1 0 1 2 3 4
- Gde. N. Magalhães
- Peq. N. Magalhães
- M 31



**Julho 2021  
00:00 (Tempo Universal)**

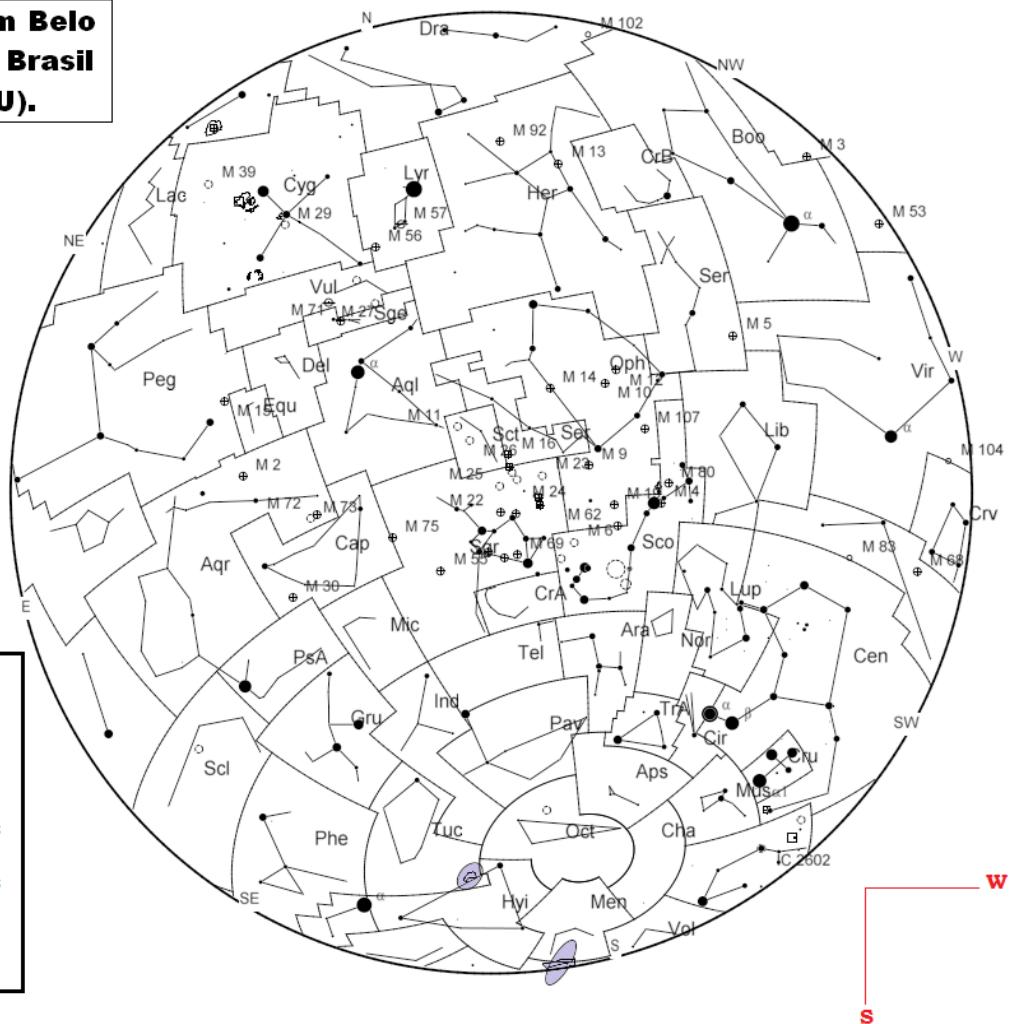
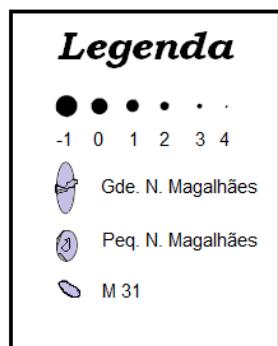
Dia	Hora	Evento	Dia	Hora	Evento
1	21:11	Lua Minguante	17	08:00	Spica (Mv= 1.06) 5.7°S da Lua
4	16:00	Urano 1.9°N da Lua		10:11	Lua Crescente
	20:00	Mercúrio em máxima elongação W (22°)		22:00	(134340) Plutão em oposição
5	15:00	Lua no Apogeu (Dist. a Terra = km)	20	13:00	Antares (Mv= 1.07) 4.5°S da Lua
	22:27	Terra no afélio (Dist. ao Sol = 1.01672 u.a)	21	10:31	Lua no perigeu (Dist. a Terra = 364.519 km)
6	21:00	Aldebaran (Mv= 0.99) 5.5°S da Lua	22	03:00	Vênus 1.1°N de Regulus (Mv= 1.41)
8	04:00	Mercúrio 3.8°S da Lua		14:00	Lua em máxima declinação Sul (-25.7°)
9	09:00	Lua em máxima declinação Norte (25.6°)	23	16:00	(134340) Plutão 2.1°N da Lua
10	01:00	Lua Nova (Lun. 1219), dur. = 29d 12h 33m	24	02:37	Lua Cheia
	11:00	Pollux (Mv= 1.22) 3.2°N da Lua		18:00	Saturno 3.7°N da Lua
12	11:00	Vênus 3.1°S da Lua		22:00	Mercúrio 5.7°S de Pollux (Mv= 1.22)
	12:00	Marte 3.6°S da Lua	26	03:00	Júpiter 3.9°N da Lua
13	08:00	Regulus (Mv= 1.41) 4.6°S da Lua	27	20:00	Netuno 3.8°N da Lua
	13:00	Vênus 0.5N de Marte	30	01:00	Marte 0.6°N de Regulus (Mv= 1.41)
			31	13:16	Lua Minguante

**Objetos de Céu Profundo**

[M 83 / NGC 5236 - Galáxia do Cata-vento do Sul](#)  
[M 11 / NGC 6705 – Aglomerado dos Patos Selvagens](#)

M 54 / NGC 6715 – Aglomerado Globular  
 M 71 / NGC 6838 – Aglomerado Globular

**Aspecto do Céu em Belo  
Horizonte - MG, Brasil  
15 Ago - 0h:00m (TU).**



**Agosto 2021  
00:00 (Tempo Universal)**

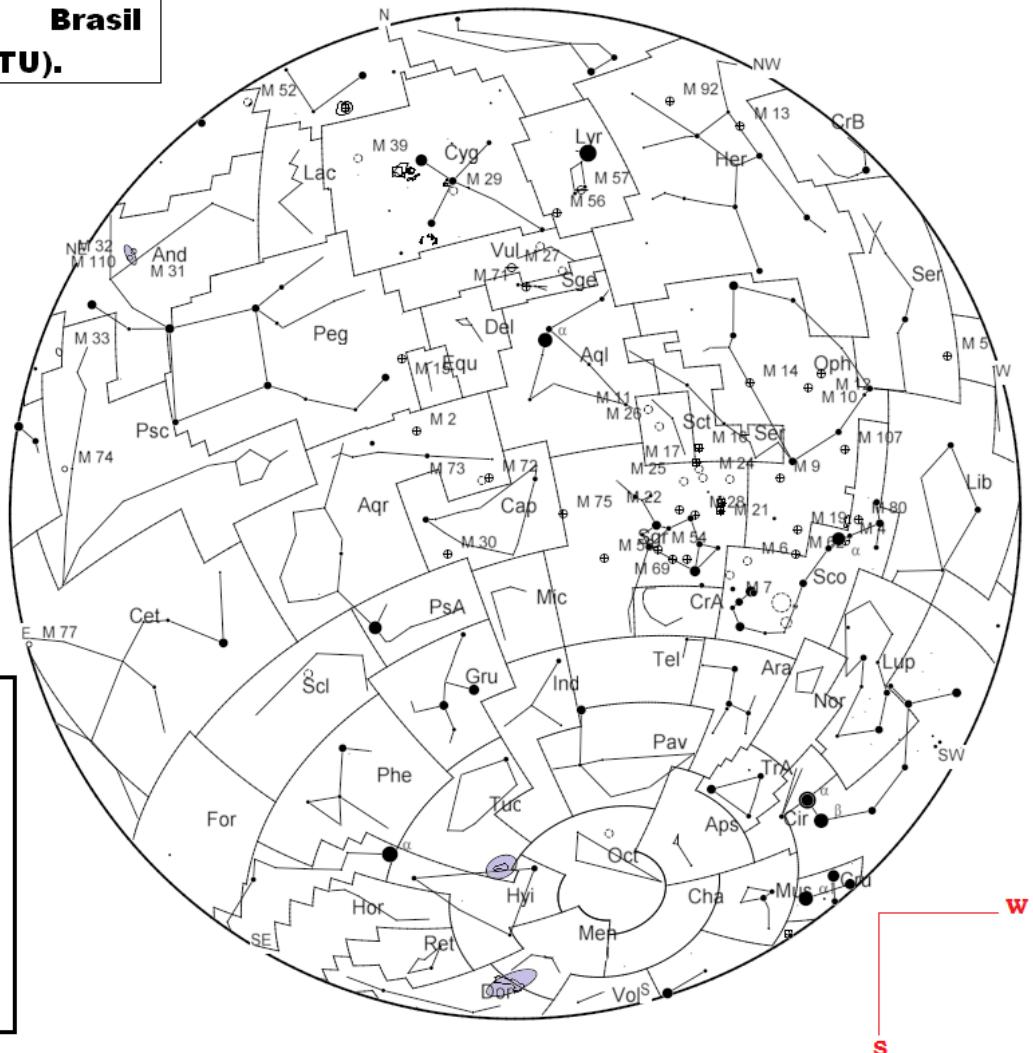
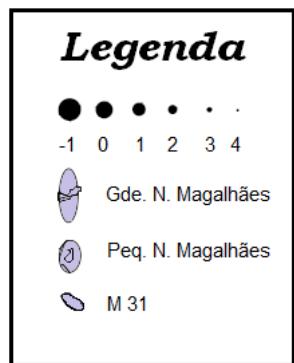
Dia	Hora	Evento	Dia	Hora	Evento
1	01:00	Urano 1.7°N da Lua	16	20:00	Antares (Mv= 1.07) 4.3°S da Lua
	14:00	Mercúrio em conjunção superior	17	09:25	Lua no perigeu (Dist. a Terra = 369.126 km)
2	06:00	Saturno em oposição	18	22:00	Lua em máxima declinação Sul (-25.8°)
	07:36	Lua no Apogeu (Dist. a Terra = 404.410 km)	19	04:00	Mercúrio 0.1°S de Marte
3	05:00	Aldebaran (Mv= 0.99) 5.6°S da Lua	20	00:00	(134340) Plutão 2.1°N da Lua
5	16:00	Lua em máxima declinação Norte (25.7°)			Júpiter em oposição
6	19:00	Pollux (Mv= 1.22) 3.1°N da Lua		03:00	Urano estacionário
8	13:50	Lua Nova (Lun. 1220), dur. = 29d 11h 01m		23:00	Saturno 3.6°N da Lua
9	05:00	Mercúrio 3.2°S da Lua	22	07:00	Júpiter 3.7°N da Lua
	15:00	Regulus (Mv= 1.41) 4.5°S da Lua		12:02	Lua Cheia
10	03:00	Marte 4.0°S da Lua	24	04:00	Netuno 3.6°N da Lua
11	10:00	Vênus 3.9°S da Lua	28	09:00	Urano 1.4°N da Lua
12	00:00	Mercúrio 1.1°N de Regulus	30	02:23	Lua no Apogeu (Dist. a Terra = 404.098 km)
13	13:00	Spica (Mv= 1.06) 5.5°S da Lua		07:13	Lua Minguante
15	15:20	Lua Crescente		13:00	Aldebaran (Mv= 0.99) 5.8°S da Lua

**Objetos de Céu Profundo**

[M 17 / NGC 6618 - Nebulosa Ômega](#)  
M 72 / NGC 6981 - Aglomerado Globular

M 2 / NGC 7089 - Aglomerado Globular  
M 15 / NGC 7078 – Aglomerado Globular

**Aspecto do Céu em Belo  
Horizonte – MG, Brasil  
15 Set – 0h:00m (TU).**



**Setembro 2021  
00:00 (Tempo Universal)**

Dia	Hora	Evento	Dia	Hora	Evento
02	00:00	Lua em máxima declinação Norte ( $25.9^{\circ}$ )	15	04:00	Lua em máxima declinação Sul ( $-26.0^{\circ}$ )
03	03:00	Pollux (Mv= 1.22) $3.0^{\circ}$ N da Lua	16	05:00	(134340) Plutão $2.2^{\circ}$ N da Lua
05	19:00	Vênus $1.6^{\circ}$ N de Spica (Mv= 1.06)	17	04:00	Saturno $3.7^{\circ}$ N da Lua
	23:00	Regulus (Mv= 1.41) $4.5^{\circ}$ S da Lua	18	09:00	Júpiter $3.8^{\circ}$ N da Lua
07	00:52	Lua Nova (Lun. 1221), dur. = 29d 10h 14m	20	11:00	Netuno $3.6^{\circ}$ N da Lua
	19:00	Marte $3.8^{\circ}$ S da Lua	20	23:55	Lua Cheia
09	00:00	Mercúrio $5.9^{\circ}$ S da Lua	22	03:00	Mercúrio $1.4^{\circ}$ S de Spica (Mv= 1.06)
	20:00	Spica (Mv= 1.06) $5.4^{\circ}$ S da Lua	22	19:22	Equinócio
10	04:00	Vênus $3.7^{\circ}$ S da Lua	24	16:00	Urano $1.3^{\circ}$ N da Lua
11	10:07	Lua no perigeu (Dist. a Terra = 368.463 km)	26	21:45	Lua no Apogeu (Dist. a Terra = 404.639 km)
13	01:00	Antares (Mv= 1.07) $4.1^{\circ}$ S da Lua	27	01:00	Mercúrio estacionário
13	20:39	Lua Crescente	29	01:57	Lua Minguante
14	00:00	Mercúrio em máxima elongação E ( $27^{\circ}$ )	29	08:00	Lua em máxima declinação Norte ( $26.1^{\circ}$ )
14	09:00	Netuno em oposição	30	12:00	Pollux (Mv= 1.22) $2.8^{\circ}$ N da Lua

**Objetos de Céu Profundo**

\*NGC 292 – Pequena Nuvem de Magalhães

\*GNM – Grande Nuvem de Magalhães

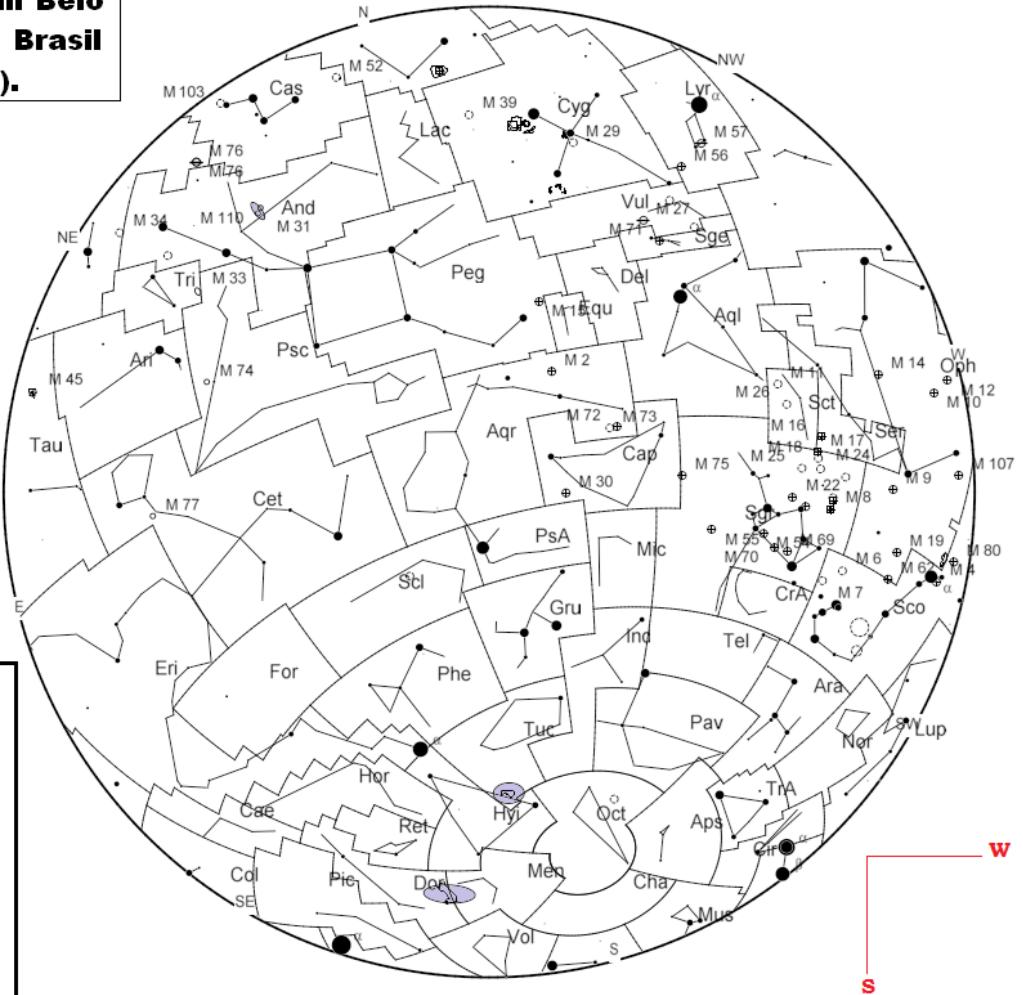
\*Objeto indicado na Carta Celeste

[M 57 / NGC 6720 - Nebulosa do Anel](#)  
[M 52 / NGC 7654 – Aglomerado Aberto](#)

**Aspecto do Céu em Belo Horizonte – MG, Brasil  
15 Out – 0h:00m (TU).**

**Legenda**

- ● ● ● -1 0 1 2 3 4
- Gde. N. Magalhães
- Peq. N. Magalhães
- M 31



**Outubro 2021  
00:00 (Tempo Universal)**

Dia	Hora	Evento	Dia	Hora	Evento
1	11:00	Mercúrio 1.5°S de Spica (Mv= 1.06)	14	08:00	Saturno 3.8°N da Lua
3	08:00	Regulus (Mv= 1.41) 4.6°S da Lua	15	12:00	Júpiter 3.9°N da Lua
6	11:00	Marte 3.2S da Lua	16	18:00	Vênus 1.4°N de Antares (Mv= 1.07)
	11:05	Lua Nova (Lun. 1222), dur = 29d 10h 09m	17	17:00	Netuno 3.7N da Lua
	11:00	(134340) Plutão estacionário	18	01:00	Mercúrio estacionário
7	04:00	Spica (Mv= 1.06) 5.3°S da Lua	18	10:00	Júpiter estacionário
8	03:00	Marte em conjunção	20	14:57	Lua Cheia
	17:29	Lua no perigeu (Dist. a Terra = 363.387 km)	21	20:00	Marte 2.6°N de Spica (Mv= 1.06)
9	16:00	Mercúrio em conjunção inferior	21	22:00	Urano 1.2°N da Lua
	19:00	Vênus 2.8°S da Lua	24	15:31	Lua no Apogeu (Dist. a Terra = 405.614 km)
	23:00	Mercúrio 2.4°S de Marte	25	10:00	Mercúrio em máxima elongação W (18°)
10	07:00	Antares (Mv= 1.07) 4.0°S da Lua	26	16:00	Lua em máxima declinação Norte (26.2°)
11	02:00	Saturno estacionário	27	20:00	Pollux (Mv= 1.22) 2.6°N da Lua
12	09:00	Lua em máxima declinação Sul (-26.2°)	28	20:05	Lua Minguante
13	03:25	Lua Crescente	29	20:00	Vênus em máxima elongação E (47°)
	10:00	(134340) Plutão 2.4°N da Lua	30	18:00	Regulus (Mv= 1.41) 4.8°S da Lua

**Objetos de Céu Profundo**

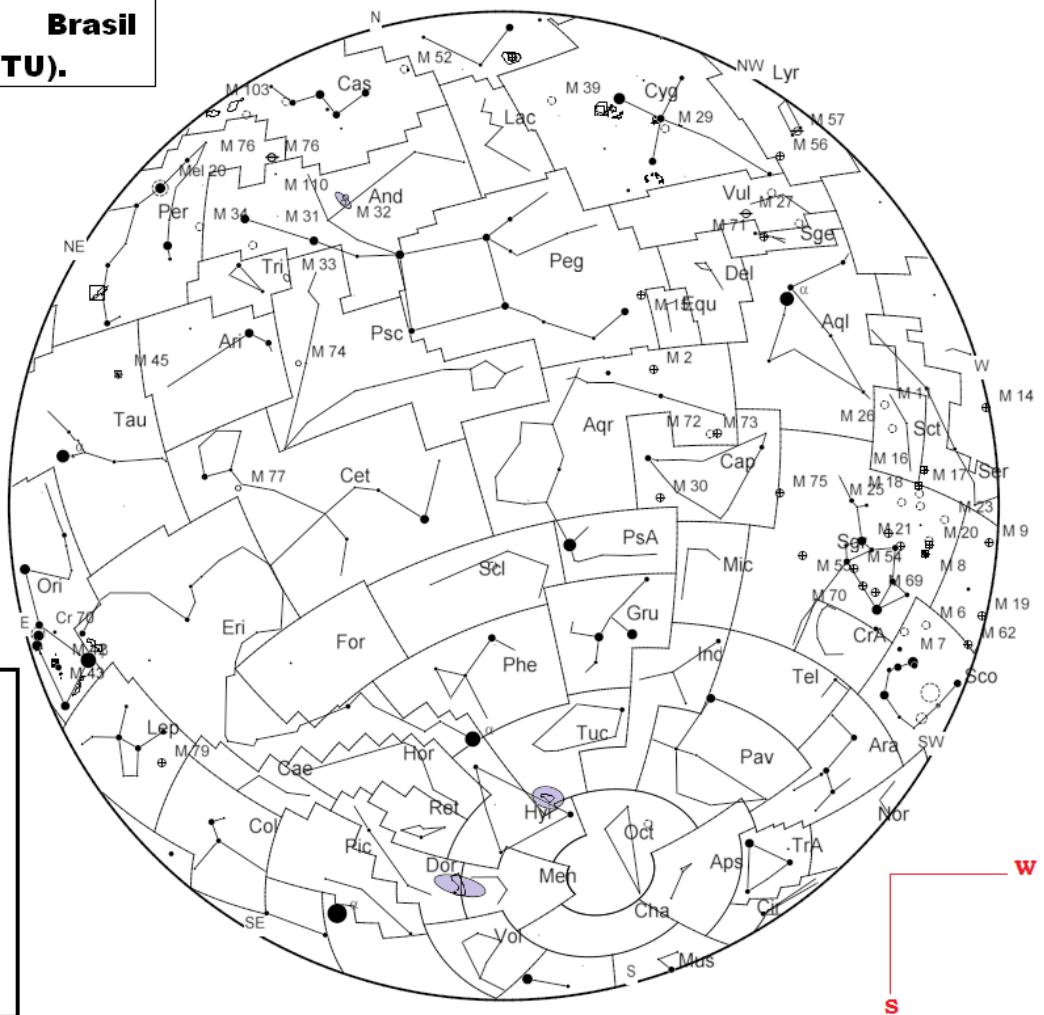
[M 31 / NGC 224 - Galáxia de Andrômeda](#)  
[M 33 / NGC 598 - Galáxia do Triângulo](#)

[M 103 / NGC 581 – Aglomerado Aberto](#)  
[M 74 / NGC 628 – Galáxia Espiral](#)

**Aspecto do Céu em Belo  
Horizonte - MG, Brasil  
15 Nov - 0h:00m (TU).**

**Legenda**

- ● ● ● ● -1 0 1 2 3 4
- Gde. N. Magalhães
- Peq. N. Magalhães
- M 31



**Novembro 2021  
00:00 (Tempo Universal)**

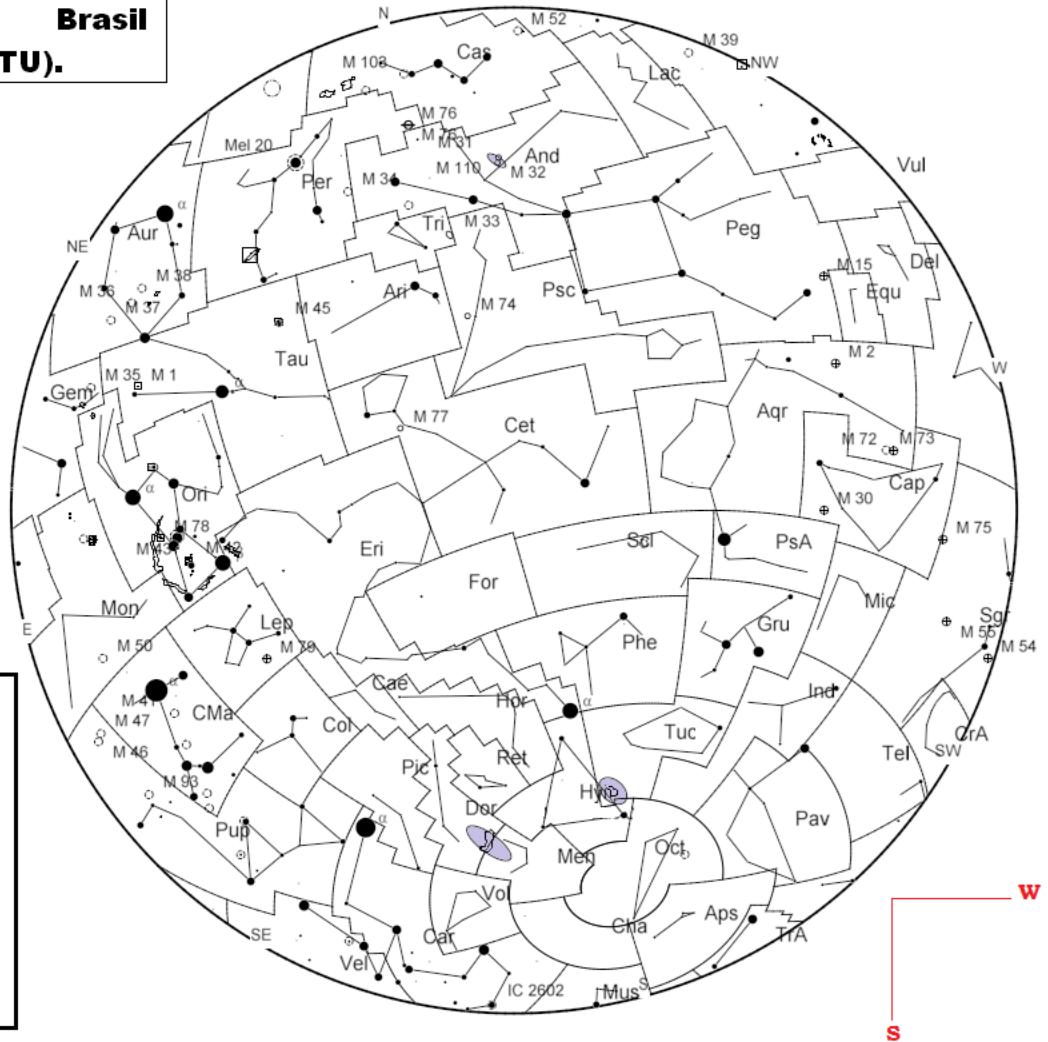
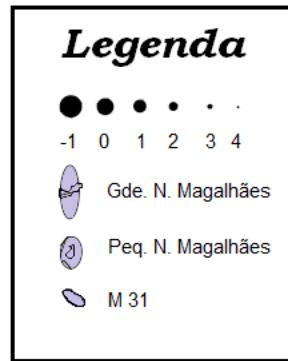
Dia	Hora	Evento	Dia	Hora	Evento
2	03:00	Mercúrio 4.1°N de Spica (Mv= 1.06)	11	12:46	Lua Crescente
3	15:00	Spica (Mv= 1.06) 5.2°S da Lua		19:00	Júpiter 4.1°N da Lua
	19:00	Mercúrio 1.1°S da Lua (Ocultação)	13	21:00	Netuno 3.8°N da Lua
4	05:00	Marte 2.1°S da Lua	18	02:00	Urano 1.3°N da Lua
	21:15	Lua Nova (Lun. 1223), dur. = 29d 10h 29m	19	08:58	Lua Cheia
	23:00	Urano em oposição		09:04	Eclipse Parcial da Lua
5	22:24	Lua no perigeu (Dist. a Terra = 358.844 km)	21	02:15	Lua no Apogeu (Dist. a Terra = 406.275 km)
6	16:00	Antares (Mv= 1.07) 3.9°S da Lua	22	22:00	Lua em máxima declinação Norte (26.3°)
8	05:00	Vênus 1.2°S da Lua (Ocultação)	24	03:00	Pollux (Mv= 1.22) 2.6°N da Lua
	17:00	Lua em máxima declinação Sul (-26.2°)	27	00:00	(1) Ceres em Oposição
9	17:00	(134340) Plutão 2.4°N da Lua		22:00	Regulus (Mv= 1.41) 4.8°S da Lua
10	12:00	Mercúrio 1.0°N de Marte		12:28	Lua Mingante
10	16:00	Saturno 3.9°N da Lua	29	04:00	Mercúrio em conjunção superior

**Objetos de Céu Profundo**

[M 42 / NGC 1976 - Nebulosa de Órion](#)  
[M 34 / NGC 1039 – Aglomerado Aberto](#)  
[NGC 292 - Pequena Nuvem de Magalhães \(PNM\)](#)

[M 77 / NGC 1068 – Galáxia Espiral](#)  
[NGC 104 - Aglomerado Globular \(47 Tucanae\)](#)

**Aspecto do Céu em Belo  
Horizonte – MG, Brasil  
15 Dez – 0h:00m (TU).**



**Dezembro 2021  
00:00 (Tempo Universal)**

Dia	Hora	Evento	Dia	Hora	Evento
1	00:00	Mercurio 3.7°N de Antares (Mv= 1.07)	15	06:00	Urano 1.3°N da Lua
	02:00	Spica (Mv= 1.06) 5.2°S da Lua	18	02:18	Lua no Apogeu (Dist. a Terra = 406.321 km)
	21:00	Netuno estacionário	18	10:00	Vênus estacionário
3	00:00	Marte 0.6°S da Lua (Ocultação)	19	04:36	Lua Cheia
4	04:00	Antares (Mv= 1.07) 3.8°S da Lua	20	04:00	Lua em máxima declinação Norte (26.3°)
	07:33	Eclipse Total do Sol	21	09:00	Pollux (Mv= 1.22) 2.6°N da Lua
	07:43	Lua Nova (Lun. 1224), dur. = 29d 10h 50m	21	16:00	Solstício
	10:02	Lua no perigeu (Dist. a Terra = 356.793 km)	24	08:00	Regulus (Mv= 1.41) 4.7°S da Lua
	12:00	Mercurio 0.0°N da Lua (Ocultação)	25	05:00	Vênus 2.9°N de (134340) Plutão
6	02:00	Lua em máxima declinação Sul (-26.3°)	27	02:24	Lua Minguante
7	01:00	Vênus 1.8°N da Lua	27	17:00	Marte 4.5°N de Antares (Mv= 1.07)
	03:00	(134340) Plutão 2.5°N da Lua	28	11:00	Spica (Mv= 1.06) 5.1°S da Lua
8	03:00	Saturno 4.0°N da Lua	29	10:00	Mercurio 4.2°S de Vênus
9	09:00	Júpiter 4.2°N da Lua	30	10:00	Mercurio 0.2°S de (134340) Plutão
11	01:36	Lua Crescente	31	15:00	Antares (Mv= 1.07) 3.7°S da Lua
	03:00	Netuno 3.8°N da Lua	31	20:00	Marte 1.0°N da Lua (Ocultação)
	20:00	Vênus 0.1°N de (134340) Plutão			

**Objetos de Céu Profundo**

[M 45 – Plêiades](#)  
NGC 253 - Galáxia Espiral do Escultor

NGC 1499 – Nebulosa Difusa Califórnia  
NGC 2237 – Nebulosa de Emissão Roseta

# VI - Efemérides da Lua – Janeiro a Dezembro

00:00 Hora – Tempo Universal

## Janeiro

Dia	Elong. °	Ang. PH	Fase	Mag.
1	157.8	22.2	-0.963	-12.2
2	145.6	34.3	-0.913	-11.8
3	133.3	46.6	-0.844	-11.5
4	120.8	59.1	-0.757	-11.1
5	108.1	71.8	-0.656	-10.8
6	95.2	84.7	-0.547	-10.3
7	82.2	97.7	-0.433	-9.8
8	69.0	110.9	-0.322	-9.2
9	55.7	124.2	-0.219	-8.5
10	42.3	137.6	-0.131	-7.7
11	29.0	150.9	-0.063	-6.7
12	15.8	164.1	-0.019	-5.5
13	3.8	176.2	+0.001	-4.3
14	10.8	169.2	+0.009	-5.0
15	23.1	156.9	+0.040	-6.2
16	35.2	144.7	+0.092	-7.2
17	46.9	132.9	+0.159	-8.0
18	58.4	121.5	+0.239	-8.7
19	69.6	110.3	+0.327	-9.3
20	80.5	99.3	+0.419	-9.8
21	91.3	88.5	+0.513	-10.2
22	102.1	77.7	+0.606	-10.6
23	113.0	66.9	+0.696	-10.9
24	123.9	56.0	+0.780	-11.2
25	135.1	44.8	+0.855	-11.5
26	146.4	33.5	+0.917	-11.9
27	158.0	21.9	+0.964	-12.2
28	169.6	10.4	+0.992	-12.5
29	175.2	4.8	-0.998	-12.6
30	164.2	15.7	-0.981	-12.3
31	151.7	28.3	-0.940	-12.0

## Fevereiro

Dia	Elong. °	Ang. PH	Fase	Mag.
1	138.8	41.1	-0.877	-11.6
2	125.8	54.1	-0.793	-11.3
3	112.7	67.2	-0.694	-10.9
4	99.6	80.3	-0.585	-10.5
5	86.5	93.3	-0.471	-10.0
6	73.5	106.4	-0.359	-9.5
7	60.5	119.4	-0.255	-8.8
8	47.6	132.3	-0.164	-8.1
9	34.9	145.0	-0.090	-7.2
10	22.4	157.5	-0.038	-6.2
11	10.6	169.4	-0.009	-5.0
12	5.3	174.7	+0.002	-4.5
13	15.3	164.7	+0.018	-5.5
14	26.7	153.3	+0.053	-6.5
15	37.9	142.0	+0.106	-7.4
16	49.0	130.9	+0.173	-8.2
17	60.0	119.9	+0.251	-8.8
18	70.8	109.1	+0.337	-9.3
19	81.5	98.3	+0.428	-9.8
20	92.4	87.5	+0.522	-10.2
21	103.3	76.6	+0.616	-10.6
22	114.4	65.4	+0.708	-11.0
23	125.8	54.0	+0.794	-11.3
24	137.6	42.3	+0.870	-11.6
25	149.6	30.3	+0.932	-11.9
26	161.9	18.0	+0.975	-12.3
27	173.3	6.7	+0.997	-12.6
28	169.9	10.0	-0.992	-12.5

## Março

Dia	Elong. °	Ang. PH	Fase	Mag.
1	157.3	22.7	-0.961	-12.1
2	143.9	36.0	-0.905	-11.8
3	130.5	49.4	-0.825	-11.4
4	117.1	62.8	-0.729	-11.0
5	103.9	76.0	-0.621	-10.6
6	90.8	89.1	-0.508	-10.2
7	78.0	101.9	-0.397	-9.6
8	65.3	114.5	-0.292	-9.1
9	53.0	126.9	-0.200	-8.4
10	40.8	139.1	-0.122	-7.6
11	28.9	151.0	-0.063	-6.7
12	17.4	162.6	-0.023	-5.7
13	7.0	172.9	-0.004	-4.7
14	8.1	171.9	+0.005	-4.8
15	18.3	161.6	+0.026	-5.8
16	29.2	150.8	+0.064	-6.7
17	40.0	139.9	+0.117	-7.5
18	50.8	129.1	+0.184	-8.3
19	61.5	118.4	+0.263	-8.9
20	72.3	107.5	+0.349	-9.4
21	83.2	96.6	+0.442	-9.9
22	94.4	85.5	+0.539	-10.3
23	105.7	74.1	+0.637	-10.7
24	117.5	62.4	+0.732	-11.0
25	129.6	50.3	+0.820	-11.4
26	142.2	37.7	+0.896	-11.7
27	155.1	24.8	+0.954	-12.1
28	168.1	11.8	+0.989	-12.4
29	174.6	5.4	-0.998	-12.6
30	162.6	17.4	-0.977	-12.3
31	148.9	31.0	-0.928	-11.9

## Abril

Dia	Elong. °	Ang. PH	Fase	Mag.
1	135.1	44.8	-0.855	-11.5
2	121.5	58.3	-0.762	-11.2
3	108.3	71.6	-0.658	-10.8
4	95.3	84.6	-0.547	-10.3
5	82.7	97.2	-0.438	-9.8
6	70.4	109.4	-0.334	-9.3
7	58.4	121.4	-0.239	-8.7
8	46.7	133.2	-0.158	-8.0
9	35.2	144.7	-0.092	-7.2
10	24.0	155.9	-0.043	-6.3
11	13.1	166.9	-0.013	-5.3
12	4.1	175.9	-0.001	-4.3
13	10.3	169.6	+0.008	-5.0
14	20.8	159.1	+0.033	-6.0
15	31.6	148.4	+0.074	-6.9
16	42.3	137.6	+0.131	-7.7
17	53.2	126.7	+0.201	-8.4
18	64.1	115.7	+0.283	-9.0
19	75.3	104.6	+0.374	-9.5
20	86.6	93.2	+0.472	-10.0
21	98.3	81.5	+0.574	-10.4
22	110.5	69.4	+0.676	-10.8
23	123.0	56.9	+0.773	-11.2
24	136.0	43.9	+0.860	-11.6
25	149.5	30.4	+0.931	-11.9
26	163.3	16.7	+0.979	-12.3
27	176.3	3.7	+0.999	-12.6
28	167.7	12.3	-0.989	-12.4
29	153.7	26.3	-0.948	-12.0
30	139.8	40.1	-0.882	-11.7

**Maio**

Dia	Elong. °	Ang. PH	Fase	Mag.
1	126.2	53.7	-0.796	-11.3
2	113.0	66.9	-0.696	-10.9
3	100.2	79.6	-0.590	-10.5
4	87.9	92.0	-0.483	-10.1
5	75.9	103.9	-0.380	-9.6
6	64.3	115.6	-0.284	-9.0
7	52.9	127.0	-0.199	-8.4
8	41.7	138.2	-0.127	-7.7
9	30.7	149.3	-0.070	-6.9
10	19.7	160.2	-0.030	-5.9
11	8.9	171.0	-0.006	-4.9
12	2.7	177.3	+0.001	-4.2
13	13.1	166.9	+0.013	-5.3
14	23.9	156.0	+0.043	-6.3
15	34.9	145.0	+0.090	-7.2
16	46.0	133.9	+0.153	-8.0
17	57.2	122.7	+0.230	-8.6
18	68.7	111.2	+0.319	-9.2
19	80.4	99.5	+0.418	-9.8
20	92.4	87.4	+0.523	-10.2
21	104.9	74.9	+0.630	-10.7
22	117.8	62.1	+0.734	-11.1
23	131.2	48.7	+0.830	-11.4
24	144.9	35.0	+0.910	-11.8
25	159.0	21.0	+0.967	-12.2
26	173.3	6.7	+0.997	-12.6
27	172.4	7.6	-0.996	-12.5
28	158.3	21.6	-0.965	-12.2
29	144.5	35.4	-0.907	-11.8
30	131.1	48.8	-0.829	-11.4
31	118.1	61.7	-0.737	-11.1

**Junho**

Dia	Elong. °	Ang. PH	Fase	Mag.
1	105.7	74.2	-0.636	-10.7
2	93.6	86.2	-0.533	-10.3
3	82.0	97.9	-0.431	-9.8
4	70.6	109.3	-0.335	-9.3
5	59.5	120.4	-0.247	-8.8
6	48.5	131.4	-0.169	-8.1
7	37.6	142.3	-0.104	-7.4
8	26.7	153.2	-0.054	-6.5
9	15.8	164.1	-0.019	-5.6
10	5.0	175.0	-0.002	-4.4
11	6.2	173.8	+0.003	-4.6
12	17.3	162.7	+0.023	-5.7
13	28.5	151.4	+0.061	-6.7
14	39.9	140.0	+0.117	-7.5
15	51.5	128.3	+0.190	-8.3
16	63.4	116.5	+0.277	-9.0
17	75.5	104.3	+0.376	-9.5
18	88.0	91.9	+0.483	-10.1
19	100.7	79.1	+0.594	-10.5
20	113.9	66.0	+0.703	-10.9
21	127.4	52.5	+0.804	-11.3
22	141.2	38.8	+0.890	-11.7
23	155.1	24.8	+0.954	-12.1
24	169.1	10.9	+0.991	-12.4
25	176.1	3.9	-0.999	-12.6
26	162.8	17.2	-0.978	-12.3
27	149.4	30.5	-0.931	-11.9
28	136.4	43.5	-0.863	-11.6
29	123.9	56.0	-0.780	-11.2
30	111.8	68.1	-0.687	-10.9

**Julho**

Dia	Elong. °	Ang. PH	Fase	Mag.
1	100.1	79.8	-0.589	-10.5
2	88.7	91.2	-0.490	-10.1
3	77.5	102.3	-0.393	-9.6
4	66.6	113.3	-0.302	-9.1
5	55.7	124.2	-0.219	-8.6
6	44.8	135.0	-0.146	-7.9
7	34.0	145.9	-0.086	-7.1
8	23.0	156.9	-0.040	-6.2
9	12.1	167.9	-0.011	-5.2
10	3.2	176.8	-0.001	-4.2
11	11.6	168.4	+0.010	-5.1
12	23.0	156.9	+0.040	-6.2
13	34.9	145.1	+0.090	-7.2
14	46.9	133.0	+0.159	-8.0
15	59.2	120.7	+0.245	-8.7
16	71.7	108.1	+0.345	-9.4
17	84.5	95.3	+0.453	-9.9
18	97.5	82.3	+0.567	-10.4
19	110.8	69.1	+0.678	-10.8
20	124.2	55.7	+0.782	-11.2
21	137.8	42.1	+0.871	-11.6
22	151.4	28.6	+0.939	-12.0
23	164.8	15.2	+0.983	-12.3
24	175.8	4.2	+0.999	-12.6
25	167.3	12.6	-0.988	-12.4
26	154.8	25.2	-0.952	-12.1
27	142.4	37.6	-0.896	-11.7
28	130.3	49.6	-0.824	-11.4
29	118.6	61.3	-0.740	-11.1
30	107.2	72.7	-0.649	-10.7
31	96.1	83.8	-0.554	-10.4

**Agosto**

Dia	Elong. °	Ang. PH	Fase	Mag.
1	85.1	94.7	-0.459	-9.9
2	74.2	105.6	-0.365	-9.5
3	63.4	116.5	-0.277	-9.0
4	52.5	127.4	-0.196	-8.4
5	41.5	138.4	-0.126	-7.7
6	30.3	149.6	-0.069	-6.8
7	19.0	160.9	-0.027	-5.9
8	8.2	171.8	-0.005	-4.8
9	7.1	172.9	+0.004	-4.7
10	18.1	161.8	+0.025	-5.8
11	30.4	149.6	+0.069	-6.8
12	42.9	137.0	+0.134	-7.8
13	55.7	124.2	+0.219	-8.5
14	68.6	111.3	+0.319	-9.2
15	81.6	98.2	+0.428	-9.8
16	94.8	85.1	+0.543	-10.3
17	108.0	71.9	+0.655	-10.8
18	121.2	58.7	+0.760	-11.2
19	134.4	45.5	+0.850	-11.5
20	147.4	32.5	+0.922	-11.9
21	160.2	19.7	+0.971	-12.2
22	172.0	8.0	+0.995	-12.5
23	172.0	8.0	-0.995	-12.5
24	160.7	19.2	-0.972	-12.2
25	149.0	30.9	-0.929	-11.9
26	137.5	42.4	-0.869	-11.6
27	126.1	53.7	-0.796	-11.3
28	115.0	64.8	-0.713	-11.0
29	104.1	75.7	-0.623	-10.6
30	93.3	86.6	-0.530	-10.3
31	82.4	97.4	-0.435	-9.8

### Setembro

Dia	Elong. °	Ang. PH	Fase	Mag.
1	71.5	108.4	-0.343	-9.4
2	60.4	119.4	-0.254	-8.8
3	49.2	130.7	-0.174	-8.2
4	37.6	142.3	-0.105	-7.4
5	25.9	154.1	-0.050	-6.5
6	14.0	165.9	-0.015	-5.4
7	5.0	175.0	-0.002	-4.4
8	13.3	166.7	+0.013	-5.3
9	25.9	154.0	+0.051	-6.5
10	39.0	140.9	+0.112	-7.5
11	52.2	127.7	+0.194	-8.3
12	65.5	114.4	+0.293	-9.1
13	78.7	101.2	+0.403	-9.7
14	91.8	88.0	+0.517	-10.2
15	104.9	75.0	+0.629	-10.7
16	117.7	62.1	+0.734	-11.1
17	130.5	49.4	+0.825	-11.4
18	143.0	36.9	+0.900	-11.8
19	155.3	24.7	+0.954	-12.1
20	167.1	12.9	+0.987	-12.4
21	175.4	4.6	+0.998	-12.6
22	167.5	12.5	-0.988	-12.4
23	156.4	23.5	-0.959	-12.1
24	145.3	34.6	-0.912	-11.8
25	134.3	45.6	-0.850	-11.5
26	123.4	56.5	-0.776	-11.2
27	112.6	67.3	-0.693	-10.9
28	101.8	78.1	-0.603	-10.6
29	90.9	89.0	-0.509	-10.2
30	79.8	100.0	-0.413	-9.7

### Outubro

Dia	Elong. °	Ang. PH	Fase	Mag.
1	68.6	111.3	-0.318	-9.2
2	57.0	122.9	-0.228	-8.6
3	45.0	134.9	-0.147	-7.9
4	32.7	147.3	-0.079	-7.0
5	20.0	159.9	-0.030	-6.0
6	7.5	172.5	-0.004	-4.7
7	8.1	171.9	+0.005	-4.8
8	21.1	158.9	+0.034	-6.0
9	34.7	145.2	+0.089	-7.2
10	48.3	131.6	+0.168	-8.1
11	61.8	118.0	+0.265	-8.9
12	75.1	104.7	+0.373	-9.5
13	88.2	91.7	+0.485	-10.1
14	100.9	78.9	+0.596	-10.5
15	113.4	66.4	+0.700	-10.9
16	125.7	54.2	+0.793	-11.3
17	137.7	42.2	+0.870	-11.6
18	149.5	30.4	+0.931	-11.9
19	161.0	18.9	+0.973	-12.2
20	172.2	7.8	+0.995	-12.5
21	175.0	5.0	-0.998	-12.6
22	164.6	15.4	-0.982	-12.3
23	153.7	26.2	-0.949	-12.0
24	142.9	37.0	-0.899	-11.8
25	132.1	47.8	-0.836	-11.5
26	121.3	58.6	-0.761	-11.2
27	110.4	69.5	-0.675	-10.8
28	99.4	80.5	-0.583	-10.5
29	88.1	91.7	-0.485	-10.1
30	76.6	103.3	-0.385	-9.6
31	64.7	115.2	-0.287	-9.0

### Novembro

Dia	Elong. °	Ang. PH	Fase	Mag.
1	52.3	127.5	-0.195	-8.3
2	39.5	140.4	-0.115	-7.5
3	26.3	153.7	-0.052	-6.5
4	12.6	167.3	-0.012	-5.2
5	2.3	177.7	+0.000	-4.1
6	15.7	164.3	+0.019	-5.5
7	29.7	150.2	+0.066	-6.8
8	43.6	136.3	+0.139	-7.8
9	57.2	122.6	+0.230	-8.6
10	70.5	109.4	+0.334	-9.3
11	83.3	96.5	+0.443	-9.9
12	95.8	84.1	+0.552	-10.3
13	107.9	71.9	+0.655	-10.8
14	119.7	60.1	+0.749	-11.1
15	131.3	48.6	+0.831	-11.4
16	142.7	37.2	+0.898	-11.8
17	153.9	26.1	+0.949	-12.1
18	164.9	15.0	+0.983	-12.3
19	175.9	4.1	+0.999	-12.6
20	173.2	6.8	-0.997	-12.6
21	162.4	17.6	-0.977	-12.3
22	151.5	28.4	-0.940	-12.0
23	140.7	39.2	-0.887	-11.7
24	129.8	50.1	-0.821	-11.4
25	118.8	61.1	-0.742	-11.1
26	107.5	72.3	-0.652	-10.7
27	96.1	83.8	-0.554	-10.4
28	84.3	95.6	-0.451	-9.9
29	72.1	107.8	-0.347	-9.4
30	59.4	120.5	-0.246	-8.8

### Dezembro

Dia	Elong. °	Ang. PH	Fase	Mag.
1	46.3	133.6	-0.155	-8.0
2	32.7	147.2	-0.080	-7.0
3	18.7	161.2	-0.027	-5.8
4	4.6	175.4	-0.002	-4.4
5	9.8	170.1	+0.007	-5.0
6	24.0	155.9	+0.043	-6.3
7	37.9	142.0	+0.106	-7.4
8	51.4	128.5	+0.189	-8.3
9	64.5	115.4	+0.286	-9.0
10	77.1	102.8	+0.389	-9.6
11	89.2	90.6	+0.494	-10.1
12	101.0	78.9	+0.597	-10.5
13	112.4	67.4	+0.692	-10.9
14	123.6	56.2	+0.778	-11.2
15	134.7	45.2	+0.852	-11.5
16	145.6	34.4	+0.913	-11.8
17	156.4	23.6	+0.958	-12.1
18	167.1	12.9	+0.987	-12.4
19	177.1	2.9	+0.999	-12.7
20	170.7	9.3	-0.993	-12.5
21	159.9	20.0	-0.970	-12.2
22	149.0	30.9	-0.929	-11.9
23	137.9	42.0	-0.871	-11.6
24	126.6	53.3	-0.799	-11.3
25	115.1	64.8	-0.713	-11.0
26	103.3	76.5	-0.616	-10.6
27	91.2	88.6	-0.512	-10.2
28	78.8	101.1	-0.404	-9.7
29	65.9	114.0	-0.297	-9.1
30	52.6	127.3	-0.197	-8.4
31	39.0	140.9	-0.112	-7.5

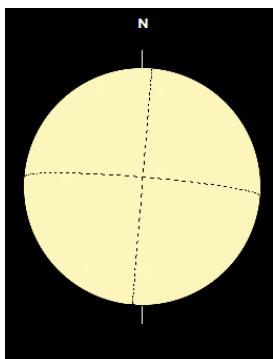
## VII - Efemérides do Sol – Janeiro a Dezembro

00:00 Hora – Tempo Universal

### Janeiro

Dia	$\alpha$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ "	DT (ua)*	P.H	Po°	Bo°	Lo°	NRC
1	18h 47m 26.88s	-22° 59' 19.8"	1951.93	0.9832637	8.94"	1.95	-3.03	280.37	2239
2	18h 51m 51.48s	-22° 54' 06.1"	1951.94	0.9832577	8.94"	1.47	-3.15	267.20	2239
3	18h 56m 15.74s	-22° 48' 25.1"	1951.94	0.9832580	8.94"	0.98	-3.26	254.03	2239
4	19h 00m 39.63s	-22° 42' 16.9"	1951.93	0.9832644	8.94"	0.50	-3.38	240.86	2239
5	19h 05m 03.12s	-22° 35' 41.7"	1951.90	0.9832766	8.94"	0.01	-3.49	227.69	2239
6	19h 09m 26.20s	-22° 28' 39.7"	1951.87	0.9832943	8.94"	-0.47	-3.60	214.52	2239
7	19h 13m 48.83s	-22° 21' 11.1"	1951.82	0.9833173	8.94"	-0.95	-3.71	201.35	2239
8	19h 18m 11.00s	-22° 13' 16.0"	1951.77	0.9833451	8.94"	-1.43	-3.82	188.18	2239
9	19h 22m 32.68s	-22° 04' 54.6"	1951.70	0.9833774	8.94"	-1.91	-3.93	175.01	2239
10	19h 26m 53.83s	-21° 56' 07.4"	1951.63	0.9834140	8.94"	-2.39	-4.04	161.85	2239
11	19h 31m 14.43s	-21° 46' 54.4"	1951.55	0.9834544	8.94"	-2.87	-4.15	148.68	2239
12	19h 35m 34.46s	-21° 37' 16.0"	1951.46	0.9834986	8.94"	-3.34	-4.25	135.51	2239
13	19h 39m 53.87s	-21° 27' 12.4"	1951.37	0.9835464	8.94"	-3.82	-4.35	122.34	2239
14	19h 44m 12.65s	-21° 16' 44.0"	1951.27	0.9835978	8.94"	-4.29	-4.46	109.17	2239
15	19h 48m 30.77s	-21° 05' 51.0"	1951.16	0.9836528	8.94"	-4.76	-4.56	96.01	2239
16	19h 52m 48.20s	-20° 54' 33.8"	1951.04	0.9837115	8.94"	-5.22	-4.66	82.84	2239
17	19h 57m 04.93s	-20° 42' 52.6"	1950.92	0.9837742	8.94"	-5.69	-4.76	69.67	2239
18	20h 01m 20.93s	-20° 30' 47.8"	1950.78	0.9838409	8.94"	-6.15	-4.85	56.50	2239
19	20h 05m 36.19s	-20° 18' 19.8"	1950.64	0.9839119	8.94"	-6.61	-4.95	43.34	2239
20	20h 09m 50.70s	-20° 05' 28.7"	1950.49	0.9839875	8.94"	-7.06	-5.04	30.17	2239
21	20h 14m 04.44s	-19° 52' 15.2"	1950.33	0.9840678	8.94"	-7.51	-5.13	17.00	2239
22	20h 18m 17.41s	-19° 38' 39.4"	1950.16	0.9841530	8.94"	-7.96	-5.22	3.84	2239
23	20h 22m 29.59s	-19° 24' 41.7"	1949.99	0.9842433	8.94"	-8.41	-5.31	350.67	2240
24	20h 26m 40.97s	-19° 10' 22.6"	1949.80	0.9843390	8.93"	-8.85	-5.40	337.50	2240
25	20h 30m 51.56s	-18° 55' 42.5"	1949.60	0.9844401	8.93"	-9.29	-5.48	324.34	2240
26	20h 35m 01.34s	-18° 40' 41.6"	1949.38	0.9845469	8.93"	-9.72	-5.57	311.17	2240
27	20h 39m 10.30s	-18° 25' 20.4"	1949.16	0.9846595	8.93"	10.15	-5.65	298.00	2240
28	20h 43m 18.45s	-18° 09' 39.3"	1948.93	0.9847781	8.93"	10.58	-5.73	284.84	2240
29	20h 47m 25.79s	-17° 53' 38.6"	1948.68	0.9849026	8.93"	11.00	-5.81	271.67	2240
30	20h 51m 32.31s	-17° 37' 18.8"	1948.42	0.9850332	8.93"	11.42	-5.88	258.51	2240
31	20h 55m 38.01s	-17° 20' 40.2"	1948.15	0.9851697	8.93"	11.83	-5.96	245.34	2240

**Aspecto do disco solar no dia 15 de Janeiro às 12:00 – Tempo Universal**

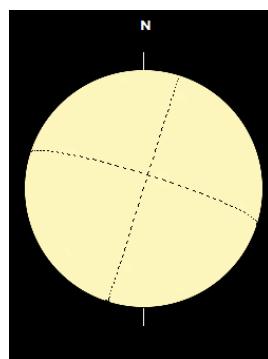


# Efemérides do Sol

00:00 Hora – Tempo Universal  
Fevereiro

Dia	$\alpha(J2000.0)$	$\delta(J2000.0)$	$\varnothing$ "	DT (ua)*	P.H	Po°	Bo°	Lo°	NRC
1	20h 59m 42.91s	-17° 03' 43.2"	1947.87	0.9853119	8.93"	12.24	-6.03	232.17	2240
2	21h 03m 47.01s	-16° 46' 28.1"	1947.58	0.9854597	8.92"	12.64	-6.10	219.01	2240
3	21h 07m 50.31s	-16° 28' 55.4"	1947.28	0.9856127	8.92"	13.04	-6.17	205.84	2240
4	21h 11m 52.81s	-16° 11' 05.4"	1946.96	0.9857707	8.92"	13.44	-6.23	192.67	2240
5	21h 15m 54.54s	-15° 52' 58.5"	1946.64	0.9859331	8.92"	13.83	-6.30	179.51	2240
6	21h 19m 55.48s	-15° 34' 35.2"	1946.31	0.9860997	8.92"	14.21	-6.36	166.34	2240
7	21h 23m 55.64s	-15° 15' 55.8"	1945.98	0.9862701	8.92"	14.59	-6.42	153.17	2240
8	21h 27m 55.03s	-14° 57' 00.8"	1945.64	0.9864438	8.92"	14.97	-6.48	140.01	2240
9	21h 31m 53.64s	-14° 37' 50.6"	1945.29	0.9866206	8.91"	15.34	-6.54	126.84	2240
10	21h 35m 51.48s	-14° 18' 25.6"	1944.93	0.9868002	8.91"	15.70	-6.59	113.67	2240
11	21h 39m 48.55s	-13° 58' 46.3"	1944.57	0.9869825	8.91"	16.06	-6.64	100.51	2240
12	21h 43m 44.85s	-13° 38' 53.1"	1944.21	0.9871674	8.91"	16.42	-6.69	87.34	2240
13	21h 47m 40.39s	-13° 18' 46.4"	1943.84	0.9873547	8.91"	16.77	-6.74	74.17	2240
14	21h 51m 35.18s	-12° 58' 26.6"	1943.47	0.9875446	8.91"	17.11	-6.79	61.01	2240
15	21h 55m 29.22s	-12° 37' 54.2"	1943.09	0.9877371	8.90"	17.45	-6.83	47.84	2240
16	21h 59m 22.53s	-12° 17' 09.7"	1942.70	0.9879324	8.90"	17.78	-6.87	34.67	2240
17	22h 03m 15.11s	-11° 56' 13.3"	1942.31	0.9881304	8.90"	18.10	-6.91	21.50	2240
18	22h 07m 06.99s	-11° 35' 05.7"	1941.92	0.9883314	8.90"	18.42	-6.95	8.33	2240
19	22h 10m 58.17s	-11° 13' 47.1"	1941.52	0.9885355	8.90"	18.74	-6.99	355.16	2241
20	22h 14m 48.66s	-10° 52' 18.1"	1941.11	0.9887429	8.89"	19.05	-7.02	341.99	2241
21	22h 18m 38.48s	-10° 30' 39.0"	1940.70	0.9889538	8.89"	19.35	-7.05	328.83	2241
22	22h 22m 27.65s	-10° 08' 50.2"	1940.28	0.9891682	8.89"	19.65	-7.08	315.66	2241
23	22h 26m 16.18s	-09° 46' 52.3"	1939.85	0.9893864	8.89"	19.94	-7.11	302.49	2241
24	22h 30m 04.08s	-09° 24' 45.5"	1939.41	0.9896086	8.89"	20.22	-7.13	289.32	2241
25	22h 33m 51.39s	-09° 02' 30.3"	1938.97	0.9898349	8.88"	20.50	-7.15	276.14	2241
26	22h 37m 38.10s	-08° 40' 07.2"	1938.52	0.9900655	8.88"	20.77	-7.17	262.97	2241
27	22h 41m 24.25s	-08° 17' 36.4"	1938.06	0.9903003	8.88"	21.04	-7.19	249.80	2241
28	22h 45m 09.85s	-07° 54' 58.4"	1937.59	0.9905396	8.88"	21.30	-7.21	236.63	2241

**Aspecto do disco solar no dia 15 de Fevereiro às 12:00 – Tempo Universal**



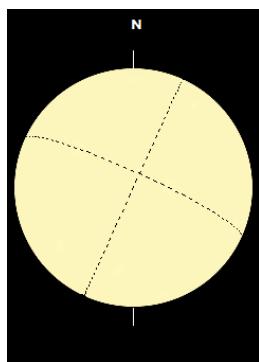
## Efemérides do Sol

00:00 Hora – Tempo Universal

**Março**

Dia	$\alpha(2000.0)$	$\delta(2000.0)$	$\varnothing$ "	DT (ua)*	P.H	Po°	Bo°	Lo°	NRC
1	22h 48m 54.94s	-07° 32' 13.4"	1937.11	0.9907831	8.88"	21.55	-7.22	223.46	2241
2	22h 52m 39.52s	-07° 09' 22.0"	1936.63	0.9910307	8.87"	21.80	-7.23	210.29	2241
3	22h 56m 23.64s	-06° 46' 24.4"	1936.14	0.9912822	8.87"	22.04	-7.24	197.11	2241
4	23h 00m 07.31s	-06° 23' 20.9"	1935.64	0.9915372	8.87"	22.28	-7.25	183.94	2241
5	23h 03m 50.55s	-06° 00' 12.1"	1935.14	0.9917954	8.87"	22.51	-7.25	170.76	2241
6	23h 07m 33.38s	-05° 36' 58.1"	1934.63	0.9920562	8.86"	22.73	-7.25	157.59	2241
7	23h 11m 15.83s	-05° 13' 39.5"	1934.12	0.9923194	8.86"	22.94	-7.25	144.41	2241
8	23h 14m 57.90s	-04° 50' 16.6"	1933.60	0.9925845	8.86"	23.15	-7.25	131.24	2241
9	23h 18m 39.61s	-04° 26' 49.8"	1933.08	0.9928511	8.86"	23.36	-7.24	118.06	2241
10	23h 22m 20.98s	-04° 03' 19.5"	1932.56	0.9931189	8.86"	23.55	-7.24	104.89	2241
11	23h 26m 02.03s	-03° 39' 46.1"	1932.04	0.9933876	8.85"	23.74	-7.23	91.71	2241
12	23h 29m 42.77s	-03° 16' 10.1"	1931.51	0.9936570	8.85"	23.93	-7.22	78.53	2241
13	23h 33m 23.22s	-02° 52' 31.7"	1930.99	0.9939270	8.85"	24.10	-7.20	65.35	2241
14	23h 37m 03.39s	-02° 28' 51.5"	1930.46	0.9941974	8.85"	24.27	-7.19	52.17	2241
15	23h 40m 43.31s	-02° 05' 09.7"	1929.94	0.9944683	8.84"	24.43	-7.17	38.99	2241
16	23h 44m 23.00s	-01° 41' 26.7"	1929.41	0.9947395	8.84"	24.59	-7.15	25.81	2241
17	23h 48m 02.47s	-01° 17' 43.1"	1928.88	0.9950112	8.84"	24.74	-7.13	12.63	2241
18	23h 51m 41.73s	-00° 53' 59.1"	1928.36	0.9952834	8.84"	24.88	-7.10	359.45	2242
19	23h 55m 20.82s	-00° 30' 15.1"	1927.83	0.9955561	8.83"	25.02	-7.08	346.27	2242
20	23h 58m 59.75s	-00° 06' 31.5"	1927.30	0.9958295	8.83"	25.15	-7.05	333.08	2242
21	00h 02m 38.53s	+00° 17' 11.3"	1926.77	0.9961037	8.83"	25.27	-7.02	319.90	2242
22	00h 06m 17.19s	+00° 40' 52.9"	1926.24	0.9963789	8.83"	25.38	-6.99	306.72	2242
23	00h 09m 55.74s	+01° 04' 33.0"	1925.70	0.9966552	8.82"	25.49	-6.95	293.53	2242
24	00h 13m 34.21s	+01° 28' 11.1"	1925.16	0.9969328	8.82"	25.59	-6.91	280.34	2242
25	00h 17m 12.62s	+01° 51' 47.0"	1924.63	0.9972119	8.82"	25.69	-6.87	267.16	2242
26	00h 20m 50.98s	+02° 15' 20.3"	1924.08	0.9974926	8.82"	25.77	-6.83	253.97	2242
27	00h 24m 29.32s	+02° 38' 50.6"	1923.54	0.9977752	8.81"	25.85	-6.79	240.78	2242
28	00h 28m 07.67s	+03° 02' 17.5"	1922.99	0.9980598	8.81"	25.93	-6.75	227.59	2242
29	00h 31m 46.04s	+03° 25' 40.9"	1922.44	0.9983464	8.81"	25.99	-6.70	214.40	2242
30	00h 35m 24.47s	+03° 49' 00.3"	1921.88	0.9986349	8.81"	26.05	-6.65	201.21	2242
31	00h 39m 02.99s	+04° 12' 15.6"	1921.32	0.9989253	8.80"	26.10	-6.60	188.02	2242

**Aspecto do disco solar no dia 15 de Março às 12:00 – Tempo Universal**



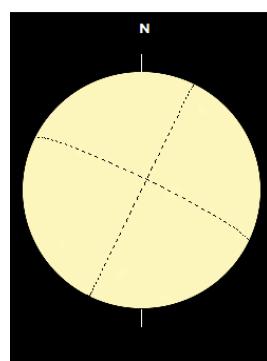
# Efemérides do Sol

00:00 Hora – Tempo Universal

## Abril

Dia	$\alpha$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ "	DT (ua)*	P.H	Po°	Bo°	Lo°	NRC
1	00h 42m 41.60s	+04° 35' 26.2"	1920.76	0.9992173	8.80"	26.15	-6.55	174.83	2242
2	00h 46m 20.35s	+04° 58' 32.1"	1920.20	0.9995105	8.80"	26.18	-6.49	161.64	2242
3	00h 49m 59.25s	+05° 21' 32.7"	1919.64	0.9998044	8.80"	26.21	-6.43	148.44	2242
4	00h 53m 38.32s	+05° 44' 27.8"	1919.07	1.0000988	8.79"	26.24	-6.37	135.25	2242
5	00h 57m 17.57s	+06° 07' 17.1"	1918.51	1.0003932	8.79"	26.25	-6.31	122.05	2242
6	01h 00m 57.02s	+06° 30' 00.1"	1917.94	1.0006871	8.79"	26.26	-6.25	108.86	2242
7	01h 04m 36.68s	+06° 52' 36.5"	1917.38	1.0009802	8.79"	26.26	-6.19	95.66	2242
8	01h 08m 16.58s	+07° 15' 06.0"	1916.82	1.0012722	8.78"	26.26	-6.12	82.46	2242
9	01h 11m 56.73s	+07° 37' 28.2"	1916.27	1.0015629	8.78"	26.24	-6.05	69.27	2242
10	01h 15m 37.14s	+07° 59' 42.8"	1915.71	1.0018518	8.78"	26.22	-5.99	56.07	2242
11	01h 19m 17.83s	+08° 21' 49.3"	1915.16	1.0021390	8.78"	26.19	-5.91	42.87	2242
12	01h 22m 58.82s	+08° 43' 47.5"	1914.62	1.0024243	8.77"	26.16	-5.84	29.67	2242
13	01h 26m 40.11s	+09° 05' 36.9"	1914.08	1.0027074	8.77"	26.12	-5.77	16.47	2242
14	01h 30m 21.73s	+09° 27' 17.2"	1913.54	1.0029885	8.77"	26.07	-5.69	3.26	2242
15	01h 34m 03.68s	+09° 48' 48.1"	1913.01	1.0032675	8.77"	26.01	-5.61	350.06	2243
16	01h 37m 45.98s	+10° 10' 09.3"	1912.48	1.0035445	8.76"	25.94	-5.53	336.86	2243
17	01h 41m 28.63s	+10° 31' 20.3"	1911.96	1.0038194	8.76"	25.87	-5.45	323.65	2243
18	01h 45m 11.66s	+10° 52' 20.7"	1911.44	1.0040923	8.76"	25.79	-5.37	310.44	2243
19	01h 48m 55.08s	+11° 13' 10.4"	1910.92	1.0043635	8.76"	25.71	-5.29	297.24	2243
20	01h 52m 38.88s	+11° 33' 48.8"	1910.41	1.0046330	8.75"	25.61	-5.20	284.03	2243
21	01h 56m 23.10s	+11° 54' 15.7"	1909.90	1.0049010	8.75"	25.51	-5.11	270.82	2243
22	02h 00m 07.73s	+12° 14' 30.7"	1909.39	1.0051676	8.75"	25.40	-5.03	257.61	2243
23	02h 03m 52.79s	+12° 34' 33.5"	1908.89	1.0054333	8.75"	25.28	-4.94	244.40	2243
24	02h 07m 38.30s	+12° 54' 23.7"	1908.39	1.0056980	8.74"	25.16	-4.85	231.19	2243
25	02h 11m 24.26s	+13° 14' 01.1"	1907.88	1.0059622	8.74"	25.03	-4.75	217.98	2243
26	02h 15m 10.70s	+13° 33' 25.3"	1907.38	1.0062259	8.74"	24.89	-4.66	204.77	2243
27	02h 18m 57.63s	+13° 52' 36.1"	1906.89	1.0064892	8.74"	24.75	-4.56	191.56	2243
28	02h 22m 45.07s	+14° 11' 33.1"	1906.39	1.0067522	8.74"	24.59	-4.47	178.34	2243
29	02h 26m 33.03s	+14° 30' 16.2"	1905.89	1.0070147	8.73"	24.43	-4.37	165.13	2243
30	02h 30m 21.53s	+14° 48' 45.0"	1905.40	1.0072765	8.73"	24.27	-4.27	151.92	2243

Aspecto do disco solar no dia 15 de Abril às 12:00 – Tempo Universal



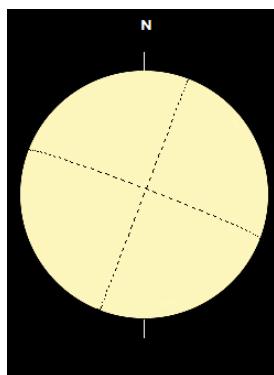
# Efemérides do Sol

00:00 Hora – Tempo Universal

## Maio

Dia	$\alpha$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ "	DT (ua)*	P.H	Po°	Bo°	Lo°	NRC
1	02h 34m 10.57s	+15° 06' 59.2"	1904.90	1.0075373	8.73"	24.09	-4.17	138.70	2243
2	02h 38m 00.17s	+15° 24' 58.6"	1904.41	1.0077967	8.73"	23.91	-4.07	125.48	2243
3	02h 41m 50.32s	+15° 42' 42.7"	1903.93	1.0080543	8.72"	23.72	-3.97	112.27	2243
4	02h 45m 41.04s	+16° 00' 11.3"	1903.44	1.0083097	8.72"	23.52	-3.87	99.05	2243
5	02h 49m 32.33s	+16° 17' 24.1"	1902.97	1.0085624	8.72"	23.32	-3.76	85.83	2243
6	02h 53m 24.20s	+16° 34' 20.8"	1902.49	1.0088123	8.72"	23.11	-3.66	72.61	2243
7	02h 57m 16.64s	+16° 51' 00.9"	1902.03	1.0090589	8.72"	22.89	-3.55	59.39	2243
8	03h 01m 09.66s	+17° 07' 24.3"	1901.57	1.0093020	8.71"	22.67	-3.44	46.17	2243
9	03h 05m 03.26s	+17° 23' 30.5"	1901.12	1.0095414	8.71"	22.44	-3.33	32.95	2243
10	03h 08m 57.45s	+17° 39' 19.4"	1900.68	1.0097769	8.71"	22.20	-3.23	19.73	2243
11	03h 12m 52.21s	+17° 54' 50.5"	1900.24	1.0100082	8.71"	21.96	-3.12	6.50	2243
12	03h 16m 47.55s	+18° 10' 03.6"	1899.81	1.0102354	8.71"	21.70	-3.01	353.28	2244
13	03h 20m 43.47s	+18° 24' 58.3"	1899.40	1.0104584	8.70"	21.45	-2.89	340.06	2244
14	03h 24m 39.96s	+18° 39' 34.5"	1898.98	1.0106771	8.70"	21.18	-2.78	326.83	2244
15	03h 28m 37.01s	+18° 53' 51.6"	1898.58	1.0108915	8.70"	20.91	-2.67	313.61	2244
16	03h 32m 34.61s	+19° 07' 49.6"	1898.19	1.0111017	8.70"	20.63	-2.55	300.38	2244
17	03h 36m 32.76s	+19° 21' 28.1"	1897.80	1.0113077	8.70"	20.35	-2.44	287.15	2244
18	03h 40m 31.46s	+19° 34' 46.8"	1897.42	1.0115097	8.69"	20.05	-2.33	273.93	2244
19	03h 44m 30.69s	+19° 47' 45.4"	1897.05	1.0117079	8.69"	19.76	-2.21	260.70	2244
20	03h 48m 30.44s	+20° 00' 23.6"	1896.68	1.0119025	8.69"	19.45	-2.09	247.47	2244
21	03h 52m 30.70s	+20° 12' 41.3"	1896.33	1.0120936	8.69"	19.14	-1.98	234.24	2244
22	03h 56m 31.48s	+20° 24' 38.1"	1895.97	1.0122817	8.69"	18.83	-1.86	221.01	2244
23	04h 00m 32.76s	+20° 36' 13.8"	1895.63	1.0124668	8.69"	18.51	-1.74	207.78	2244
24	04h 04m 34.54s	+20° 47' 28.2"	1895.29	1.0126494	8.68"	18.18	-1.62	194.55	2244
25	04h 08m 36.81s	+20° 58' 21.1"	1894.95	1.0128296	8.68"	17.84	-1.51	181.32	2244
26	04h 12m 39.58s	+21° 08' 52.3"	1894.62	1.0130076	8.68"	17.51	-1.39	168.09	2244
27	04h 16m 42.82s	+21° 19' 01.6"	1894.29	1.0131834	8.68"	17.16	-1.27	154.86	2244
28	04h 20m 46.55s	+21° 28' 48.9"	1893.96	1.0133570	8.68"	16.81	-1.15	141.63	2244
29	04h 24m 50.73s	+21° 38' 13.9"	1893.64	1.0135282	8.68"	16.45	-1.03	128.40	2244
30	04h 28m 55.37s	+21° 47' 16.4"	1893.33	1.0136967	8.68"	16.09	-0.91	115.16	2244
31	04h 33m 00.44s	+21° 55' 56.3"	1893.02	1.0138621	8.67"	15.73	-0.79	101.93	2244

**Aspecto do disco solar no dia 15 de Maio às 12:00 – Tempo Universal**



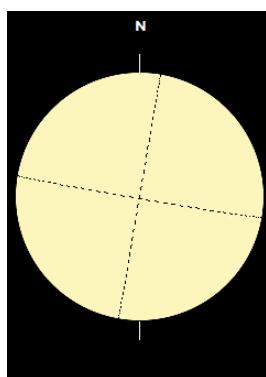
# Efemérides do Sol

00:00 Hora – Tempo Universal

## Junho

Dia	$\alpha$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ "	DT (ua)*	P.H	Po°	Bo°	Lo°	NRC
1	04h 37m 05.94s	+22° 04' 13.4"	1892.72	1.0140242	8.67"	15.36	-0.67	88.70	2244
2	04h 41m 11.85s	+22° 12' 07.5"	1892.42	1.0141825	8.67"	14.98	-0.55	75.46	2244
3	04h 45m 18.16s	+22° 19' 38.3"	1892.13	1.0143368	8.67"	14.60	-0.43	62.23	2244
4	04h 49m 24.84s	+22° 26' 45.8"	1891.85	1.0144866	8.67"	14.22	-0.31	49.00	2244
5	04h 53m 31.88s	+22° 33' 29.7"	1891.58	1.0146319	8.67"	13.83	-0.19	35.76	2244
6	04h 57m 39.27s	+22° 39' 50.0"	1891.32	1.0147722	8.67"	13.43	-0.06	22.53	2244
7	05h 01m 46.97s	+22° 45' 46.4"	1891.07	1.0149074	8.67"	13.03	0.06	9.29	2244
8	05h 05m 54.97s	+22° 51' 18.8"	1890.83	1.0150373	8.66"	12.63	0.18	356.06	2245
9	05h 10m 03.25s	+22° 56' 27.2"	1890.60	1.0151617	8.66"	12.23	0.30	342.82	2245
10	05h 14m 11.78s	+23° 01' 11.3"	1890.37	1.0152806	8.66"	11.82	0.42	329.59	2245
11	05h 18m 20.53s	+23° 05' 31.2"	1890.16	1.0153938	8.66"	11.40	0.54	316.35	2245
12	05h 22m 29.48s	+23° 09' 26.6"	1889.96	1.0155014	8.66"	10.99	0.66	303.11	2245
13	05h 26m 38.61s	+23° 12' 57.5"	1889.77	1.0156032	8.66"	10.57	0.78	289.88	2245
14	05h 30m 47.87s	+23° 16' 03.8"	1889.59	1.0156995	8.66"	10.14	0.90	276.64	2245
15	05h 34m 57.26s	+23° 18' 45.4"	1889.43	1.0157903	8.66"	-9.72	1.02	263.40	2245
16	05h 39m 06.73s	+23° 21' 02.3"	1889.27	1.0158757	8.66"	-9.29	1.14	250.17	2245
17	05h 43m 16.27s	+23° 22' 54.5"	1889.12	1.0159559	8.66"	-8.85	1.26	236.93	2245
18	05h 47m 25.85s	+23° 24' 21.8"	1888.98	1.0160312	8.66"	-8.42	1.37	223.69	2245
19	05h 51m 35.45s	+23° 25' 24.3"	1888.85	1.0161019	8.65"	-7.98	1.49	210.46	2245
20	05h 55m 45.04s	+23° 26' 01.9"	1888.72	1.0161683	8.65"	-7.54	1.61	197.22	2245
21	05h 59m 54.61s	+23° 26' 14.7"	1888.61	1.0162307	8.65"	-7.10	1.73	183.98	2245
22	06h 04m 04.13s	+23° 26' 02.6"	1888.50	1.0162895	8.65"	-6.66	1.84	170.75	2245
23	06h 08m 13.58s	+23° 25' 25.8"	1888.39	1.0163448	8.65"	-6.21	1.96	157.51	2245
24	06h 12m 22.95s	+23° 24' 24.3"	1888.30	1.0163969	8.65"	-5.77	2.08	144.27	2245
25	06h 16m 32.22s	+23° 22' 58.0"	1888.21	1.0164459	8.65"	-5.32	2.19	131.04	2245
26	06h 20m 41.36s	+23° 21' 07.2"	1888.12	1.0164918	8.65"	-4.87	2.31	117.80	2245
27	06h 24m 50.35s	+23° 18' 51.8"	1888.04	1.0165344	8.65"	-4.42	2.42	104.56	2245
28	06h 28m 59.19s	+23° 16' 11.9"	1887.97	1.0165735	8.65"	-3.97	2.53	91.33	2245
29	06h 33m 07.83s	+23° 13' 07.5"	1887.90	1.0166089	8.65"	-3.52	2.65	78.09	2245
30	06h 37m 16.28s	+23° 09' 38.6"	1887.85	1.0166403	8.65"	-3.06	2.76	64.85	2245

### Aspecto do disco solar no dia 15 de Junho às 12:00 – Tempo Universal



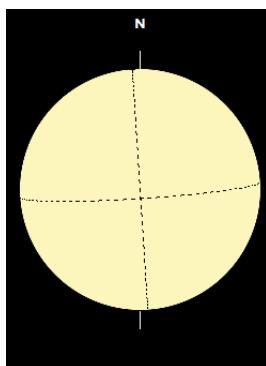
# Efemérides do Sol

00:00 Hora – Tempo Universal

**Julho**

Dia	$\alpha$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ "	DT (ua)*	P.H	Po°	Bo°	Lo°	NRC
1	06h 41m 24.50s	+23° 05' 45.5"	1887.80	1.0166674	8.65"	-2.61	2.87	51.62	2245
2	06h 45m 32.48s	+23° 01' 28.2"	1887.75	1.0166899	8.65"	-2.16	2.98	38.38	2245
3	06h 49m 40.21s	+22° 56' 46.7"	1887.72	1.0167076	8.65"	-1.70	3.09	25.15	2245
4	06h 53m 47.64s	+22° 51' 41.2"	1887.70	1.0167201	8.65"	-1.25	3.20	11.91	2245
5	06h 57m 54.78s	+22° 46' 11.8"	1887.68	1.0167274	8.65"	-0.80	3.30	358.67	2246
6	07h 02m 01.59s	+22° 40' 18.7"	1887.68	1.0167291	8.65"	-0.34	3.41	345.44	2246
7	07h 06m 08.06s	+22° 34' 01.9"	1887.69	1.0167252	8.65"	0.11	3.52	332.20	2246
8	07h 10m 14.15s	+22° 27' 21.7"	1887.71	1.0167154	8.65"	0.56	3.62	318.97	2246
9	07h 14m 19.86s	+22° 20' 18.2"	1887.74	1.0166997	8.65"	1.01	3.73	305.73	2246
10	07h 18m 25.15s	+22° 12' 51.5"	1887.78	1.0166779	8.65"	1.46	3.83	292.50	2246
11	07h 22m 30.01s	+22° 05' 01.9"	1887.83	1.0166501	8.65"	1.91	3.93	279.27	2246
12	07h 26m 34.41s	+21° 56' 49.5"	1887.89	1.0166162	8.65"	2.36	4.03	266.03	2246
13	07h 30m 38.34s	+21° 48' 14.6"	1887.96	1.0165763	8.65"	2.80	4.13	252.80	2246
14	07h 34m 41.78s	+21° 39' 17.2"	1888.05	1.0165306	8.65"	3.25	4.23	239.57	2246
15	07h 38m 44.70s	+21° 29' 57.7"	1888.14	1.0164792	8.65"	3.69	4.33	226.33	2246
16	07h 42m 47.10s	+21° 20' 16.3"	1888.25	1.0164224	8.65"	4.14	4.42	213.10	2246
17	07h 46m 48.96s	+21° 10' 13.1"	1888.37	1.0163605	8.65"	4.58	4.52	199.87	2246
18	07h 50m 50.27s	+20° 59' 48.4"	1888.49	1.0162938	8.65"	5.01	4.61	186.64	2246
19	07h 54m 51.02s	+20° 49' 02.4"	1888.62	1.0162227	8.65"	5.45	4.70	173.40	2246
20	07h 58m 51.20s	+20° 37' 55.4"	1888.76	1.0161475	8.65"	5.88	4.80	160.17	2246
21	08h 02m 50.81s	+20° 26' 27.7"	1888.91	1.0160686	8.65"	6.31	4.89	146.94	2246
22	08h 06m 49.85s	+20° 14' 39.5"	1889.06	1.0159862	8.66"	6.74	4.97	133.71	2246
23	08h 10m 48.29s	+20° 02' 31.0"	1889.22	1.0159007	8.66"	7.17	5.06	120.48	2246
24	08h 14m 46.15s	+19° 50' 02.6"	1889.38	1.0158121	8.66"	7.59	5.15	107.25	2246
25	08h 18m 43.42s	+19° 37' 14.5"	1889.56	1.0157205	8.66"	8.01	5.23	94.02	2246
26	08h 22m 40.09s	+19° 24' 06.8"	1889.73	1.0156259	8.66"	8.43	5.31	80.79	2246
27	08h 26m 36.17s	+19° 10' 39.9"	1889.91	1.0155280	8.66"	8.85	5.40	67.57	2246
28	08h 30m 31.66s	+18° 56' 54.0"	1890.10	1.0154268	8.66"	9.26	5.48	54.34	2246
29	08h 34m 26.57s	+18° 42' 49.4"	1890.30	1.0153219	8.66"	9.67	5.55	41.11	2246
30	08h 38m 20.88s	+18° 28' 26.2"	1890.50	1.0152133	8.66"	10.07	5.63	27.88	2246
31	08h 42m 14.61s	+18° 13' 44.9"	1890.71	1.0151006	8.66"	10.47	5.71	14.66	2246

**Aspecto do disco solar no dia 15 de Julho às 12:00 – Tempo Universal**



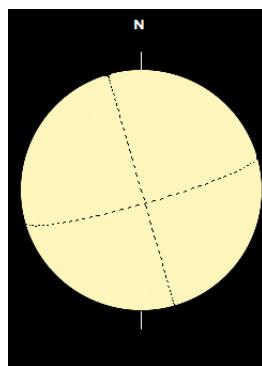
## Efemérides do Sol

00:00 Hora – Tempo Universal

### Agosto

Dia	$\alpha$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ "	DT (ua)*	P.H	Po°	Bo°	Lo°	NRC
1	08h 46m 07.74s	+17° 58' 45.6"	1890.93	1.0149837	8.66"	10.87	5.78	1.43	2246
2	08h 50m 00.29s	+17° 43' 28.6"	1891.15	1.0148624	8.67"	11.27	5.85	348.21	2247
3	08h 53m 52.26s	+17° 27' 54.3"	1891.39	1.0147364	8.67"	11.66	5.92	334.98	2247
4	08h 57m 43.63s	+17° 12' 02.9"	1891.63	1.0146055	8.67"	12.05	5.99	321.76	2247
5	09h 01m 34.42s	+16° 55' 54.7"	1891.88	1.0144697	8.67"	12.43	6.06	308.53	2247
6	09h 05m 24.62s	+16° 39' 30.1"	1892.15	1.0143287	8.67"	12.81	6.13	295.31	2247
7	09h 09m 14.23s	+16° 22' 49.3"	1892.42	1.0141825	8.67"	13.18	6.19	282.09	2247
8	09h 13m 03.26s	+16° 05' 52.6"	1892.70	1.0140309	8.67"	13.56	6.25	268.86	2247
9	09h 16m 51.69s	+15° 48' 40.5"	1893.00	1.0138740	8.67"	13.92	6.31	255.64	2247
10	09h 20m 39.55s	+15° 31' 13.1"	1893.30	1.0137116	8.68"	14.29	6.37	242.42	2247
11	09h 24m 26.81s	+15° 13' 30.8"	1893.61	1.0135440	8.68"	14.65	6.43	229.20	2247
12	09h 28m 13.50s	+14° 55' 33.9"	1893.94	1.0133712	8.68"	15.00	6.49	215.98	2247
13	09h 31m 59.62s	+14° 37' 22.8"	1894.27	1.0131935	8.68"	15.35	6.54	202.76	2247
14	09h 35m 45.17s	+14° 18' 57.7"	1894.61	1.0130112	8.68"	15.70	6.59	189.54	2247
15	09h 39m 30.16s	+14° 00' 19.1"	1894.96	1.0128247	8.68"	16.04	6.64	176.32	2247
16	09h 43m 14.61s	+13° 41' 27.2"	1895.31	1.0126342	8.68"	16.37	6.69	163.10	2247
17	09h 46m 58.52s	+13° 22' 22.3"	1895.68	1.0124402	8.69"	16.71	6.73	149.89	2247
18	09h 50m 41.90s	+13° 03' 04.8"	1896.05	1.0122431	8.69"	17.03	6.78	136.67	2247
19	09h 54m 24.77s	+12° 43' 35.1"	1896.42	1.0120433	8.69"	17.36	6.82	123.45	2247
20	09h 58m 07.13s	+12° 23' 53.4"	1896.80	1.0118410	8.69"	17.67	6.86	110.24	2247
21	10h 01m 49.01s	+12° 04' 00.0"	1897.18	1.0116366	8.69"	17.99	6.90	97.02	2247
22	10h 05m 30.42s	+11° 43' 55.3"	1897.57	1.0114302	8.69"	18.29	6.94	83.80	2247
23	10h 09m 11.38s	+11° 23' 39.5"	1897.96	1.0112219	8.70"	18.60	6.97	70.59	2247
24	10h 12m 51.90s	+11° 03' 12.9"	1898.36	1.0110118	8.70"	18.89	7.00	57.38	2247
25	10h 16m 32.00s	+10° 42' 35.9"	1898.75	1.0107996	8.70"	19.19	7.03	44.16	2247
26	10h 20m 11.71s	+10° 21' 48.6"	1899.16	1.0105855	8.70"	19.47	7.06	30.95	2247
27	10h 23m 51.04s	+10° 00' 51.4"	1899.56	1.0103691	8.70"	19.76	7.09	17.74	2247
28	10h 27m 30.00s	+09° 39' 44.6"	1899.97	1.0101505	8.71"	20.03	7.11	4.53	2247
29	10h 31m 08.63s	+09° 18' 28.6"	1900.39	1.0099294	8.71"	20.30	7.14	351.31	2248
30	10h 34m 46.93s	+08° 57' 03.5"	1900.81	1.0097056	8.71"	20.57	7.16	338.10	2248
31	10h 38m 24.91s	+08° 35' 29.8"	1901.24	1.0094790	8.71"	20.83	7.18	324.89	2248

### Aspecto do disco solar no dia 15 de Agosto às 12:00 – Tempo Universal



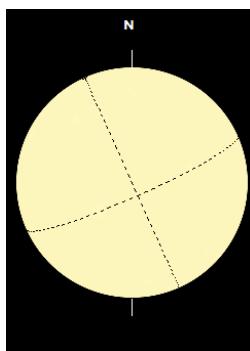
# Efemérides do Sol

00:00 Hora – Tempo Universal

## Setembro

Dia	$\alpha$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ "	DT (ua)*	P.H	Po°	Bo°	Lo°	NRC
1	10h 42m 02.60s	+08° 13' 47.6"	1901.67	1.0092494	8.71"	21.09	7.19	311.68	2248
2	10h 45m 40.01s	+07° 51' 57.5"	1902.11	1.0090167	8.72"	21.34	7.21	298.48	2248
3	10h 49m 17.16s	+07° 29' 59.7"	1902.55	1.0087807	8.72"	21.58	7.22	285.27	2248
4	10h 52m 54.05s	+07° 07' 54.5"	1903.01	1.0085411	8.72"	21.82	7.23	272.06	2248
5	10h 56m 30.71s	+06° 45' 42.3"	1903.47	1.0082980	8.72"	22.05	7.24	258.85	2248
6	11h 00m 07.15s	+06° 23' 23.4"	1903.93	1.0080511	8.72"	22.28	7.25	245.64	2248
7	11h 03m 43.37s	+06° 00' 58.1"	1904.40	1.0078005	8.73"	22.50	7.25	232.44	2248
8	11h 07m 19.41s	+05° 38' 26.8"	1904.89	1.0075461	8.73"	22.72	7.25	219.23	2248
9	11h 10m 55.26s	+05° 15' 49.9"	1905.37	1.0072880	8.73"	22.93	7.25	206.03	2248
10	11h 14m 30.96s	+04° 53' 07.7"	1905.87	1.0070264	8.73"	23.13	7.25	192.82	2248
11	11h 18m 06.51s	+04° 30' 20.4"	1906.37	1.0067616	8.73"	23.33	7.24	179.62	2248
12	11h 21m 41.94s	+04° 07' 28.6"	1906.88	1.0064938	8.74"	23.52	7.24	166.41	2248
13	11h 25m 17.26s	+03° 44' 32.5"	1907.39	1.0062235	8.74"	23.70	7.23	153.21	2248
14	11h 28m 52.48s	+03° 21' 32.6"	1907.91	1.0059510	8.74"	23.88	7.22	140.01	2248
15	11h 32m 27.64s	+02° 58' 29.0"	1908.43	1.0056768	8.74"	24.06	7.21	126.80	2248
16	11h 36m 02.74s	+02° 35' 22.3"	1908.95	1.0054014	8.75"	24.22	7.19	113.60	2248
17	11h 39m 37.80s	+02° 12' 12.7"	1909.47	1.0051250	8.75"	24.39	7.18	100.40	2248
18	11h 43m 12.85s	+01° 49' 00.5"	1910.00	1.0048480	8.75"	24.54	7.16	87.20	2248
19	11h 46m 47.92s	+01° 25' 46.1"	1910.53	1.0045707	8.75"	24.69	7.14	74.00	2248
20	11h 50m 23.02s	+01° 02' 29.7"	1911.06	1.0042932	8.76"	24.83	7.11	60.80	2248
21	11h 53m 58.18s	+00° 39' 11.8"	1911.58	1.0040158	8.76"	24.97	7.09	47.60	2248
22	11h 57m 33.43s	+00° 15' 52.5"	1912.11	1.0037385	8.76"	25.10	7.06	34.40	2248
23	12h 01m 08.79s	-00° 07' 27.9"	1912.64	1.0034612	8.76"	25.22	7.03	21.20	2248
24	12h 04m 44.28s	-00° 30' 48.9"	1913.17	1.0031841	8.77"	25.33	7.00	8.00	2248
25	12h 08m 19.94s	-00° 54' 10.4"	1913.70	1.0029069	8.77"	25.44	6.97	354.80	2249
26	12h 11m 55.77s	-01° 17' 31.9"	1914.23	1.0026297	8.77"	25.55	6.93	341.60	2249
27	12h 15m 31.81s	-01° 40' 53.1"	1914.76	1.0023523	8.77"	25.64	6.89	328.41	2249
28	12h 19m 08.08s	-02° 04' 13.8"	1915.29	1.0020745	8.78"	25.73	6.85	315.21	2249
29	12h 22m 44.59s	-02° 27' 33.5"	1915.82	1.0017963	8.78"	25.82	6.81	302.01	2249
30	12h 26m 21.36s	-02° 50' 51.9"	1916.35	1.0015175	8.78"	25.89	6.77	288.82	2249

**Aspecto do disco solar no dia 15 de Setembro às 12:00 – Tempo Universal**



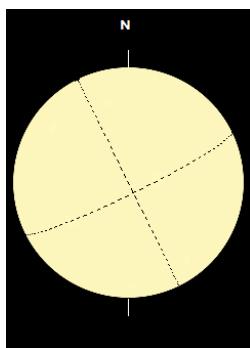
# Efemérides do Sol

00:00 Hora – Tempo Universal

## Outubro

Dia	$\alpha$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ "	DT (ua)*	P.H	Po°	Bo°	Lo°	NRC
1	12h 29m 58.42s	-03° 14' 08.8"	1916.89	1.0012380	8.78"	25.96	6.72	275.62	2249
2	12h 33m 35.79s	-03° 37' 23.6"	1917.42	1.0009575	8.79"	26.02	6.67	262.42	2249
3	12h 37m 13.47s	-04° 00' 36.1"	1917.96	1.0006758	8.79"	26.08	6.62	249.23	2249
4	12h 40m 51.50s	-04° 23' 45.8"	1918.51	1.0003929	8.79"	26.12	6.57	236.03	2249
5	12h 44m 29.88s	-04° 46' 52.5"	1919.05	1.0001086	8.79"	26.17	6.52	222.84	2249
6	12h 48m 08.64s	-05° 09' 55.6"	1919.60	0.9998227	8.80"	26.20	6.46	209.65	2249
7	12h 51m 47.78s	-05° 32' 54.9"	1920.15	0.9995353	8.80"	26.23	6.40	196.45	2249
8	12h 55m 27.34s	-05° 55' 50.0"	1920.71	0.9992465	8.80"	26.24	6.35	183.26	2249
9	12h 59m 07.33s	-06° 18' 40.4"	1921.27	0.9989563	8.80"	26.26	6.28	170.07	2249
10	13h 02m 47.75s	-06° 41' 25.8"	1921.83	0.9986651	8.81"	26.26	6.22	156.87	2249
11	13h 06m 28.64s	-07° 04' 05.7"	1922.39	0.9983733	8.81"	26.26	6.16	143.68	2249
12	13h 10m 09.99s	-07° 26' 39.8"	1922.95	0.9980811	8.81"	26.25	6.09	130.49	2249
13	13h 13m 51.83s	-07° 49' 07.6"	1923.51	0.9977891	8.81"	26.23	6.02	117.30	2249
14	13h 17m 34.17s	-08° 11' 28.9"	1924.07	0.9974977	8.82"	26.21	5.95	104.11	2249
15	13h 21m 17.03s	-08° 33' 43.1"	1924.63	0.9972073	8.82"	26.17	5.88	90.91	2249
16	13h 25m 00.44s	-08° 55' 49.9"	1925.19	0.9969182	8.82"	26.14	5.80	77.72	2249
17	13h 28m 44.40s	-09° 17' 48.9"	1925.75	0.9966308	8.82"	26.09	5.72	64.53	2249
18	13h 32m 28.95s	-09° 39' 39.9"	1926.30	0.9963454	8.83"	26.03	5.65	51.34	2249
19	13h 36m 14.10s	-10° 01' 22.4"	1926.85	0.9960621	8.83"	25.97	5.57	38.15	2249
20	13h 39m 59.87s	-10° 22' 56.0"	1927.39	0.9957812	8.83"	25.90	5.49	24.96	2249
21	13h 43m 46.29s	-10° 44' 20.5"	1927.93	0.9955027	8.83"	25.82	5.40	11.77	2249
22	13h 47m 33.38s	-11° 05' 35.4"	1928.47	0.9952267	8.84"	25.74	5.32	358.58	2250
23	13h 51m 21.15s	-11° 26' 40.4"	1929.00	0.9949533	8.84"	25.64	5.23	345.40	2250
24	13h 55m 09.62s	-11° 47' 35.1"	1929.52	0.9946823	8.84"	25.54	5.14	332.21	2250
25	13h 58m 58.80s	-12° 08' 19.1"	1930.04	0.9944139	8.84"	25.43	5.05	319.02	2250
26	14h 02m 48.72s	-12° 28' 52.1"	1930.56	0.9941479	8.85"	25.32	4.96	305.83	2250
27	14h 06m 39.38s	-12° 49' 13.7"	1931.07	0.9938841	8.85"	25.19	4.87	292.64	2250
28	14h 10m 30.80s	-13° 09' 23.4"	1931.58	0.9936226	8.85"	25.06	4.78	279.46	2250
29	14h 14m 23.00s	-13° 29' 20.9"	1932.08	0.9933630	8.85"	24.92	4.68	266.27	2250
30	14h 18m 15.98s	-13° 49' 05.7"	1932.58	0.9931053	8.85"	24.77	4.58	253.08	2250
31	14h 22m 09.75s	-14° 08' 37.5"	1933.08	0.9928493	8.86"	24.62	4.48	239.90	2250

**Aspecto do disco solar no dia 15 de Outubro às 12:00 – Tempo Universal**



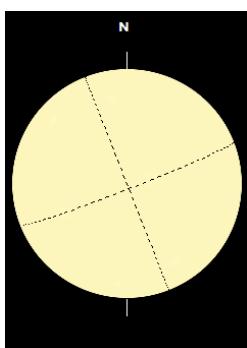
# Efemérides do Sol

00:00 Hora – Tempo Universal

## Novembro

Dia	$\alpha$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ "	DT (ua)*	P.H	Po°	Bo°	Lo°	NRC
1	14h 26m 04.32s	-14° 27' 55.9"	1933.58	0.9925947	8.86"	24.45	4.38	226.71	2250
2	14h 29m 59.71s	-14° 47' 00.3"	1934.07	0.9923414	8.86"	24.28	4.28	213.52	2250
3	14h 33m 55.92s	-15° 05' 50.5"	1934.56	0.9920892	8.86"	24.10	4.18	200.34	2250
4	14h 37m 52.96s	-15° 24' 25.9"	1935.05	0.9918378	8.87"	23.92	4.07	187.15	2250
5	14h 41m 50.82s	-15° 42' 46.2"	1935.54	0.9915873	8.87"	23.72	3.97	173.97	2250
6	14h 45m 49.52s	-16° 00' 50.9"	1936.03	0.9913377	8.87"	23.52	3.86	160.78	2250
7	14h 49m 49.06s	-16° 18' 39.6"	1936.52	0.9910891	8.87"	23.31	3.75	147.60	2250
8	14h 53m 49.42s	-16° 36' 11.9"	1937.00	0.9908417	8.88"	23.09	3.65	134.41	2250
9	14h 57m 50.62s	-16° 53' 27.2"	1937.48	0.9905960	8.88"	22.86	3.54	121.23	2250
10	15h 01m 52.64s	-17° 10' 25.3"	1937.96	0.9903522	8.88"	22.63	3.42	108.04	2250
11	15h 05m 55.48s	-17° 27' 05.7"	1938.43	0.9901108	8.88"	22.39	3.31	94.86	2250
12	15h 09m 59.15s	-17° 43' 27.9"	1938.90	0.9898723	8.88"	22.14	3.20	81.67	2250
13	15h 14m 03.65s	-17° 59' 31.7"	1939.36	0.9896369	8.89"	21.88	3.08	68.49	2250
14	15h 18m 08.97s	-18° 15' 16.5"	1939.81	0.9894051	8.89"	21.62	2.97	55.31	2250
15	15h 22m 15.13s	-18° 30' 42.0"	1940.26	0.9891771	8.89"	21.34	2.85	42.13	2250
16	15h 26m 22.11s	-18° 45' 47.9"	1940.70	0.9889532	8.89"	21.06	2.73	28.94	2250
17	15h 30m 29.93s	-19° 00' 33.8"	1941.13	0.9887337	8.89"	20.78	2.62	15.76	2250
18	15h 34m 38.57s	-19° 14' 59.3"	1941.55	0.9885186	8.90"	20.48	2.50	2.58	2250
19	15h 38m 48.04s	-19° 29' 04.1"	1941.97	0.9883082	8.90"	20.18	2.38	349.40	2251
20	15h 42m 58.34s	-19° 42' 47.8"	1942.37	0.9881024	8.90"	19.87	2.26	336.21	2251
21	15h 47m 09.45s	-19° 56' 10.1"	1942.76	0.9879015	8.90"	19.56	2.13	323.03	2251
22	15h 51m 21.37s	-20° 09' 10.7"	1943.15	0.9877053	8.90"	19.23	2.01	309.85	2251
23	15h 55m 34.09s	-20° 21' 49.2"	1943.53	0.9875139	8.91"	18.90	1.89	296.67	2251
24	15h 59m 47.60s	-20° 34' 05.2"	1943.89	0.9873271	8.91"	18.57	1.77	283.49	2251
25	16h 04m 01.89s	-20° 45' 58.5"	1944.25	0.9871450	8.91"	18.22	1.64	270.31	2251
26	16h 08m 16.94s	-20° 57' 28.6"	1944.60	0.9869673	8.91"	17.87	1.52	257.13	2251
27	16h 12m 32.75s	-21° 08' 35.3"	1944.95	0.9867938	8.91"	17.52	1.39	243.95	2251
28	16h 16m 49.30s	-21° 19' 18.2"	1945.28	0.9866245	8.91"	17.15	1.27	230.77	2251
29	16h 21m 06.57s	-21° 29' 37.0"	1945.61	0.9864590	8.91"	16.78	1.14	217.59	2251
30	16h 25m 24.54s	-21° 39' 31.4"	1945.92	0.9862972	8.92"	16.41	1.01	204.41	2251

Aspecto do disco solar no dia 15 de Novembro às 12:00 – Tempo Universal



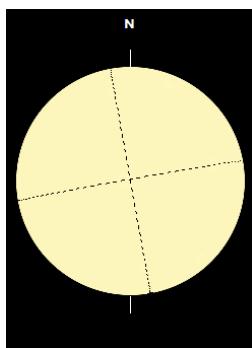
# Efemérides do Sol

00:00 Hora – Tempo Universal

## Dezembro

Dia	$\alpha(J2000.0)$	$\delta(J2000.0)$	$\varnothing$ "	DT (ua)*	P.H	Po°	Bo°	Lo°	NRC
1	16h 29m 43.20s	-21° 49' 01.1"	1946.24	0.9861387	8.92"	16.02	0.89	191.23	2251
2	16h 34m 02.52s	-21° 58' 05.8"	1946.54	0.9859833	8.92"	15.64	0.76	178.05	2251
3	16h 38m 22.49s	-22° 06' 45.1"	1946.85	0.9858308	8.92"	15.24	0.63	164.87	2251
4	16h 42m 43.07s	-22° 14' 58.9"	1947.14	0.9856811	8.92"	14.84	0.50	151.70	2251
5	16h 47m 04.23s	-22° 22' 46.8"	1947.43	0.9855340	8.92"	14.44	0.38	138.52	2251
6	16h 51m 25.93s	-22° 30' 08.6"	1947.72	0.9853898	8.92"	14.03	0.25	125.34	2251
7	16h 55m 48.15s	-22° 37' 04.1"	1948.00	0.9852485	8.93"	13.61	0.12	112.16	2251
8	17h 00m 10.85s	-22° 43' 32.9"	1948.27	0.9851106	8.93"	13.19	-0.01	98.99	2251
9	17h 04m 34.00s	-22° 49' 35.0"	1948.53	0.9849762	8.93"	12.77	-0.14	85.81	2251
10	17h 08m 57.56s	-22° 55' 09.9"	1948.79	0.9848458	8.93"	12.34	-0.26	72.63	2251
11	17h 13m 21.52s	-23° 00' 17.7"	1949.04	0.9847198	8.93"	11.90	-0.39	59.46	2251
12	17h 17m 45.83s	-23° 04' 58.1"	1949.28	0.9845984	8.93"	11.46	-0.52	46.28	2251
13	17h 22m 10.48s	-23° 09' 11.0"	1949.51	0.9844821	8.93"	11.02	-0.65	33.11	2251
14	17h 26m 35.43s	-23° 12' 56.2"	1949.73	0.9843709	8.93"	10.57	-0.78	19.93	2251
15	17h 31m 00.65s	-23° 16' 13.7"	1949.94	0.9842652	8.93"	10.12	-0.90	6.75	2251
16	17h 35m 26.12s	-23° 19' 03.3"	1950.14	0.9841653	8.94"	9.67	-1.03	353.58	2252
17	17h 39m 51.80s	-23° 21' 24.9"	1950.33	0.9840711	8.94"	9.21	-1.16	340.40	2252
18	17h 44m 17.67s	-23° 23' 18.6"	1950.50	0.9839830	8.94"	8.75	-1.28	327.23	2252
19	17h 48m 43.70s	-23° 24' 44.1"	1950.66	0.9839009	8.94"	8.28	-1.41	314.06	2252
20	17h 53m 09.85s	-23° 25' 41.6"	1950.81	0.9838249	8.94"	7.82	-1.54	300.88	2252
21	17h 57m 36.08s	-23° 26' 10.8"	1950.95	0.9837551	8.94"	7.35	-1.66	287.71	2252
22	18h 02m 02.38s	-23° 26' 11.9"	1951.08	0.9836914	8.94"	6.88	-1.79	274.54	2252
23	18h 06m 28.71s	-23° 25' 44.8"	1951.19	0.9836337	8.94"	6.40	-1.91	261.36	2252
24	18h 10m 55.03s	-23° 24' 49.5"	1951.30	0.9835819	8.94"	5.93	-2.03	248.19	2252
25	18h 15m 21.32s	-23° 23' 26.1"	1951.39	0.9835359	8.94"	5.45	-2.16	235.02	2252
26	18h 19m 47.54s	-23° 21' 34.4"	1951.47	0.9834954	8.94"	4.97	-2.28	221.85	2252
27	18h 24m 13.67s	-23° 19' 14.6"	1951.54	0.9834603	8.94"	4.49	-2.40	208.67	2252
28	18h 28m 39.67s	-23° 16' 26.7"	1951.60	0.9834302	8.94"	4.01	-2.52	195.50	2252
29	18h 33m 05.51s	-23° 13' 10.8"	1951.65	0.9834049	8.94"	3.52	-2.64	182.33	2252
30	18h 37m 31.16s	-23° 09' 26.9"	1951.69	0.9833840	8.94"	3.04	-2.76	169.16	2252
31	18h 41m 56.58s	-23° 05' 15.2"	1951.72	0.9833672	8.94"	2.56	-2.88	155.99	2252

**Aspecto do disco solar no dia 15 de Dezembro às 12:00 – Tempo Universal**



## Eclipses

### Eclipse Total da Lua em 26/05/2021

Em 21 de maio, teremos a ocorrência do primeiro eclipse lunar de 2021, cuja região de visibilidade total para este fenômeno engloba Ásia, Austrália, Oceano Pacífico e também grande parte das Américas.

A duração total deste eclipse encontra-se estimada em 03h07m (fase umbral), quando então regiões do oeste da América do Sul (exceto parte do nordeste do Brasil), América Central e do Norte (exceto nordeste e norte do Canadá) poderão acompanhar o eclipse próximo à linha do poente.

Novamente as estimativas realizadas pelo físico brasileiro Hélio Carvalho Vital, são apresentadas nas tabelas abaixo, contendo as estimativas para este fenômeno.

Fase	Imersão (TU)			Emersão (TU)	
	Penumbra (P)	Umbra (U)		Umbra (U)	Penumbra (P)
Inicial	P1 – U1 U2 – P2	08:47:27 11:11:40	09:44:49		
	P3 – U3 U4 – P4			11:26:03 12:52:43	13:50:04

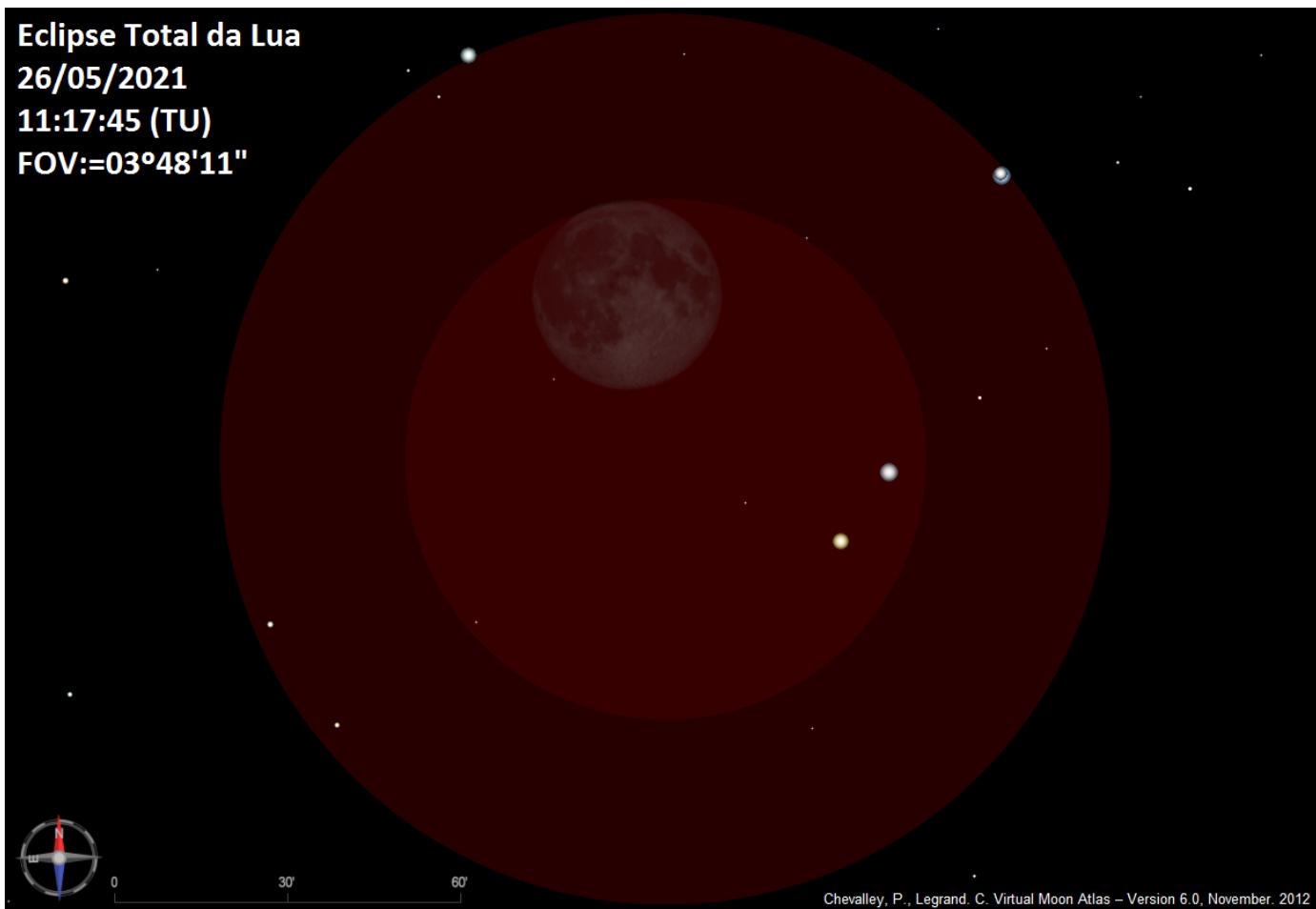
Cratera / Relevo	Coordenadas Selenográficas			Imersão (TU)	Emersão (TU)
	$\lambda L$	$\beta L$	$\varnothing$ Km		
Riccioli	3.0° S	74.3° W	150x150	09:53:04	11:50:31
Grimaldi	5.2° S	68.6° W	228x228	09:52:40	11:52:33
Billy	13.8° S	50.1° W	48x48	09:53:20	12:00:38
Birt	22.4° S	8.5° W	17x17	10:05:34	12:21:05
Bullialdus	20.7° S	22.2° W	63x63	10:18:51	12:35:24
Kepler	8.1° N	38.0° W	32x32	10:07:01	11:57:13
Aristarchus	23.7° N	47.4° W	41x41	10:15:10	11:47:34
Campanus	28.0° S	27.8° W	49x49	09:56:48	12:13:55
Copernicus	9.7° N	20.0° W	95x95	10:14:20	12:05:03
Pytheas	20.5° N	20.6° W	20x20	10:20:51	12:00:24
Timocharis	26.7° N	13.1° W	36x36	10:27:41	12:01:19
Pico	46.4° N	15.1° W	12x12	10:42:57	11:53:21
Plato	51.6° N	9.3° W	104x104	10:47:21	11:49:50
Abulfeda	13.8° S	13.9° E	65x65	10:18:01	12:30:16
Manilius	14.5° N	9.1° E	41x41	10:28:49	12:18:26
Dionysius	2.8° N	17.3° E	19x19	10:26:29	12:27:22
Menelaus	16.3° N	16.0° E	27x27	10:32:31	12:21:10
Nicolai	42.4° S	25.0° E	43x43	10:12:45	12:37:44
Eudoxus	44.3° N	16.3° E	70x70	10:48:24	12:04:47
Aristoteles	50.2° N	17.4° E	90x90	10:52:14	12:00:58
Plinius	15.4° N	23.7° E	44x44	10:35:02	12:25:24
Censorinus	0.4° S	32.7° E	3x3	10:31:14	12:35:51
Posidonius	31.8° N	29.9° E	99x99	10:45:23	12:18:57
Goclenius	10.0° S	45.0° E	56x56	10:31:29	12:43:16
Stevinus	32.5° S	54.0° E	77x77	10:24:36	12:47:12
Taruntius	5.6° N	46.5° E	58x58	10:38:35	12:39:26
Tycho	43.3° S	11.2° W	88x88	10:00:12	12:24:11
Proclus	16.1° N	46.8° E	29x29	10:43:12	12:34:51
Langrenus	8.9° S	60.9° E	136x136	10:36:24	12:48:04
Mare Crisium	17.0° N	59.0° E	638x638	10:46:45	12:38:13

## Eclipse Total da Lua

26/05/2021

11:17:45 (TU)

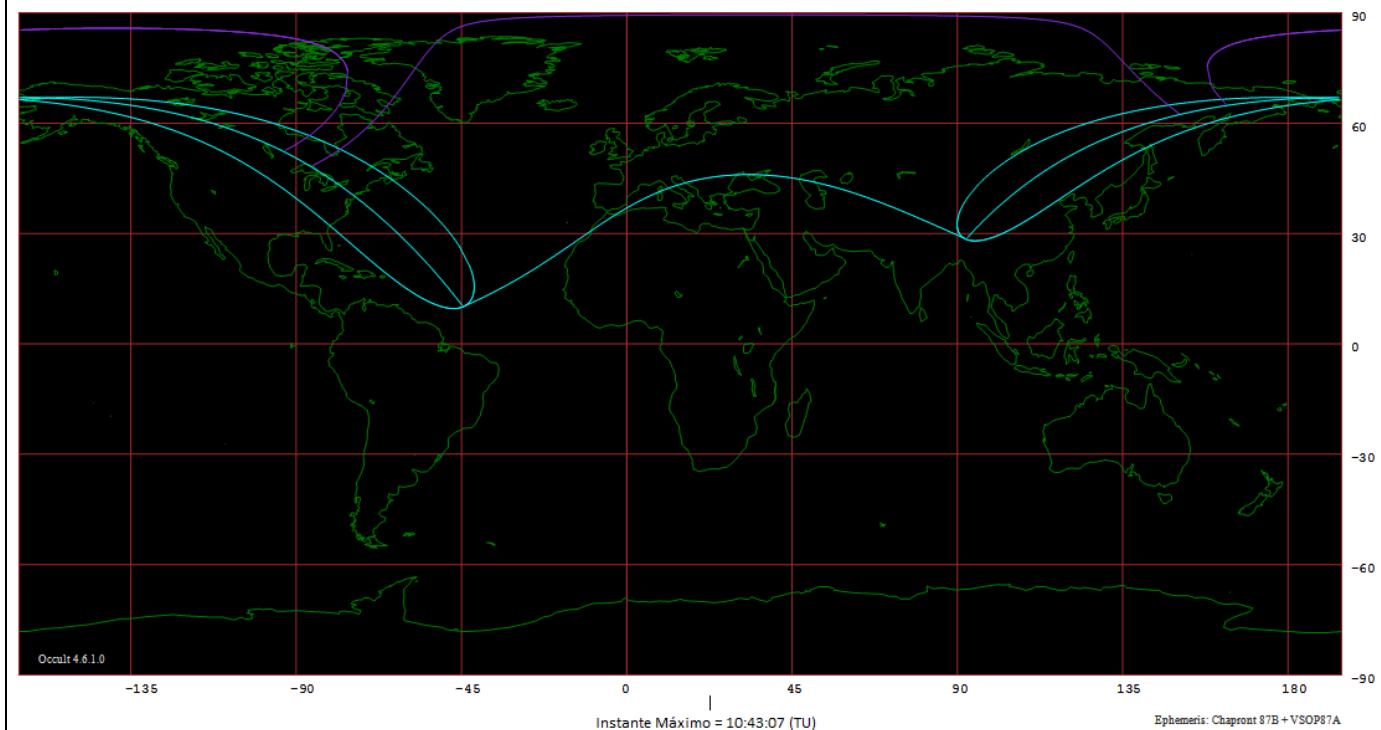
FOV:=03°48'11"



## Eclipse Anular do Sol em 10/06/2021

Em 10 de Junho, ocorrerá o segundo eclipse de 2021, cuja Abrangência de visibilidade recai sobre regiões no norte da África (Marrocos); norte da América do Norte (Canadá, EUA), Europa e Ásia, sendo que a faixa de anularidade cortará a o Norte do Canadá, Groelândia e Rússia. O instante máximo ocorre às 10:43:07 (TU) e a duração da totalidade é estimada em 03m51.2s (Espenak, 2013).

### Eclipse Anular do Sol em 10 de junho de 2021



# Eclipse Parcial da Lua de 19/11/2021

Em 19 de novembro, ocorrerá o terceiro eclipse de 2021, cuja região de visibilidade total para este fenômeno engloba o noroeste da África, região central e norte da Europa, todas regiões das Américas, Oceano Pacífico; Este da Ásia e Austrália.

Este eclipse terá seu instante máximo ocorrendo as 09:02:53.1 (TU) e sua duração total (fase umbral), encontra-se estimada em 03h28m.

Novamente as estimativas realizadas pelo físico brasileiro Hélio Carvalho Vital, são apresentadas nas tabelas abaixo, contendo as estimativas para este fenômeno.

Fase	Imersão (TU)			Emersão (TU)	
	Penumbra (P)	Umbra (U)		Umbra (U)	Penumbra (P)
Inicial P1 – U1	06:01:59	07:18:36			
Final U4 – P4				10:47:26	12:04:01

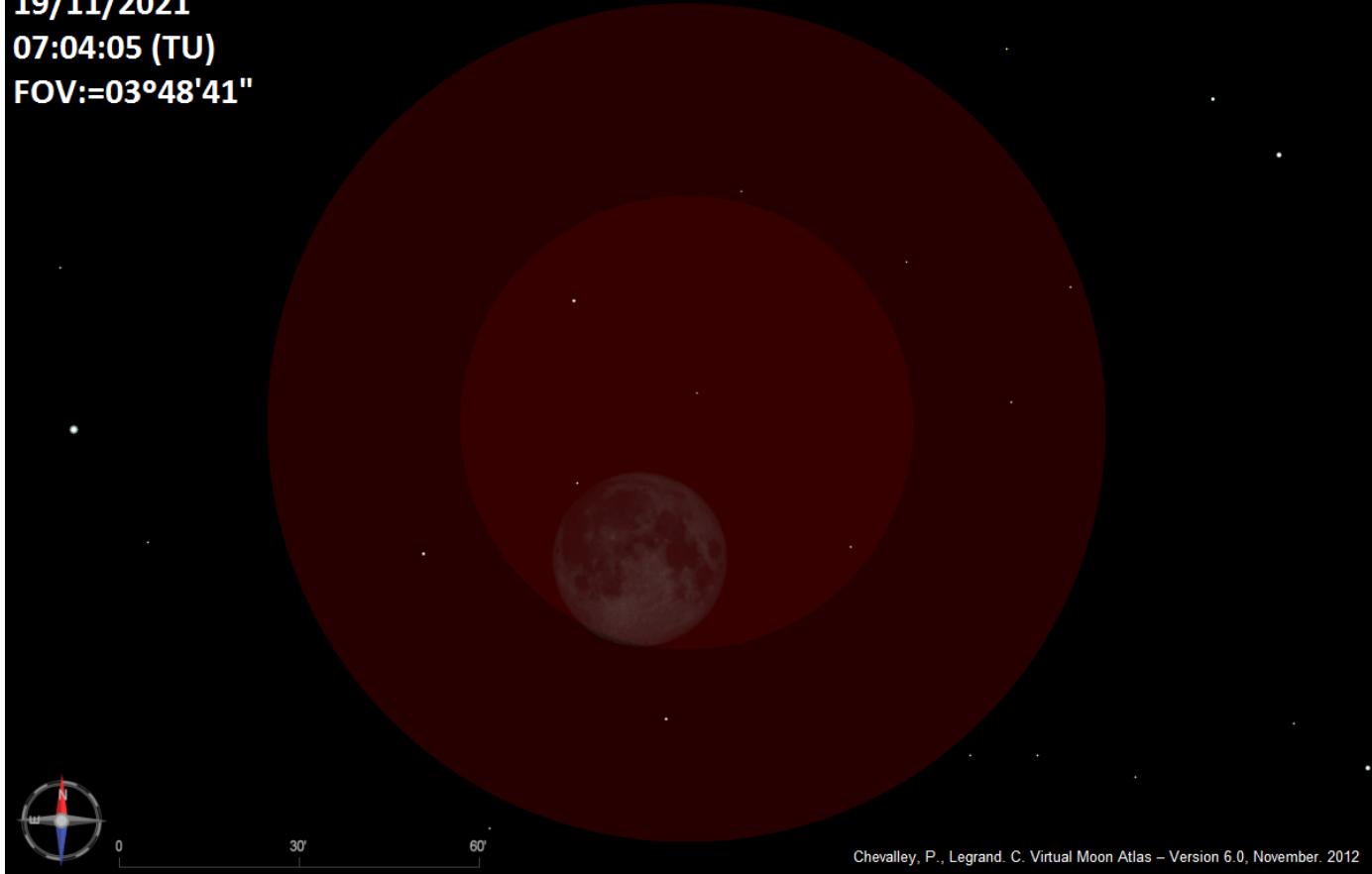
Cratera / Relevo	Coordenadas Selenográficas			Imersão (TU)	Emersão (TU)
	$\lambda L$	$\beta L$	$\varnothing$ Km		
Riccioli	3.0° S	74.3° W	150x150	07:31:50	09:32:32
Grimaldi	5.2° S	68.6° W	228x228	07:34:19	09:32:36
Billy	13.8° S	50.1° W	48x48	07:44:36	09:34:39
Birt	22.4° S	8.5° W	17x17	08:06:48	09:52:12
Bullialdus	20.7° S	22.2° W	63x63	08:18:54	10:11:23
Kepler	8.1° N	38.0° W	32x32	07:34:38	09:49:40
Aristarchus	23.7° N	47.4° W	41x41	07:25:58	09:52:09
Campanus	28.0° S	27.8° W	49x49	08:04:10	09:38:12
Copernicus	9.7° N	20.0° W	95x95	07:41:28	09:59:46
Pytheas	20.5° N	20.6° W	20x20	07:37:04	10:03:17
Timocharis	26.7° N	13.1° W	36x36	07:38:34	10:09:07
Pico	46.4° N	15.1° W	12x12	07:36:26	10:15:23
Plato	51.6° N	9.3° W	104x104	07:35:37	10:16:11
Abulfeda	13.8° S	13.9° E	65x65	08:10:58	10:10:32
Manilius	14.5° N	9.1° E	41x41	07:53:42	10:18:30
Dionysius	2.8° N	17.3° E	19x19	08:03:19	10:19:51
Menelaus	16.3° N	16.0° E	27x27	07:56:19	10:22:53
Nicolai	42.4° S	25.0° E	43X43	08:34:36	09:56:41
Eudoxus	44.3° N	16.3° E	70x70	07:46:16	10:25:45
Aristoteles	50.2° N	17.4° E	90x90	07:44:57	10:26:02
Plinius	15.4° N	23.7° E	44x44	08:00:24	10:26:56
Censorinus	0.4° S	32.7° E	3x3	08:12:10	10:27:20
Posidonius	31.8° N	29.9° E	99x99	07:56:06	10:31:41
Goclenius	10.0° S	45.0° E	56x56	08:22:04	10:29:06
Stevinus	32.5° S	54.0° E	77X77	08:36:34	10:17:04
Taruntius	5.6° N	46.5° E	58x58	08:14:47	10:35:51
Tycho	43.3° S	11.2° W	88x88	08:24:23	09:37:23
Proclus	16.1° N	46.8° E	29x29	08:09:47	10:38:03
Langrenus	8.9° S	60.9° E	136x136	08:26:35	10:35:40
Mare Crisium	17.0° N	59.0° E	638x638	08:13:17	10:42:29

## Eclipse Total da Lua

19/11/2021

07:04:05 (TU)

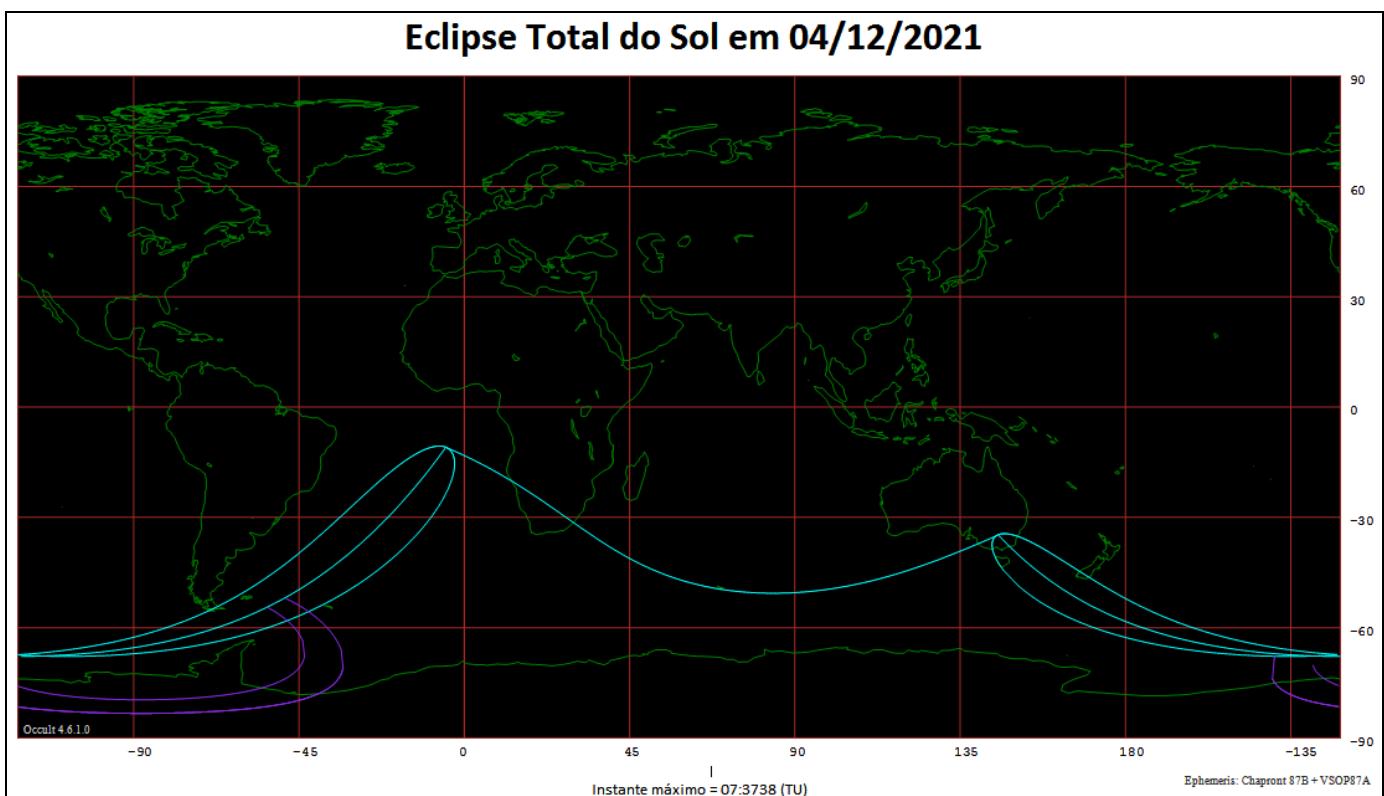
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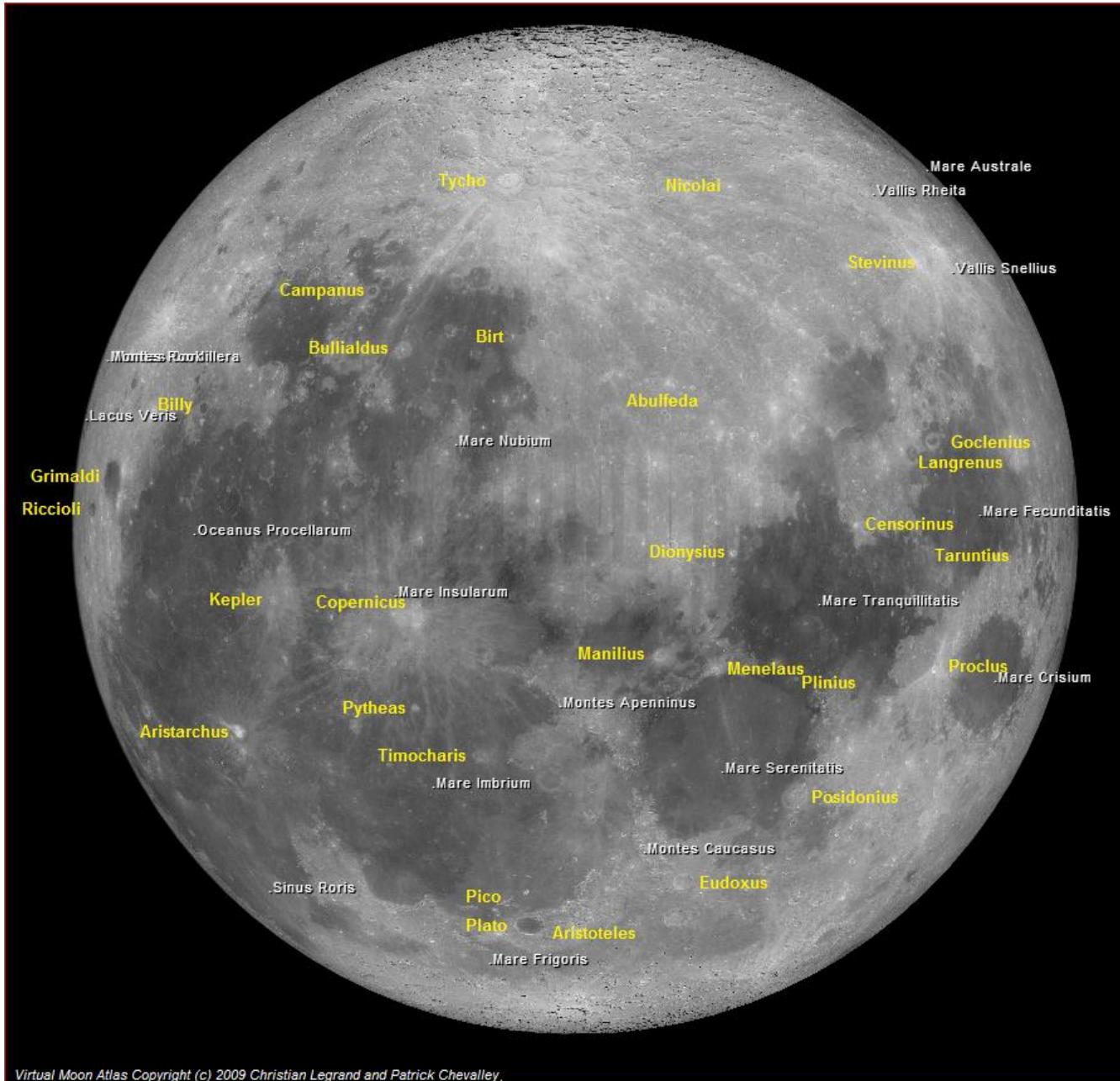
## Eclipse Total do Sol de 04/12/2021

Em 04 de dezembro, ocorrerá o quarto eclipse de 2021, cuja região de visibilidade para este fenômeno engloba as regiões austrais no hemisfério sul sendo que o instante máximo às 07:34:38 (TU), ocorre sobre no Mar de Weddell na região Antártica.

Este eclipse será visível como parcial nas seguintes regiões: África do Sul, Oceania (Austrália e Noza Zelândia) e na Argentina (Ushuaia, no extremo sul da América do Sul).



## Principais Crateras do relevo lunar



# Ocultações de Estrelas pela Lua

Data: 30 Jan 2021

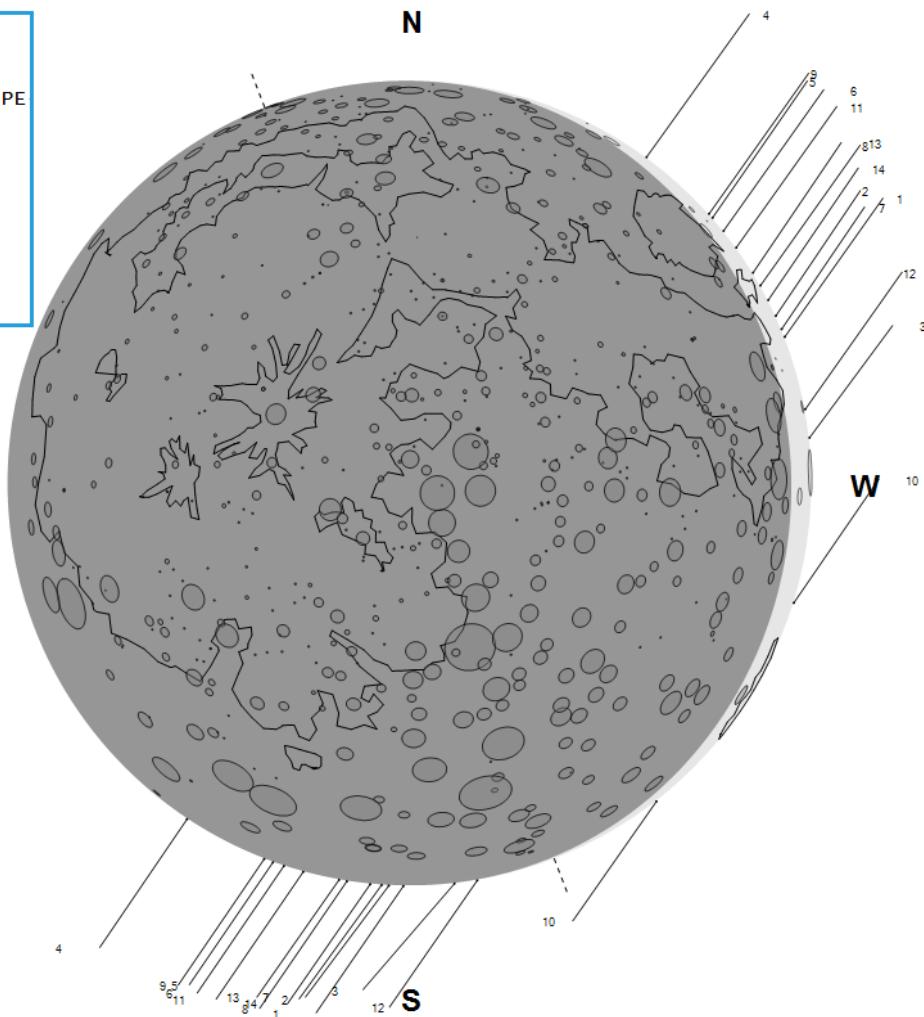
**Al Jabhah** (30 eta Leonis); NSV 4738, HR 3975, BD+17 2171, HD 87737, SAO 98955, FK5 379 – Mv = 3.52

Lua: % iluminada = 98 (-); Elongação do Sol = 162°

Cidades Estados	Hora (T.U)	Desaparecimento					Reaparecimento					
		Lua		AC	AP	AV	Hora (T.U)	Lua		AC	AP	
		Alt.	Az.	0	0	0		Alt.	Az.	0	0	
Aracaju – SE	05 27 45	55	321	-27S	158	137	06 34 04			43	305	84S
Belém – PA	04 48 09	72	357	-30S	155	134	06 04 59			63	313	88S
Boa Vista – RR	04 15 49	67	53	-20S	165	144	05 21 37			76	11	70S
Fortaleza – CE	05 09 36	64	322	-46S	139	118	06 29 30			49	301	76N
João Pessoa – PB	05 21 33	57	316	-44S	141	120	06 37 37			42	300	78N
Macapá – AP	04 39 54	73	12	-29S	156	135	05 56 41			67	318	85S
Maceió – AL	05 25 19	55	319	-35S	150	129	06 36 54			42	303	88N
Natal – RN	05 18 50	59	316	-47S	138	117	06 36 27			43	299	75N
Palmas – TO	05 27 06	61	338	12S	197	176	05 53 05			58	327	46S
Recife – PE	05 23 30	56	317	-41S	144	123	06 38 06			41	301	81N
Salvador – BA	05 32 28	53	323	-16S	169	147	06 29 42			43	308	74S
São Luís – MA	04 57 44	69	339	-36S	149	128	06 16 52			57	306	86N
Teresina – PI	05 06 16	66	333	-32S	153	132	06 21 03			53	307	90N
Aracaju – SE	05 27 45	55	321	-27S	158	137	06 34 04			43	305	84S

## Circunstâncias de Desaparecimento e Reaparecimento

- 1 - Aracaju - SE
- 2 - Belém - PA
- 3 - Boa Vista - RR
- 4 - Fern. de Noronha - PE
- 5 - Fortaleza - CE
- 6 - João Pessoa - PB
- 7 - Macapá - AP
- 8 - Maceió - AL
- 9 - Natal - RN
- 10 - Palmas - TO
- 11 - Recife - PE
- 12 - Salvador - BA
- 13 - São Luís - MA
- 14 - Teresina - PI



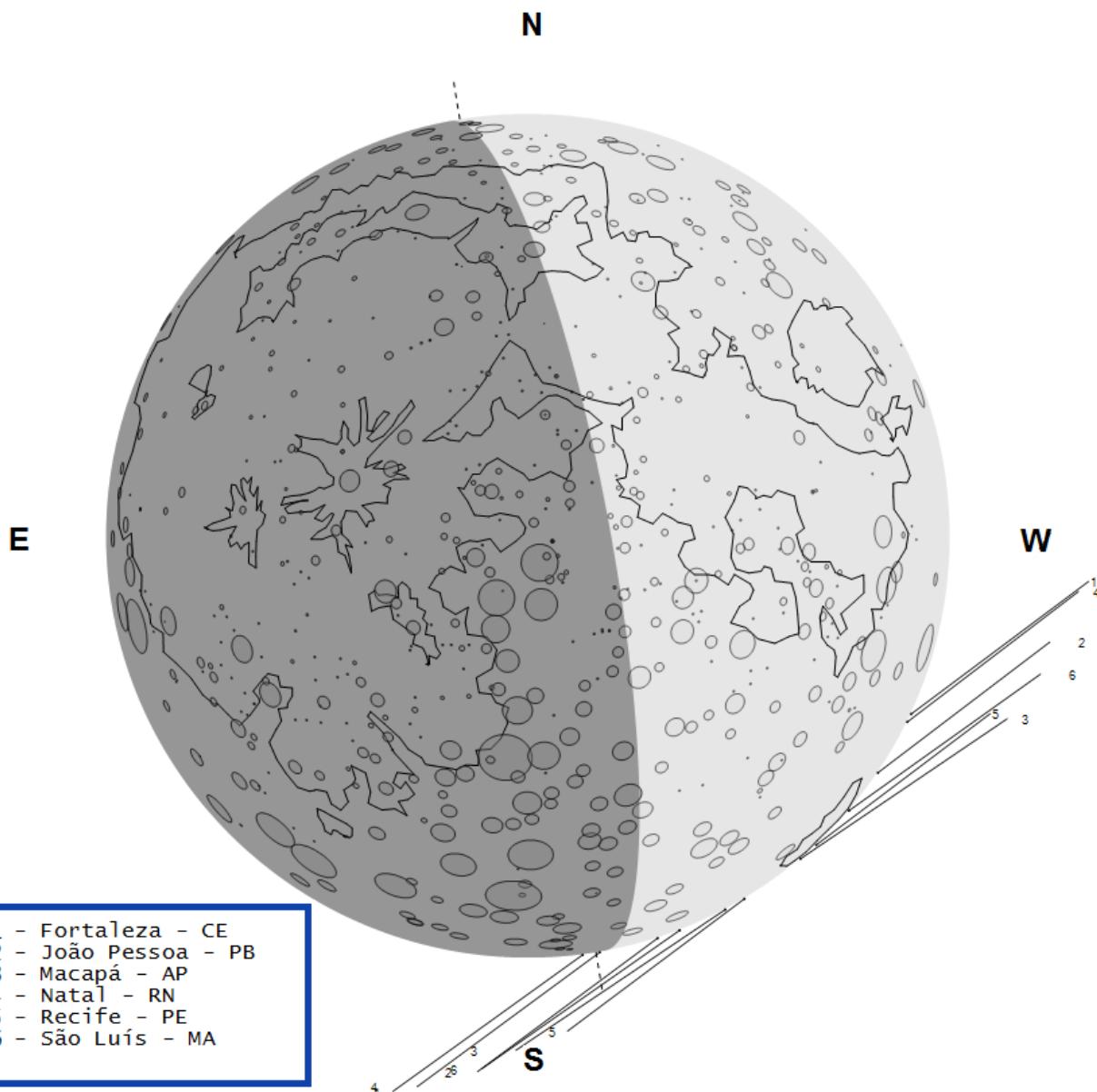
Data: 05 Mar 2021

**Acrab** – 8 beta Scorpii - NSV 7424, HR 5984, BD-19 4307, HD 144217, SAO 159682, FK5 597 – Mv = 2.6

Lua: % iluminada = 60 (-); Elongação do Sol = 101°

Cidades	Desaparecimento							Reaparecimento						
	Hora	Sol	Lua		AC	AP	AV	Hora	Sol	Lua		AC	AP	AV
Estado	(T.U)	Alt.	Alt.	Az.	0	0	0	(T.U)	Alt.	Alt.	Az.	0	0	0
Fortaleza - CE	02 55 49		17	110	-13S	178	169	03 24 55		24	110	45S	236	227
João Pessoa - PB	03 05 10		24	109	-2S	189	179	03 25 33		29	109	36S	227	217
Macapá - AP	03 01 42		5	110	8S	199	189	03 07 47		7	110	20S	211	202
Natal - RN	02 59 58		22	109	-10S	181	171	03 28 06		29	109	44S	235	225
Recife - PE	03 12 41		26	108	11S	202	192	03 19 43		28	108	23S	214	204
São Luís - MA	03 00 22		12	110	1S	192	182	03 14 27		16	110	30S	220	211

### Região de Desaparecimento e Reaparecimento



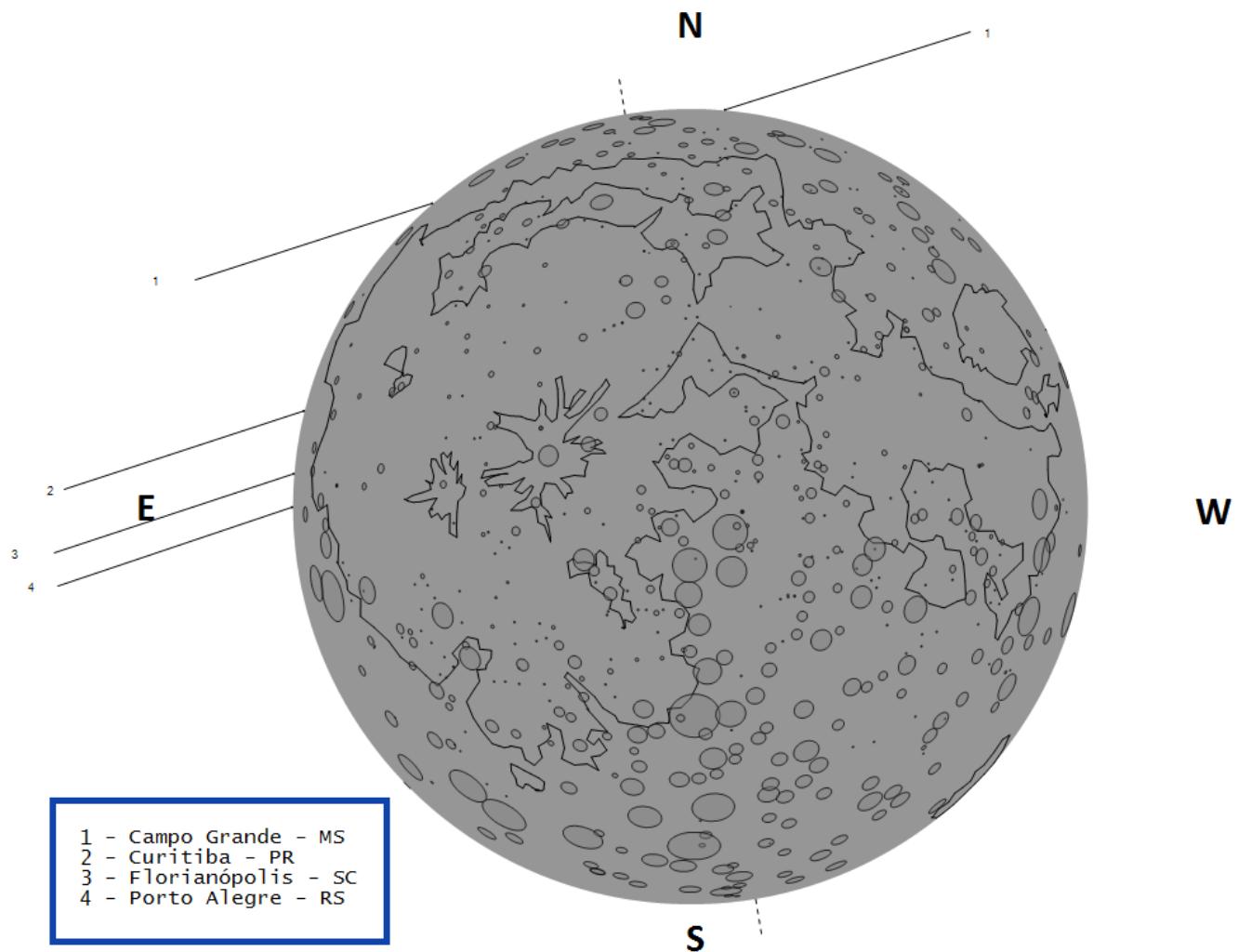
Data: 26 Mai 2021

**Acrab** – 8 beta Scorpii - NSV 7424, HR 5984, BD-19 4307, HD 144217, SAO 159682, FK5 597 – Mv = 2.6

Lua: % iluminada = 100 (+); Elongação do Sol = 178°

Cidades	Desaparecimento							Reaparecimento						
	Hora	Sol	Lua		AC	AP	AV	Hora	Sol	Lua		AC	AP	AV
Estado	(T.U)	Alt.	Alt.	Az.	°	°	°	(T.U)	Alt.	Alt.	Az.	°	°	°
Campo Grande - MS	09 36 16	-7	5	251	-1N	31	22	09 56 30	-3	1	249	-49N	346	336
Curitiba - PR	09 21 44	-7	5	250	33N	67	57							
Florianópolis - SC	09 18 34	-8	6	251	42N	76	66							
Porto Alegre - RS	09 16 19	-11	9	252	46N	81	71							

### Região de Desaparecimento e Reaparecimento



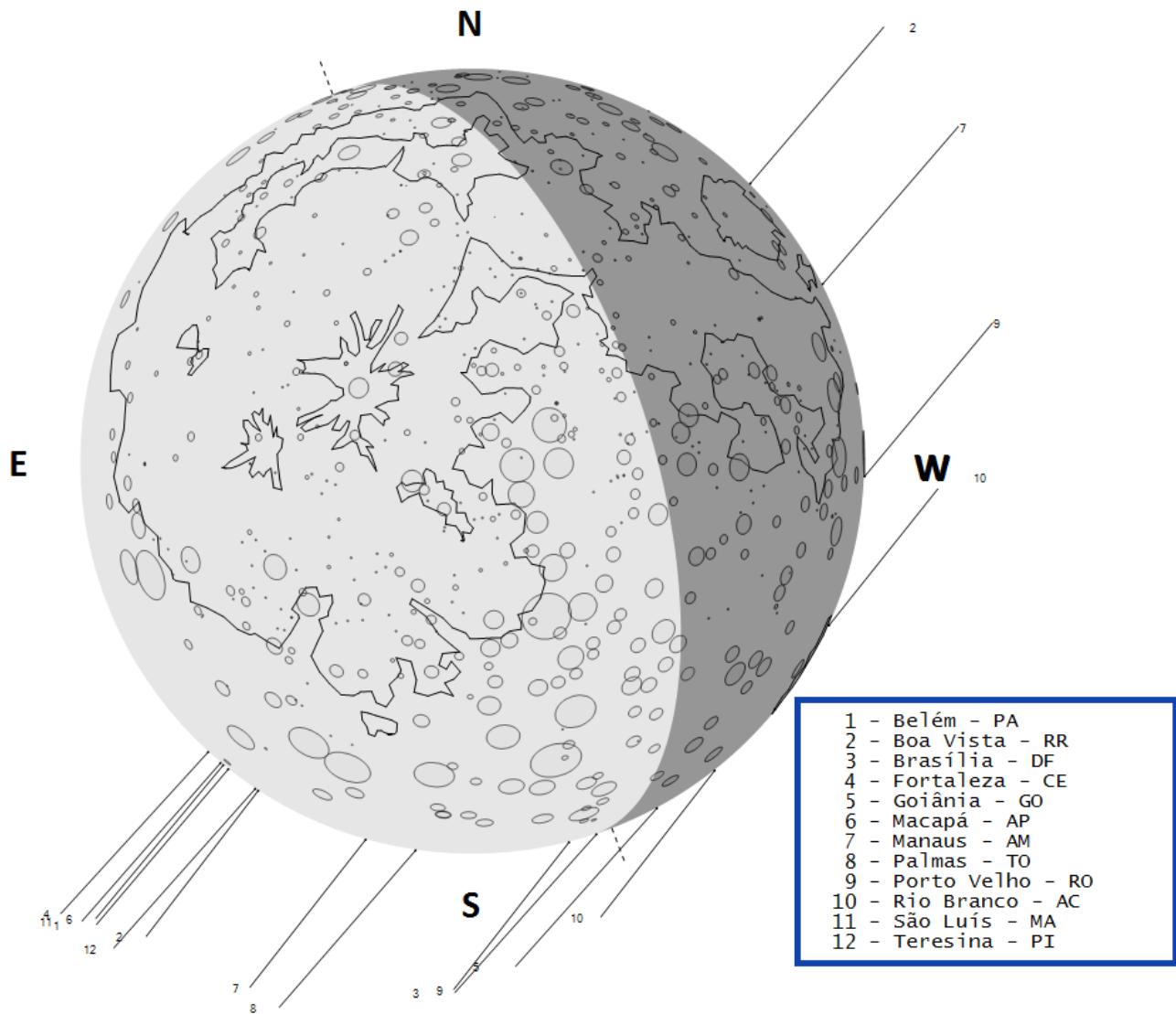
Data: 15 Jun 2021

**Al Jabhah** (30 eta Leonis); NSV 4738, HR 3975, BD+17 2171, HD 87737, SAO 98955, FK5 379 – Mv = 3.52

Lua: % iluminada = 27 (+); Elongação do Sol = 63°

Cidades Estados	Desaparecimento						Reaparecimento						
	Hora	Sol	Lua		AC	AP	AV	Hora	Lua		AC	AP	AV
	(T.U)	Alt.	Alt.	Az.	0	0	0	(T.U)	Alt.	Az.	0	0	0
Belém - PA	00 53 13		12	287	77S	121	100						
Boa Vista - RR	00 45 24		27	287	72S	126	105	01 47 37		12	286	-84N	294
Brasília - DF	01 16 03		2	288	20S	178	157						
Fortaleza - CE	00 54 43		1	287	81S	117	96						
Goiânia - GO	01 20 44		1	288	11S	187	166						
Macapá - AP	00 51 34		15	287	78S	120	99						
Manaus - AM	00 54 13		22	289	55S	143	122	01 50 34		9	287	-78S	276
Palmas - TO	01 03 53		6	288	47S	151	130						
Porto Velho - RO	01 07 20		21	292	25S	173	152	01 44 58		12	289	-49S	247
Rio Branco - AC	01 18 52		21	292	1S	197	176	01 33 49		18	291	-26S	224
São Luís - MA	00 54 23		7	287	79S	119	98						
Teresina - PI	00 56 21		5	287	72S	126	105						

### Circunstâncias de Desaparecimento e Reaparecimento



Data: 24 Jun 2021

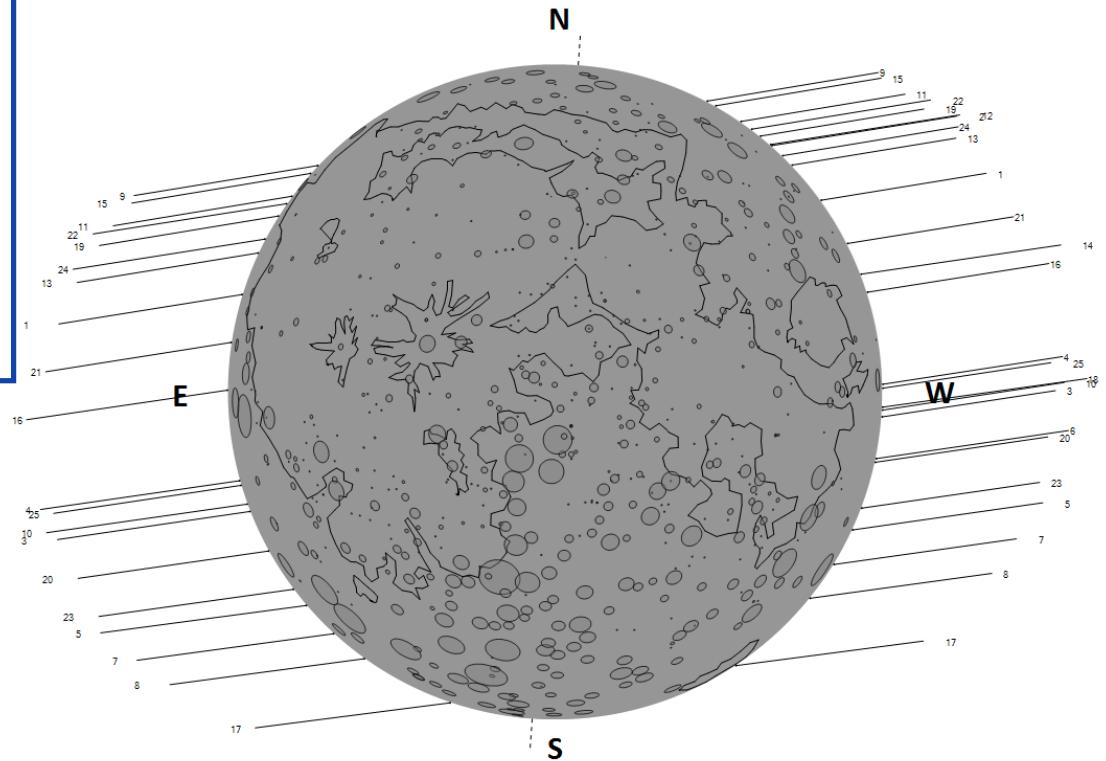
**Kaus Borealis** (22 Lambda Sgr), HR 6913, CD-2513149, HD 169916, SAO 186841, FK5 692 – Mv = 2.8

Lua: % iluminada = 100 (-); Elongação do Sol = 177°

Cidades Estados	Desaparecimento							Reaparecimento						
	Hora	Sol	Lua		AC	AP	AV	Hora	Sol	Lua		AC	AP	AV
	(T.U)	Alt.	Alt.	Az.	0	0	0	T.U)	Alt.	Alt.	Az.	0	0	0
Aracaju - SE	21 46 26		19	113	-41N	77	81	22 41 40		31	113	83N	310	314
Belém - PA								22 26 09		13	116	71N	323	327
Belo Horizonte - MG	21 50 03		17	112	-82N	115	119	22 47 24		29	109	59S	270	274
Brasília - DF	21 4 57		1	114	-76N	110	114	22 42 12		23	111	65S	275	280
Campo Grande - MS	21 54 13	-11	8	114	-77S	135	139	22 39 58		18	111	40S	249	254
Cuiabá - MT	22 00 29		16	111	-69S	141	146	22 38 25		15	113	53S	262	267
Curitiba - PR								22 44 19		26	107	34S	242	247
Florianópolis - SC	22 05 10		19	110	-62S	148	153	22 44 35		27	106	27S	235	240
Fortaleza - CE	21 50 07		15	115	-14N	50	55	22 26 25		23	116	58N	336	341
Goiânia - GO	21 46 58		10	114	-81N	114	118	22 42 00		22	111	61S	271	275
João Pessoa - PB	21 50 30		20	115	-21N	57	62	22 33 54		30	115	65N	329	334
Macapá - AP								22 24 56		10	116	71N	323	327
Maceió - AL	21 47 50		19	114	-33N	69	73	22 39 14		31	114	76N	318	322
Manaus - AM								22 31 36	-8	5	115	83S	295	300
Natal - RN	21 51 38		19	115	-16N	52	56	22 30 42		28	116	60N	335	339
Palmas - TO	21 42 12	-10	7	115	-59N	94	98	22 37 36		20	113	80S	292	296
Porto Alegre - RS	22 14 14		19	109	-44S	165	170	22 39 06		24	107	9S	218	222
Porto Velho - RO								22 34 51	-7	4	115	61S	271	276
Recife - PE	21 49 37		20	114	-25N	62	66	22 36 17		31	115	69N	325	330
Rio de Janeiro - RJ	21 54 06		19	110	-89S	123	127	22 49 43		31	107	52S	262	266
Salvador - BA	21 45 51		18	113	-50N	85	89	22 44 06		31	112	89S	301	305
São Luís - MA	21 45 21	-12	8	115	-23N	59	63	22 26 33		18	116	67N	327	332
São Paulo - SP	21 56 00		17	111	-81S	131	135	22 46 44		28	107	44S	253	258
Teresina - PI	21 44 21		10	115	-30N	66	70	22 30 57		21	115	73N	320	324
Vitória - ES	21 50 36		20	111	-77N	111	115	22 50 39		33	108	64S	275	279

### Circunstâncias de Desaparecimento e Reaparecimento

- 1 - Aracaju - SE
- 2 - Belém - PA
- 3 - Belo Horizonte - MG
- 4 - Brasília - DF
- 5 - Campo Grande - MS
- 6 - Cuiabá - MT
- 7 - Curitiba - PR
- 8 - Florianópolis - SC
- 9 - Fortaleza - CE
- 10 - Goiânia - GO
- 11 - João Pessoa - PB
- 12 - Macapá - AP
- 13 - Maceió - AL
- 14 - Manaus - AM
- 15 - Natal - RN
- 16 - Palmas - TO
- 17 - Porto Alegre - RS
- 18 - Porto Velho - RO
- 19 - Recife - PE
- 20 - Rio de Janeiro - RJ
- 21 - Salvador - BA
- 22 - São Luís - MA
- 23 - São Paulo - SP
- 24 - Teresina - PI
- 25 - Vitória - ES

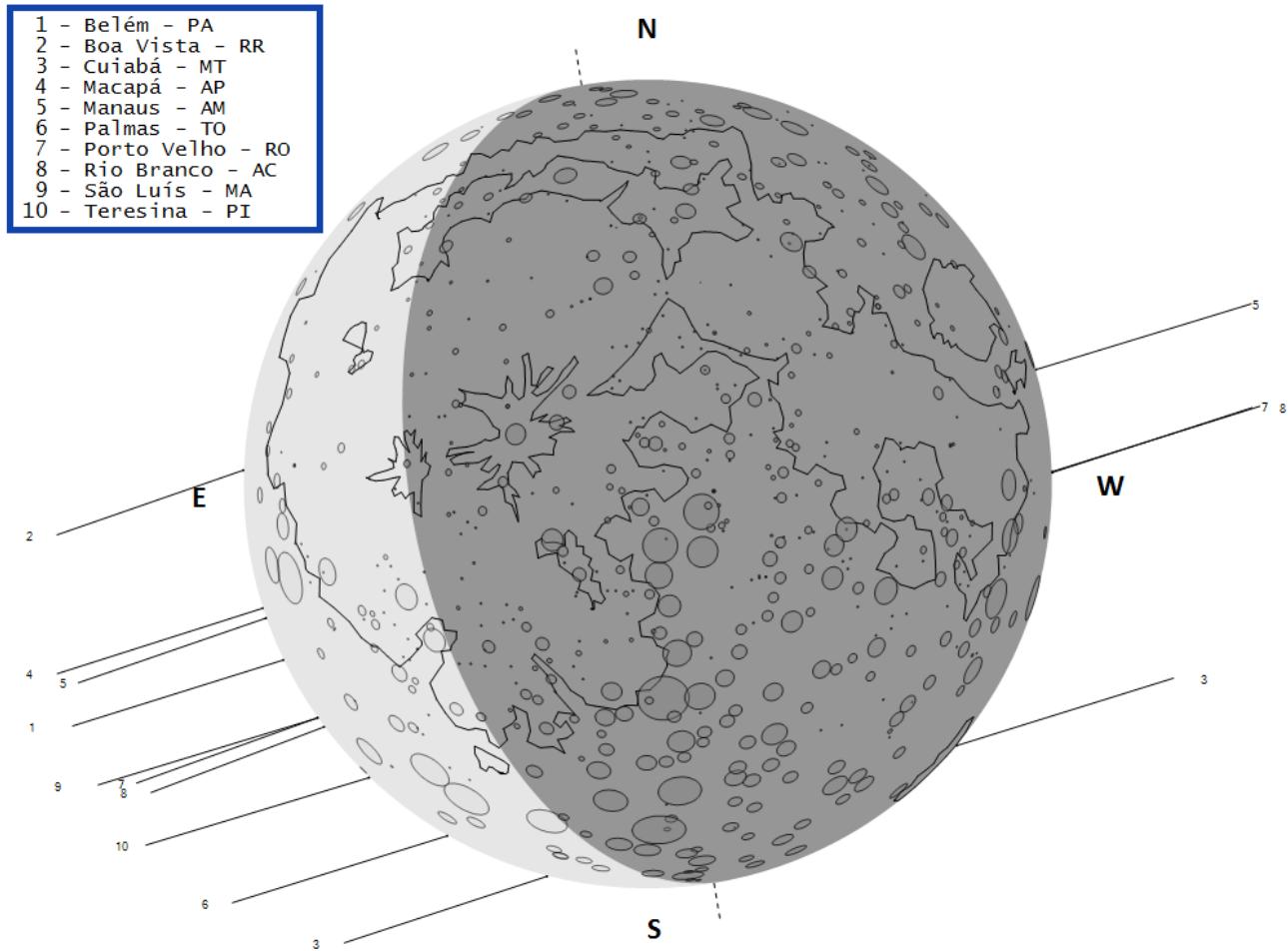


Data: 20 Jul 2021

**Kow Kin** - Omega 1 Scorpii (9 Omega1 Sco), HR 5993, BD-20 4405, HD 144470, SAO 184123 – Mv = 3.9  
 Lua: % iluminada = 79 (+); Elongação do Sol = 126°

Cidades Estados	Desaparecimento							Reaparecimento						
	Hora	Sol	Lua		AC	AP	AV	Hora	Sol	Lua		AC	AP	AV
	(T.U)	Alt.	Alt.	Az.	°	°	°	(T.U)	Alt.	Alt.	Az.	°	°	°
Belém - PA	04 51 34		9	249	85S	106	97							
Boa Vista - RR	04 43 41		21	247	68N	79	69							
Cuiabá - MT	05 01 35		19	253	35S	156	147	05 33 41		11	251	-29S	220	211
Macapá - AP	04 49 42		12	249	87N	98	89							
Manaus - AM	04 44 04		22	249	89N	100	90	05 46 45		8	249	-86S	277	268
Palmas - TO	04 59 41		10	251	50S	141	131							
Porto Velho - RO	04 42 18		28	251	75S	116	106	05 44 29		14	251	-72S	262	253
Rio Branco - AC	04 37 56		33	252	74S	117	108	05 42 14		18	251	-71S	262	253
São Luís - MA	04 54 17		5	249	75S	116	106							
Teresina - PI	04 57 00		4	250	64S	127	118							

### Circunstâncias de Desaparecimento e Reaparecimento



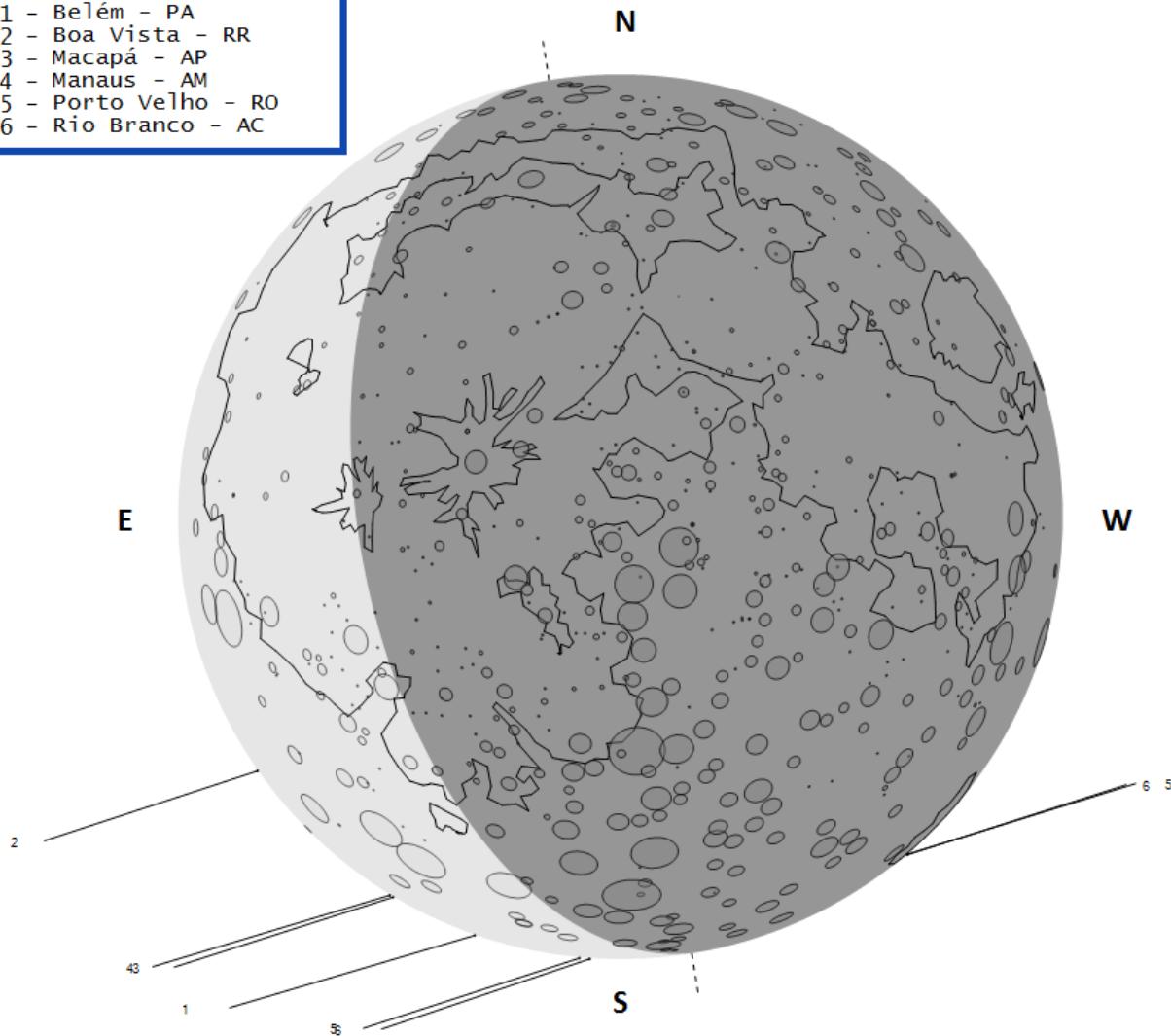
Data: 20 Jul 2021

**Kow Kin** - Omega 2 Scorpii (10 Omega2 Sco), NSV 7454, HR 5997, BD-20 4408, HD 144608, SAO 184135– Mv = 4.3  
 Lua: % iluminada = 80 (+); Elongação do Sol = 126°

Cidades Estados	Desaparecimento							Reaparecimento						
	Hora (T.U)	Sol	Lua		AC	AP	AV	Hora (T.U)	Sol	Lua		AC	AP	AV
			Alt.	Az.	0	0	0			Alt.	Az.	0	0	0
Belém - PA	05 20 55		3	249	39S	152	142							
Boa Vista - RR	05 03 34		16	247	75S	116	106							
Macapá - AP	05 15 28		6	249	52S	139	130							
Manaus - AM	05 12 10		16	249	51S	140	131							
Porto Velho - RO	05 21 21		19	251	26S	165	156	05 45 48		14	250	-20S	211	202
Rio Branco - AC	05 18 47		24	251	24S	167	157	05 43 31		18	251	-20S	211	202

### Circunstâncias de Desaparecimento e Reaparecimento

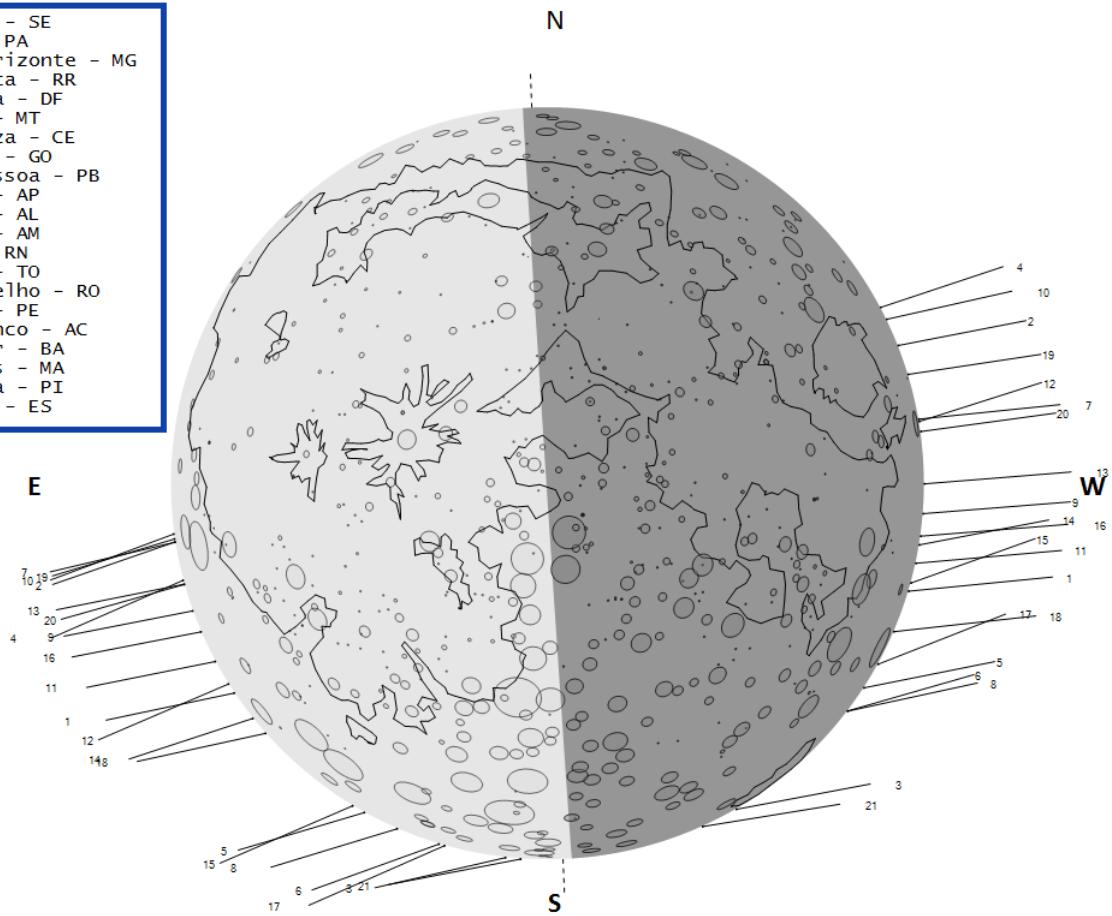
- 1 - Belém - PA
- 2 - Boa Vista - RR
- 3 - Macapá - AP
- 4 - Manaus - AM
- 5 - Porto Velho - RO
- 6 - Rio Branco - AC



Data: 13 Set 2021 (42 Ophiuchi), NSV Theta Oph, HR 6453, CD-2413292, HD 157056, SAO 185320, FK5 644 – Mv = 3.2 Lua: % iluminada = 50 (+); Elongação do Sol = 90°															
<b>Cidade</b>	<b>Desaparecimento</b>							<b>Reaparecimento</b>							
	<b>Hora</b>	<b>Sol</b>	<b>Lua</b>		<b>AC</b>	<b>AP</b>	<b>AV</b>	<b>Hora</b>	<b>Sol</b>	<b>Lua</b>		<b>AC</b>	<b>AP</b>	<b>AV</b>	
<b>Estados</b>	<b>(T.U)</b>	<b>Alt.</b>	<b>Alt.</b>	<b>Az.</b>	0	0	0	<b>(T.U)</b>	<b>Alt.</b>	<b>Alt.</b>	<b>Az.</b>	0	0	0	
Aracaju - SE	21 24 38		69	226	62S	121	119	22 46 16		52	243	-68S	251	249	
Belém - PA	20 42 54	7	66	168	87S	97	94	22 18 34		60	216	-74N	289	287	
Belo Horizonte - MG	21 36 38	-12	77	243	12S	171	169	22 05 12		71	250	-24S	208	206	
Boa Vista - RR	20 07 46	28	52	139	81S	103	100	21 38 29	5	62	173	-68N	295	294	
Brasília - DF	21 08 01	-1	81	187	35S	149	146	22 12 06		71	238	-51S	235	233	
Cuiabá - MT	20 52 59	10	76	135	23S	161	159	21 46 14	-2	80	195	-47S	230	228	
Fortaleza - CE	21 14 17	-11	66	208	87S	97	94	22 46 25		50	235	-86N	277	276	
Goiânia - GO	21 08 09	0	82	181	30S	154	152	22 06 09		74	236	-47S	230	228	
João Pessoa - PB	21 26 29		65	223	76S	107	105	22 53 42		47	240	-80S	263	261	
Macapá - AP	20 34 36	11	63	159	88S	95	93	22 09 31		62	207	-70N	293	291	
Maceió - AL	21 26 20		67	226	68S	116	113	22 50 19		50	242	-72S	255	253	
Manaus - AM	20 14 39	25	58	136	64S	120	117	21 45 09	2	68	177	-86N	277	275	
Natal - RN	21 24 50		64	220	81S	103	101	22 53 31		47	239	-84S	268	266	
Palmas - TO	20 52 39	3	75	170	58S	126	124	22 19 41		67	228	-75S	258	256	
Porto Velho - RO	20 19 34	27	60	126	37S	147	144	21 31 12	9	72	154	-69S	252	250	
Recife - PE	21 27 24		65	225	73S	111	108	22 53 05		48	241	-76S	260	258	
Rio Branco - AC	20 20 54	30	57	122	22S	162	160	21 14 57	17	68	136	-56S	239	237	
Salvador - BA	21 24 24		71	227	55S	129	127	22 40 59		56	244	-61S	244	242	
São Luís - MA	20 56 22	-1	67	185	88S	96	94	22 31 25		56	226	-79N	284	283	
Teresina - PI	21 01 50	-4	69	193	81S	103	101	22 36 05		56	231	-88N	276	274	
Vitória - ES	21 48 20		72	251	10S	174	171	22 10 17		67	253	-18S	202	200	

### Circunstâncias de Desaparecimento e Reaparecimento

- 1 - Aracaju - SE
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- 10 - Macapá - AP
- 11 - Maceió - AL
- 12 - Manaus - AM
- 13 - Natal - RN
- 14 - Palmas - TO
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- 16 - Recife - PE
- 17 - Rio Branco - AC
- 18 - Salvador - BA
- 19 - São Luís - MA
- 20 - Teresina - PI
- 21 - Vitória - ES



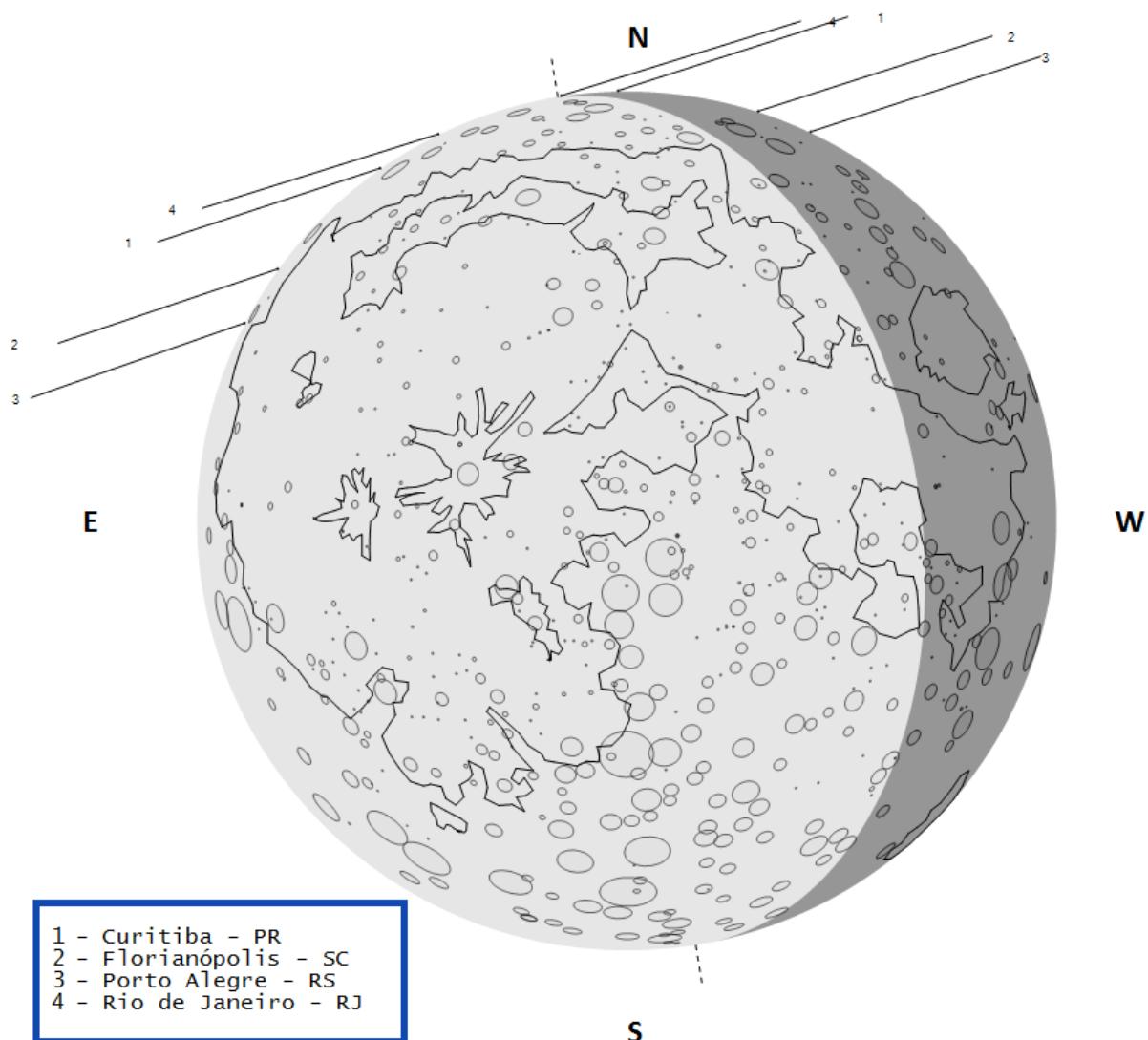
Data: 09 Out 2021

**Kow Kin** - Omega 1 Scorpii (9 Omega1 Sco), HR 5993, BD-20 4405, HD 144470, SAO 184123 – Mv = 3.9

Lua: % iluminada = 16 (+); Elongação do Sol = 47°

Cidade Estados	Desaparecimento							Reaparecimento						
	Hora (T.U)	Sol	Lua		AC	AP	AV	Hora (T.U)	Sol	Lua		AC	AP	AV
Alt.	Alt.	Az.						Alt.	Alt.	Az.				
Curitiba - PR	23 20 11		19	256	15N	26	16	23 37 23		16	254	-19N	352	343
Florianópolis - SC	23 10 08		22	257	34N	45	36	23 44 49		14	254	-38N	333	324
Porto Alegre - RS	23 03 41		26	260	42N	53	44	23 45 39		17	255	-45N	326	316
Rio de Janeiro - RJ	23 27 54		12	252	6N	17	7	23 36 22		10	252	-11N	360	350

### Circunstâncias de Desaparecimento e Reaparecimento

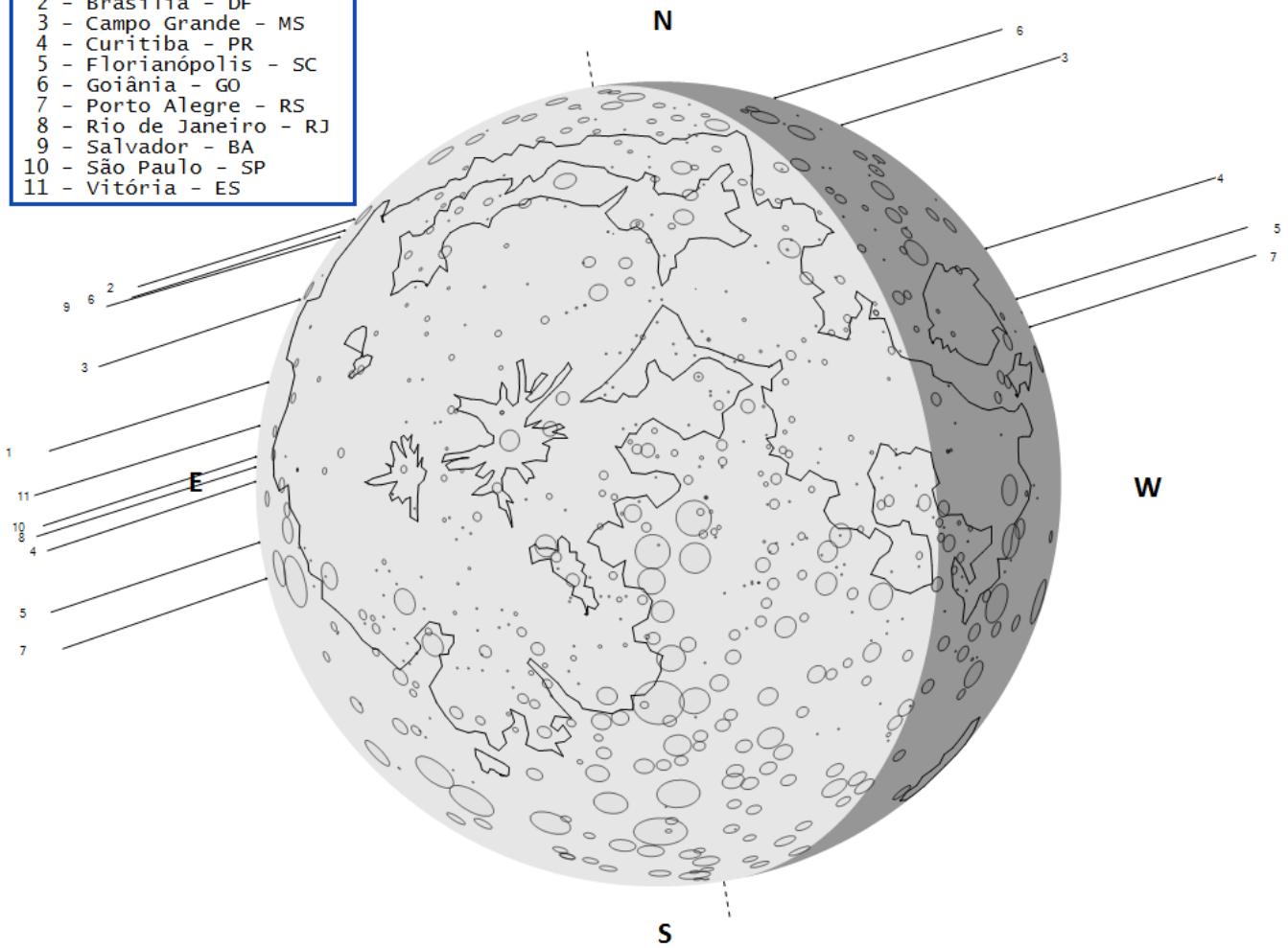


Data: 09 Out 2021  
**Kow Kin** - Omega 2 Scorpii (10 Omega2 Sco), NSV 7454, HR 5997, BD-20 4408, HD 144608, SAO 184135– Mv = 4.3  
Lua: % iluminado = 16 (+); Elongação do Sol = 47°

Cidade Estados	Desaparecimento							Reaparecimento						
	Hora (T.U)	Sol	Lua		AC	AP	AV	Hora (T.U)	Sol	Lua		AC	AP	AV
			Alt.	Alt.	Az.	0	0		Alt.	Alt.	Az.	0	0	0
Belo Horizonte - MG	23 26 32		12	252	55N	66	57							
Brasília - DF	23 36 08		12	251	29N	40	30							
Campo Grande - MS	23 25 46		22	255	42N	53	44	00 08 15		12	252	-47N	324	315
Curitiba - PR	23 18 52		20	256	69N	80	71	00 13 45		8	251	-74N	296	287
Florianópolis - SC	23 16 45		20	256	78N	89	80	00 13 28		8	251	-83N	288	279
Goiânia - GO	23 34 36		14	252	31N	42	32	00 06 35		7	250	-37N	334	325
Porto Alegre - RS	23 13 35		24	259	83N	94	85	00 12 05		11	252	-87N	284	275
Rio de Janeiro - RJ	23 22 43		13	253	67N	78	69							
Salvador - BA	23 36 57		2	249	32N	43	34							
São Paulo - SP	23 21 32		17	254	66N	77	67							
Vitória - ES	23 25 38		9	251	61N	72	63							

### Circunstâncias de Desaparecimento e Reaparecimento

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- 9 - Salvador - BA
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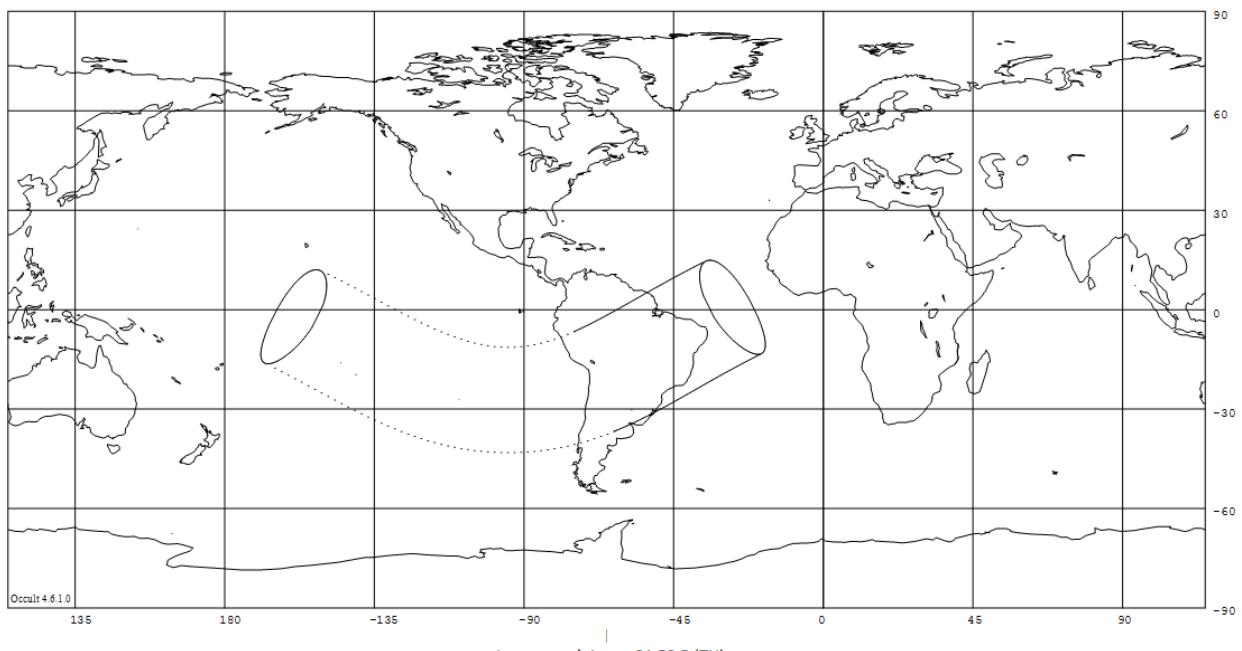
Data: 08 Nov 2021

**Nunki** (34 Sigma Sagittarii), HR 7121, CD-2613595, HD 175191, SAO 187448, FK5 706; Mv = 2.1

Lua: % iluminada = 22 (+); Elongação do Sol = 56°

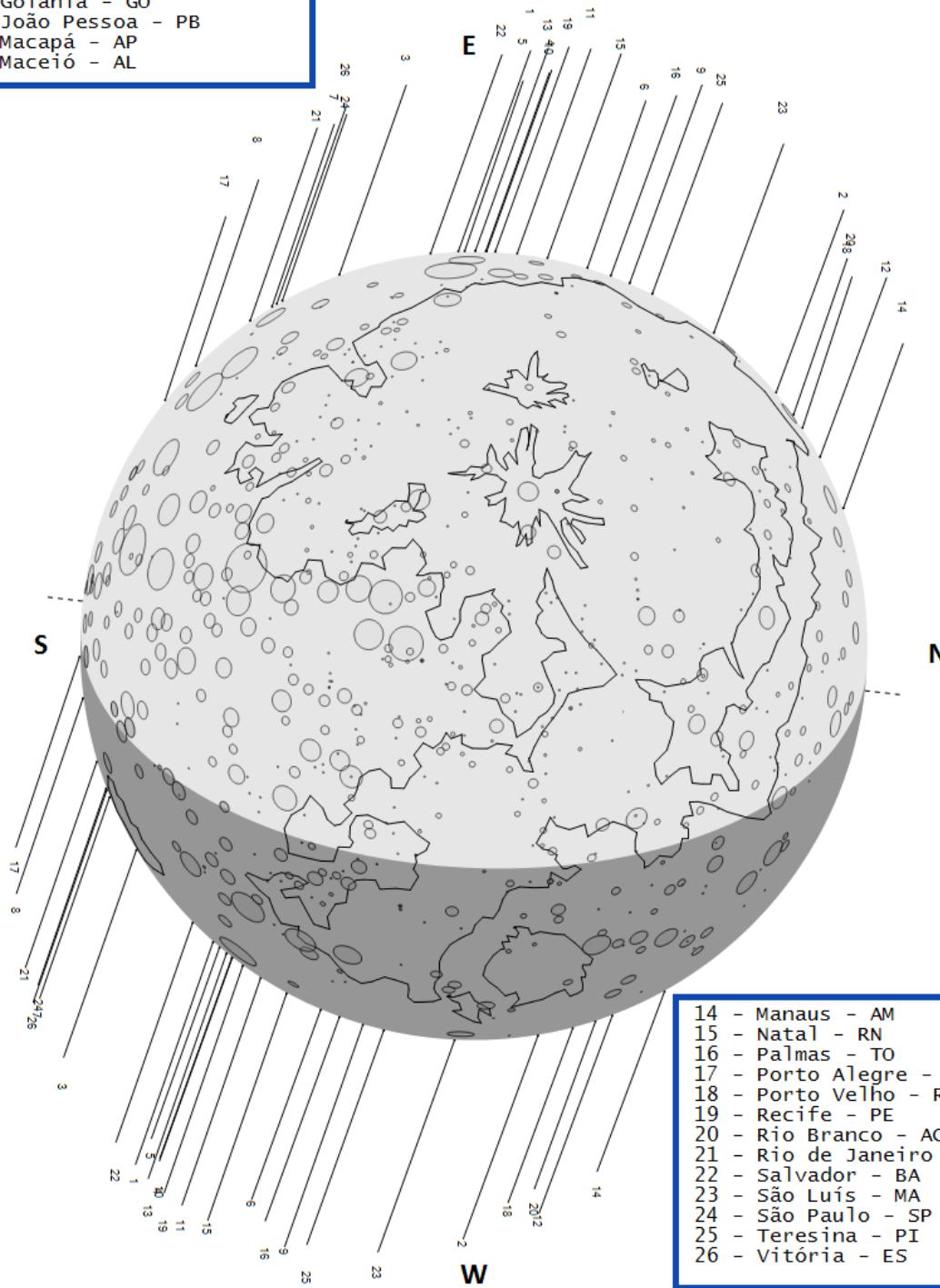
Cidade	Hora	Desaparecimento			Reaparecimento							
		Lua	AC	AP	AV	Hora	Lua	AC	AP	AV		
Estado	(T.U)	Alt.	Az.	º	º	º	(T.U)	Alt.	Az.	º	º	º
Aracaju - SE	22 59 29		21	246	78S	99	105	23 52 59		9	245	-59S
Belém - PA	23 00 43		27	241	49N	46	53	23 55 18		14	243	-71N
Belo Horizonte - MG	22 52 49		32	251	60S	116	123	23 40 33		21	249	-41S
Brasília - DF	22 47 47		35	249	82S	95	101	23 48 19		22	247	-62S
Campo Grande - MS	22 36 34	-11	45	253	79S	98	104	23 40 12		31	251	-60S
Cuiabá - MT	22 37 18	-11	45	248	83N	80	86	23 46 01		29	248	-77S
Curitiba - PR	22 46 56		39	256	50S	127	134	23 28 57		30	253	-31S
Florianópolis - SC	22 51 37		38	257	35S	141	148	23 20 29		32	255	-18S
Fortaleza - CE	23 01 22		19	244	76N	73	80	23 59 03		6	244	-84S
Goiânia - GO	22 45 52		37	249	82S	95	101	23 47 09		23	248	-62S
João Pessoa - PB	23 01 28		17	245	87S	90	97	23 56 24		5	244	-67S
Macapá - AP	23 03 02		28	240	38N	35	42	23 51 36		17	242	-60N
Maceió - AL	23 00 35		19	245	81S	96	103	23 54 18		7	244	-61S
Manaus - AM	22 54 56		39	238	30N	27	34	23 41 00		29	242	-51N
Natal - RN	23 01 42		17	244	89N	86	92	23 57 29		4	244	-72S
Palmas - TO	22 50 35		33	245	79N	76	83	23 54 01		18	246	-80S
Porto Alegre - RS	22 50 06		41	260	29S	148	155	23 13 02		36	258	-12S
Porto Velho - RO	22 38 15	-7	48	240	45N	42	49	23 39 24		35	244	-66N
Recife - PE	23 01 19		17	245	84S	93	100	23 55 26		5	244	-64S
Rio Branco - AC	22 31 05	-1	54	239	43N	40	47	23 32 40		40	244	-62N
Rio de Janeiro - RJ	22 55 59		31	252	46S	131	138	23 32 25		23	250	-27S
Salvador - BA	22 58 22		23	247	74S	103	109	23 50 50		11	245	-55S
São Luís - MA	23 00 20		23	242	62N	59	66	23 58 07		11	244	-83N
São Paulo - SP	22 50 22		36	254	51S	126	132	23 32 43		27	251	-33S
Teresina - PI	22 58 35		24	243	73N	70	76	23 58 09		10	244	-87S
Vitória - ES	22 58 25		27	250	50S	126	133	23 37 34		19	248	-32S

### Ocultação de Nunki - Sigma Sgr (Mv= 2.1) em 08 Nov 2021



## Circunstâncias de Desaparecimento e Reaparecimento

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- 11 - João Pessoa - PB
- 12 - Macapá - AP
- 13 - Maceió - AL



# Nascer e Ocaso do Sol

## Região Sudeste

Belo Horizonte – MG			Rio de Janeiro – RJ		São Paulo – SP		Vitória – ES	
Coorde- nadas	TU – 03:00 $\varphi = 19^\circ 48' 33'' S$ $L = 43^\circ 58' 15'' W$ Altitude = 858 Mts.		TU – 03:00 $\varphi = 22^\circ 53' 43'' S$ $L = 43^\circ 16' 22'' W$ Altitude = 50 Mts		TU – 03:00 $\varphi = 23^\circ 32' 36'' S$ $L = 46^\circ 37' 59'' W$ Altitude = 760 Mts		TU – 03:00 $\varphi = 20^\circ 18' 52'' S$ $L = 40^\circ 19' 06'' W$ Altitude = 50 Mts.	
Data	Nascer	Nascer	Nascer	Ocaso	Nascer	Ocaso	Nascer	Ocaso
01 Jan	05:20:27	18:38:41	05:11:26	18:42:06	05:23:32	18:56:53	05:04:51	18:25:04
08 Jan	05:24:57	18:40:23	05:16:10	18:43:33	05:28:19	18:58:17	05:09:22	18:26:43
15 Jan	05:29:36	18:41:04	05:21:10	18:43:53	05:33:24	18:58:32	05:14:05	18:27:21
22 Jan	05:34:14	18:40:41	05:26:13	18:43:04	05:38:33	18:57:37	05:18:47	18:26:54
29 Jan	05:38:39	18:39:13	05:31:09	18:41:06	05:43:34	18:55:32	05:23:16	18:25:22
05 Fev	05:42:45	18:36:46	05:35:48	18:38:04	05:48:22	18:52:24	05:27:28	18:22:49
12 Fev	05:46:29	18:33:25	05:40:09	18:34:06	05:52:50	18:48:18	05:31:18	18:19:22
19 Fev	05:49:48	18:29:15	05:44:06	18:29:18	05:56:56	18:43:21	05:34:43	18:15:06
26 Fev	05:52:42	18:24:24	05:47:40	18:23:48	06:00:38	18:37:42	05:37:43	18:10:09
04 Mar	05:55:14	18:19:02	05:50:53	18:17:45	06:03:59	18:31:30	05:40:22	18:04:40
11 Mar	05:57:28	18:13:18	05:53:49	18:11:19	06:07:04	18:24:56	05:42:43	17:58:49
18 Mar	05:59:30	18:07:19	05:56:32	18:04:39	06:09:56	18:18:07	05:44:52	17:52:44
25 Mar	06:01:23	18:01:15	05:59:06	17:57:54	06:12:39	18:11:13	05:46:51	17:46:33
01 Abr	06:03:12	17:55:14	06:01:35	17:51:12	06:15:17	18:04:22	05:48:46	17:40:26
08 Abr	06:05:03	17:49:25	06:04:07	17:44:44	06:17:57	17:57:46	05:50:44	17:34:31
15 Abr	06:07:01	17:43:57	06:06:44	17:38:37	06:20:43	17:51:30	05:52:48	17:28:57
22 Abr	06:09:07	17:38:57	06:09:27	17:32:59	06:23:35	17:45:44	05:55:01	17:23:50
29 Abr	06:11:24	17:34:30	06:12:20	17:27:57	06:26:34	17:40:35	05:57:23	17:19:18
06 Mai	06:13:52	17:30:45	06:15:21	17:23:39	06:29:43	17:36:10	05:59:57	17:15:27
13 Mai	06:16:31	17:27:47	06:18:30	17:20:11	06:32:59	17:32:35	06:02:40	17:12:24
20 Mai	06:19:16	17:25:37	06:21:41	17:17:35	06:36:16	17:29:53	06:05:29	17:10:10
27 Mai	06:22:00	17:24:18	06:24:48	17:15:54	06:39:27	17:28:08	06:08:17	17:08:47
03 Jun	06:24:39	17:23:49	06:27:43	17:15:08	06:42:26	17:27:19	06:10:58	17:08:16
10 Jun	06:27:03	17:24:08	06:30:19	17:15:17	06:45:04	17:27:24	06:13:25	17:08:33
17 Jun	06:29:03	17:25:10	06:32:25	17:16:13	06:47:11	17:28:20	06:15:26	17:09:34
24 Jun	06:30:30	17:26:46	06:33:51	17:17:50	06:48:37	17:29:57	06:16:52	17:11:10
01 Jul	06:31:16	17:28:49	06:34:30	17:20:00	06:49:15	17:32:09	06:17:38	17:13:14
08 Jul	06:31:17	17:31:11	06:34:18	17:22:36	06:49:00	17:34:47	06:17:36	17:15:39
15 Jul	06:30:26	17:33:43	06:33:10	17:25:26	06:47:48	17:37:41	06:16:43	17:18:13
22 Jul	06:28:43	17:36:15	06:31:03	17:28:21	06:45:36	17:40:41	06:14:56	17:20:49
29 Jul	06:26:06	17:38:42	06:28:00	17:31:15	06:42:27	17:43:41	06:12:15	17:23:20
05 Ago	06:22:41	17:41:00	06:24:05	17:34:04	06:38:25	17:46:37	06:08:45	17:25:43
12 Ago	06:18:31	17:43:06	06:19:21	17:36:43	06:33:34	17:49:23	06:04:29	17:27:54
19 Ago	06:13:39	17:44:58	06:13:54	17:39:11	06:27:59	17:51:59	05:59:32	17:29:52
26 Ago	06:08:13	17:46:38	06:07:51	17:41:28	06:21:48	17:54:24	05:54:01	17:31:38
02 Set	06:02:22	17:48:08	06:01:21	17:43:37	06:15:10	17:56:41	05:48:03	17:33:15
09 Set	05:56:12	17:49:34	05:54:31	17:45:42	06:08:11	17:58:55	05:41:46	17:34:47
16 Set	05:49:50	17:50:57	05:47:30	17:47:45	06:01:01	18:01:07	05:35:19	17:36:16
23 Set	05:43:26	17:52:23	05:40:25	17:49:52	05:53:48	18:03:22	05:28:48	17:37:49
30 Set	05:37:09	17:53:59	05:33:28	17:52:08	05:46:42	18:05:47	05:22:25	17:39:31
07 Out	05:31:08	17:55:49	05:26:46	17:54:39	05:39:51	18:08:27	05:16:16	17:41:28
14 Out	05:25:30	17:57:58	05:20:27	17:57:28	05:33:24	18:11:25	05:10:32	17:43:43
21 Out	05:20:24	18:00:29	05:14:42	18:00:38	05:27:31	18:14:43	05:05:20	17:46:20
28 Out	05:15:59	18:03:25	05:09:40	18:04:13	05:22:20	18:18:26	05:00:49	17:49:23
04 Nov	05:12:24	18:06:49	05:05:28	18:08:12	05:18:01	18:22:33	04:57:08	17:52:52
11 Nov	05:09:45	18:10:37	05:02:16	18:12:34	05:14:41	18:27:02	04:54:23	17:56:46
18 Nov	05:08:06	18:14:46	05:00:07	18:17:12	05:12:26	18:31:47	04:52:40	18:00:59
25 Nov	05:07:33	18:19:09	04:59:08	18:22:00	05:11:21	18:36:41	04:52:02	18:05:26
02 Dez	05:08:06	18:23:37	04:59:20	18:26:49	05:11:29	18:41:34	04:52:32	18:09:58
09 Dez	05:09:43	18:27:59	05:00:42	18:31:25	05:12:48	18:46:13	04:54:06	18:14:22
16 Dez	05:12:16	18:32:01	05:03:08	18:35:34	05:15:12	18:50:24	04:56:38	18:18:25
23 Dez	05:15:39	18:35:30	05:06:30	18:39:04	05:18:34	18:53:53	05:00:01	18:21:55
30 Dez	05:19:40	18:38:16	05:10:37	18:41:43	05:22:43	18:56:31	05:04:03	18:24:39

# Nascer e Ocaso do Sol

## Região Sul

Curitiba – PR			Florianópolis – SC		Porto Alegre – RS	
Coor- nadas	TU – 03:00 $\varphi = 25^\circ 25' 48'' S$ $L = 49^\circ 16' 15'' W$ Altitude = 904 Mts		TU – 03:00 $\varphi = 27^\circ 35' 36'' S$ $L = 48^\circ 35' 56'' W$ Altitude = 25 Mts		TU – 03:00 $\varphi = 30^\circ 02' 15'' S$ $L = 51^\circ 13' 13'' W$ Altitude = 50 Mts	
Data	Nascer	Ocaso	Nascer	Ocaso	Nascer	Ocaso
01 Jan	05:30:05	19:11:27	05:22:36	19:13:32	05:27:25	19:29:41
08 Jan	05:35:01	19:12:40	05:27:43	19:14:34	05:32:45	19:30:29
15 Jan	05:40:19	19:12:42	05:33:18	19:14:19	05:38:39	19:29:55
22 Jan	05:45:45	19:11:30	05:39:03	19:12:47	05:44:48	19:27:58
29 Jan	05:51:06	19:09:05	05:44:48	19:09:59	05:51:01	19:24:41
05 Fev	05:56:15	19:05:35	05:50:23	19:06:02	05:57:07	19:20:13
12 Fev	06:01:07	19:01:05	05:55:43	19:01:04	06:03:00	19:14:42
19 Fev	06:05:37	18:55:43	06:00:43	18:55:13	06:08:35	19:08:16
26 Fev	06:09:45	18:49:39	06:05:21	18:48:37	06:13:49	19:01:05
04 Mar	06:13:33	18:43:01	06:09:40	18:41:29	06:18:45	18:53:19
11 Mar	06:17:04	18:36:00	06:13:42	18:33:56	06:23:24	18:45:10
18 Mar	06:20:22	18:28:45	06:17:32	18:26:10	06:27:51	18:36:47
25 Mar	06:23:31	18:21:24	06:21:12	18:18:18	06:32:08	18:28:18
01 Abr	06:26:36	18:14:08	06:24:48	18:10:31	06:36:20	18:19:55
08 Abr	06:29:42	18:07:06	06:28:24	18:02:59	06:40:32	18:11:46
15 Abr	06:32:52	18:00:25	06:32:04	17:55:49	06:44:47	18:04:02
22 Abr	06:36:08	17:54:15	06:35:49	17:49:10	06:49:05	17:56:50
29 Abr	06:39:31	17:48:43	06:39:39	17:43:11	06:53:28	17:50:19
06 Mai	06:43:01	17:43:57	06:43:34	17:38:00	06:57:53	17:44:37
13 Mai	06:46:36	17:40:03	06:47:33	17:33:42	07:02:19	17:39:53
20 Mai	06:50:10	17:37:05	06:51:27	17:30:24	07:06:38	17:36:10
27 Mai	06:53:35	17:35:05	06:55:10	17:28:07	07:10:41	17:33:33
03 Jun	06:56:45	17:34:05	06:58:33	17:26:54	07:14:20	17:32:05
10 Jun	06:59:31	17:34:04	07:01:27	17:26:44	07:17:25	17:31:45
17 Jun	07:01:42	17:34:56	07:03:42	17:27:33	07:19:45	17:32:28
24 Jun	07:03:07	17:36:34	07:05:07	17:29:11	07:21:09	17:34:08
01 Jul	07:03:40	17:38:51	07:05:35	17:31:34	07:21:30	17:36:37
08 Jul	07:03:17	17:41:37	07:05:02	17:34:30	07:20:45	17:39:46
15 Jul	07:01:53	17:44:43	07:03:24	17:37:50	07:18:51	17:43:23
22 Jul	06:59:26	17:47:58	07:00:40	17:41:23	07:15:45	17:47:17
29 Jul	06:56:00	17:51:16	06:56:52	17:45:02	07:11:33	17:51:21
05 Ago	06:51:38	17:54:31	06:52:07	17:48:41	07:06:20	17:55:27
12 Ago	06:46:25	17:57:39	06:46:29	17:52:14	07:00:12	17:59:32
19 Ago	06:40:28	18:00:37	06:40:04	17:55:40	06:53:15	18:03:29
26 Ago	06:33:53	18:03:26	06:33:01	17:58:57	06:45:38	18:07:20
02 Set	06:26:50	18:06:09	06:25:29	18:02:09	06:37:31	18:11:07
09 Set	06:19:27	18:08:47	06:17:35	18:05:18	06:29:03	18:14:51
16 Set	06:11:51	18:11:25	06:09:29	18:08:26	06:20:21	18:18:35
23 Set	06:04:12	18:14:06	06:01:20	18:11:38	06:11:35	18:22:24
30 Set	05:56:39	18:16:58	05:53:16	18:15:01	06:02:55	18:26:23
07 Out	05:49:23	18:20:03	05:45:29	18:18:37	05:54:31	18:30:36
14 Out	05:42:30	18:23:27	05:38:06	18:22:31	05:46:32	18:35:05
21 Out	05:36:11	18:27:10	05:31:17	18:26:45	05:39:08	18:39:55
28 Out	05:30:36	18:31:17	05:25:13	18:31:21	05:32:30	18:45:05
04 Nov	05:25:54	18:35:48	05:20:03	18:36:19	05:26:47	18:50:36
11 Nov	05:22:13	18:40:39	05:15:56	18:41:35	05:22:09	18:56:23
18 Nov	05:19:38	18:45:43	05:12:58	18:47:02	05:18:44	19:02:17
25 Nov	05:18:17	18:50:53	05:11:16	18:52:32	05:16:38	19:08:11
02 Dez	05:18:11	18:55:59	05:10:55	18:57:54	05:15:57	19:13:52
09 Dez	05:19:21	19:00:48	05:11:53	19:02:54	05:16:42	19:19:04
16 Dez	05:21:40	19:05:03	05:14:06	19:07:15	05:18:47	19:23:32
23 Dez	05:25:01	19:08:32	05:17:26	19:10:45	05:22:07	19:27:02
30 Dez	05:29:14	19:11:05	05:21:44	19:13:12	05:26:31	19:29:23

## Nascer e Ocaso do Sol

### Região Norte – Parte I

Macapá – AP		Manaus – AM		Porto Velho – RO		Rio Branco – AC		
Coorde- nadas	TU – 03:00 $\phi = 0^{\circ} 02' 25'' N$ $L = 51^{\circ} 03' 13'' W$ Altitude = 200 Mts	$\phi = 3^{\circ} 08' 07'' S$ $L = 60^{\circ} 01' 34'' W$ Altitude = 100 Mts	TU – 04:00 $\phi = 8^{\circ} 45' 48'' S$ $L = 63^{\circ} 54' 48'' W$ Altitude = 85 Mts	TU – 04:00 $\phi = 8^{\circ} 45' 48'' S$ $L = 63^{\circ} 54' 48'' W$ Altitude = 85 Mts	TU – 05:00 $\phi = 9^{\circ} 58' 22'' S$ $L = 67^{\circ} 48' 40'' W$ Altitude = 153 Mts	Nascer	Ocaso	
Data	Nascer	Ocaso	Nascer	Ocaso	Nascer	Ocaso	Nascer	Ocaso
01 Jan	06:24:17	18:31:37	05:19:33	17:37:41	06:00:38	18:38:09	05:14:06	17:55:52
08 Jan	06:27:26	18:34:42	05:22:54	17:40:33	06:04:21	18:40:38	05:17:54	17:58:16
15 Jan	06:30:10	18:37:21	05:25:56	17:42:54	06:07:54	18:42:27	05:21:34	17:59:58
22 Jan	06:32:21	18:39:26	05:28:29	17:44:36	06:11:07	18:43:29	05:24:56	18:00:51
29 Jan	06:33:54	18:40:53	05:30:28	17:45:36	06:13:53	18:43:41	05:27:52	18:00:52
05 Fev	06:34:47	18:41:39	05:31:51	17:45:53	06:16:08	18:43:05	05:30:19	18:00:04
12 Fev	06:35:02	18:41:48	05:32:37	17:45:30	06:17:52	18:41:43	05:32:15	17:58:30
19 Fev	06:34:39	18:41:20	05:32:49	17:44:28	06:19:04	18:39:40	05:33:40	17:56:14
26 Fev	06:33:43	18:40:19	05:32:28	17:42:52	06:19:46	18:37:01	05:34:36	17:53:21
04 Mar	06:32:20	18:38:53	05:31:40	17:40:49	06:20:04	18:33:53	05:35:08	17:49:59
11 Mar	06:30:36	18:37:07	05:30:33	17:38:27	06:20:02	18:30:25	05:35:20	17:46:16
18 Mar	06:28:37	18:35:08	05:29:12	17:35:51	06:19:46	18:26:43	05:35:19	17:42:20
25 Mar	06:26:31	18:33:03	05:27:42	17:33:09	06:19:22	18:22:55	05:35:09	17:38:17
01 Abr	06:24:23	18:30:58	05:26:11	17:30:28	06:18:56	18:19:09	05:34:58	17:34:17
08 Abr	06:22:23	18:29:01	05:24:46	17:27:55	06:18:35	18:15:33	05:34:51	17:30:27
15 Abr	06:20:35	18:27:18	05:23:33	17:25:38	06:18:24	18:12:13	05:34:53	17:26:54
22 Abr	06:19:04	18:25:53	05:22:35	17:23:40	06:18:27	18:09:16	05:35:09	17:23:44
29 Abr	06:17:56	18:24:51	05:21:58	17:22:06	06:18:46	18:06:47	05:35:40	17:21:03
06 Mai	06:17:14	18:24:16	05:21:45	17:21:02	06:19:26	18:04:51	05:36:31	17:18:55
13 Mai	06:17:00	18:24:09	05:21:58	17:20:29	06:20:26	18:03:31	05:37:42	17:17:25
20 Mai	06:17:13	18:24:29	05:22:34	17:20:26	06:21:44	18:02:47	05:39:09	17:16:32
27 Mai	06:17:52	18:25:13	05:23:32	17:20:52	06:23:16	18:02:39	05:40:49	17:16:17
03 Jun	06:18:53	18:26:20	05:24:49	17:21:43	06:24:59	18:03:05	05:42:38	17:16:37
10 Jun	06:20:13	18:27:42	05:26:18	17:22:56	06:26:46	18:04:01	05:44:28	17:17:29
17 Jun	06:21:42	18:29:13	05:27:52	17:24:22	06:28:28	18:05:19	05:46:13	17:18:46
24 Jun	06:23:12	18:30:43	05:29:22	17:25:53	06:29:57	18:06:52	05:47:41	17:20:19
01 Jul	06:24:37	18:32:05	05:30:40	17:27:22	06:31:05	18:08:32	05:48:47	17:22:02
08 Jul	06:25:49	18:33:13	05:31:42	17:28:42	06:31:47	18:10:12	05:49:24	17:23:46
15 Jul	06:26:41	18:34:00	05:32:18	17:29:45	06:31:55	18:11:43	05:49:26	17:25:24
22 Jul	06:27:07	18:34:20	05:32:24	17:30:25	06:31:25	18:12:59	05:48:49	17:26:48
29 Jul	06:27:05	18:34:12	05:31:59	17:30:40	06:30:17	18:13:57	05:47:31	17:27:55
05 Ago	06:26:34	18:33:34	05:31:01	17:30:29	06:28:32	18:14:34	05:45:35	17:28:42
12 Ago	06:25:35	18:32:27	05:29:32	17:29:52	06:26:10	18:14:50	05:43:02	17:29:10
19 Ago	06:24:08	18:30:54	05:27:34	17:28:50	06:23:15	18:14:44	05:39:55	17:29:16
26 Ago	06:22:17	18:28:58	05:25:10	17:27:27	06:19:52	18:14:21	05:36:19	17:29:06
02 Set	06:20:09	18:26:45	05:22:27	17:25:48	06:16:08	18:13:43	05:32:21	17:28:42
09 Set	06:17:48	18:24:20	05:19:31	17:23:59	06:12:09	18:12:57	05:28:08	17:28:10
16 Set	06:15:20	18:21:50	05:16:27	17:22:05	06:08:00	18:12:07	05:23:46	17:27:33
23 Set	06:12:51	18:19:20	05:13:23	17:20:11	06:03:51	18:11:19	05:19:22	17:26:59
30 Set	06:10:30	18:17:00	05:10:25	17:18:27	05:59:49	18:10:40	05:15:05	17:26:34
07 Out	06:08:23	18:14:55	05:07:42	17:16:59	05:56:01	18:10:16	05:11:04	17:26:25
14 Out	06:06:37	18:13:12	05:05:21	17:15:51	05:52:36	18:10:12	05:07:25	17:26:35
21 Out	06:05:18	18:11:57	05:03:27	17:15:11	05:49:40	18:10:34	05:04:15	17:27:11
28 Out	06:04:31	18:11:16	05:02:07	17:15:03	05:47:20	18:11:27	05:01:43	17:28:16
04 Nov	06:04:23	18:11:14	05:01:27	17:15:33	05:45:44	18:12:53	04:59:54	17:29:54
11 Nov	06:04:55	18:11:53	05:01:30	17:16:40	05:44:55	18:14:52	04:58:53	17:32:05
18 Nov	06:06:08	18:13:12	05:02:16	17:18:25	05:44:55	18:17:24	04:58:43	17:34:47
25 Nov	06:08:00	18:15:11	05:03:47	17:20:46	05:45:46	18:20:24	04:59:26	17:37:56
02 Dez	06:10:30	18:17:46	05:05:59	17:23:38	05:47:26	18:23:47	05:00:59	17:41:26
09 Dez	06:13:29	18:20:49	05:08:45	17:26:53	05:49:51	18:27:24	05:03:19	17:45:07
16 Dez	06:16:47	18:24:09	05:11:57	17:30:20	05:52:50	18:31:02	05:06:16	17:48:48
23 Dez	06:20:15	18:27:37	05:15:24	17:33:48	05:56:16	18:34:30	05:09:41	17:52:16
30 Dez	06:23:40	18:31:01	05:18:55	17:37:06	05:59:57	18:37:38	05:13:25	17:55:22

**Nota.: Rio Branco – AC, Fuso horário TU – 05:00 de acordo com a Lei nº 12.876/2013.**

# Nascer e Ocaso do Sol

## Região Norte – Parte – II

Belém – PA		Boa Vista – RR		Palmas – TO		
Coorde- nadas	TU – 03:00 $\varphi = 1^{\circ} 28' 03'' S$ $L = 48^{\circ} 29' 18'' W$ Altitude = 50 Mts	TU – 04:00 $\varphi = 2^{\circ} 49' 17'' N$ $L = 60^{\circ} 39' 45'' W$ Altitude = 85 Mts	Nascer	Ocaso	Nascer	Ocaso
Data	Nascer	Ocaso	Nascer	Ocaso	Nascer	Ocaso
01 Jan	06:11:28	18:23:55	06:07:27	18:05:22	05:55:49	18:38:17
08 Jan	06:14:42	18:26:54	06:10:25	18:08:38	05:59:37	18:40:40
15 Jan	06:17:35	18:29:24	06:12:53	18:11:33	06:03:18	18:42:21
22 Jan	06:19:56	18:31:19	06:14:45	18:13:57	06:06:42	18:43:13
29 Jan	06:21:42	18:32:32	06:15:55	18:15:46	06:09:40	18:43:13
05 Fev	06:22:49	18:33:05	06:16:22	18:16:59	06:12:09	18:42:23
12 Fev	06:23:19	18:32:58	06:16:08	18:17:35	06:14:07	18:40:48
19 Fev	06:23:12	18:32:14	06:15:16	18:17:37	06:15:35	18:38:29
26 Fev	06:22:33	18:30:57	06:13:49	18:17:07	06:16:33	18:35:34
04 Mar	06:21:27	18:29:13	06:11:54	18:16:12	06:17:07	18:32:10
11 Mar	06:20:00	18:27:10	06:09:38	18:14:58	06:17:22	18:28:25
18 Mar	06:18:19	18:24:54	06:07:07	18:13:32	06:17:24	18:24:27
25 Mar	06:16:30	18:22:31	06:04:28	18:11:59	06:17:16	18:20:22
01 Abr	06:14:40	18:20:09	06:01:49	18:10:25	06:17:07	18:16:20
08 Abr	06:12:56	18:17:55	05:59:17	18:09:00	06:17:02	18:12:27
15 Abr	06:11:25	18:15:56	05:56:59	18:07:47	06:17:07	18:08:52
22 Abr	06:10:10	18:14:15	05:55:00	18:06:52	06:17:24	18:05:40
29 Abr	06:09:16	18:12:58	05:53:24	18:06:17	06:17:58	18:02:56
06 Mai	06:08:48	18:12:09	05:52:16	18:06:07	06:18:50	18:00:46
13 Mai	06:08:47	18:11:50	05:51:39	18:06:23	06:20:02	17:59:14
20 Mai	06:09:11	18:11:59	05:51:32	18:07:04	06:21:31	17:58:20
27 Mai	06:09:59	18:12:35	05:51:54	18:08:05	06:23:12	17:58:03
03 Jun	06:11:07	18:13:34	05:52:43	18:09:24	06:25:02	17:58:22
10 Jun	06:12:31	18:14:52	05:53:54	18:10:54	06:26:53	17:59:13
17 Jun	06:14:03	18:16:20	05:55:18	18:12:29	06:28:38	18:00:29
24 Jun	06:15:33	18:17:50	05:56:49	18:13:58	06:30:06	18:02:02
01 Jul	06:16:55	18:19:16	05:58:19	18:15:15	06:31:12	18:03:45
08 Jul	06:18:02	18:20:30	05:59:41	18:16:13	06:31:48	18:05:30
15 Jul	06:18:46	18:21:24	06:00:47	18:16:46	06:31:50	18:07:09
22 Jul	06:19:03	18:21:54	06:01:30	18:16:48	06:31:11	18:08:35
29 Jul	06:18:50	18:21:56	06:01:49	18:16:19	06:29:53	18:09:43
05 Ago	06:18:07	18:21:31	06:01:41	18:15:17	06:27:55	18:10:33
12 Ago	06:16:53	18:20:39	06:01:07	18:13:45	06:25:21	18:11:02
19 Ago	06:15:11	18:19:21	06:00:08	18:11:43	06:22:12	18:11:11
26 Ago	06:13:05	18:17:40	05:58:46	18:09:18	06:18:34	18:11:02
02 Set	06:10:40	18:15:43	05:57:07	18:06:35	06:14:34	18:10:41
09 Set	06:08:02	18:13:36	05:55:17	18:03:39	06:10:19	18:10:11
16 Set	06:05:17	18:11:22	05:53:21	18:00:38	06:05:54	18:09:37
23 Set	06:02:32	18:09:10	05:51:24	17:57:36	06:01:28	18:09:05
30 Set	05:59:53	18:07:07	05:49:34	17:54:44	05:57:09	18:08:42
07 Out	05:57:29	18:05:19	05:47:59	17:52:08	05:53:06	18:08:35
14 Out	05:55:26	18:03:53	05:46:45	17:49:54	05:49:24	18:08:48
21 Out	05:53:50	18:02:54	05:45:55	17:48:09	05:46:12	18:09:25
28 Out	05:52:48	18:02:29	05:45:38	17:46:59	05:43:37	18:10:32
04 Nov	05:52:25	18:02:42	05:45:58	17:46:30	05:41:46	18:12:12
11 Nov	05:52:43	18:03:34	05:46:56	17:46:43	05:40:43	18:14:25
18 Nov	05:53:43	18:05:06	05:48:31	17:47:40	05:40:31	18:17:08
25 Nov	05:55:25	18:07:15	05:50:43	17:49:20	05:41:11	18:20:18
02 Dez	05:57:46	18:09:58	05:53:28	17:51:40	05:42:43	18:23:49
09 Dez	06:00:40	18:13:07	05:56:38	17:54:32	05:45:02	18:27:31
16 Dez	06:03:55	18:16:30	06:00:02	17:57:48	05:47:58	18:31:12
23 Dez	06:07:22	18:19:58	06:03:31	18:01:15	05:51:23	18:34:41
30 Dez	06:10:50	18:23:20	06:06:52	18:04:45	05:55:07	18:37:46

# Nascer e Ocaso do Sol

## Região Nordeste – Parte I

Aracajú – SE			Fortaleza – CE		João Pessoa – PB	
Coorde- nadas	TU – 03:00 $\varphi = 10^\circ 55' 00'' S$ $L = 37^\circ 03' 00 W$ Altitude = 30 Mts		TU – 03:00 $\varphi = 3^\circ 45' 47'' S$ $L = 38^\circ 31' 23'' W$ Altitude = 30 Mts		TU – 03:00 $\varphi = 7^\circ 06' 57'' S$ $L = 34^\circ 53' 14'' W$ Altitude = 47 Mts	
Data	Nascer	Ocaso	Nascer	Ocaso	Nascer	Ocaso
01 Jan	05:09:20	17:54:28	05:27:41	17:47:56	05:07:21	17:39:09
08 Jan	05:13:12	17:56:49	05:31:04	17:50:46	05:10:58	17:41:45
15 Jan	05:16:58	17:58:25	05:34:09	17:53:04	05:14:22	17:43:44
22 Jan	05:20:27	17:59:11	05:36:47	17:54:42	05:17:24	17:44:58
29 Jan	05:23:31	17:59:05	05:38:51	17:55:37	05:19:56	17:45:25
05 Fev	05:26:07	17:58:09	05:40:20	17:55:49	05:21:56	17:45:05
12 Fev	05:28:14	17:56:25	05:41:13	17:55:19	05:23:23	17:44:01
19 Fev	05:29:50	17:53:59	05:41:31	17:54:10	05:24:18	17:42:16
26 Fev	05:30:57	17:50:55	05:41:18	17:52:28	05:24:41	17:39:56
04 Mar	05:31:40	17:47:23	05:40:38	17:50:18	05:24:40	17:37:08
11 Mar	05:32:04	17:43:29	05:39:38	17:47:48	05:24:19	17:33:59
18 Mar	05:32:14	17:39:22	05:38:23	17:45:05	05:23:44	17:30:37
25 Mar	05:32:16	17:35:08	05:37:01	17:42:16	05:23:01	17:27:09
01 Abr	05:32:15	17:30:56	05:35:37	17:39:27	05:22:15	17:23:41
08 Abr	05:32:19	17:26:55	05:34:19	17:36:48	05:21:36	17:20:24
15 Abr	05:32:32	17:23:12	05:33:13	17:34:23	05:21:06	17:17:23
22 Abr	05:32:58	17:19:51	05:32:22	17:32:19	05:20:51	17:14:43
29 Abr	05:33:39	17:17:00	05:31:51	17:30:39	05:20:53	17:12:30
06 Mai	05:34:39	17:14:43	05:31:44	17:29:29	05:21:17	17:10:48
13 Mai	05:35:57	17:13:04	05:32:01	17:28:50	05:22:03	17:09:42
20 Mai	05:37:31	17:12:04	05:32:43	17:28:43	05:23:09	17:09:10
27 Mai	05:39:17	17:11:42	05:33:44	17:29:04	05:24:31	17:09:11
03 Jun	05:41:10	17:11:58	05:35:03	17:29:53	05:26:06	17:09:45
10 Jun	05:43:04	17:12:46	05:36:34	17:31:04	05:27:47	17:10:45
17 Jun	05:44:50	17:14:01	05:38:09	17:32:29	05:29:27	17:12:06
24 Jun	05:46:18	17:15:35	05:39:39	17:34:00	05:30:56	17:13:38
01 Jul	05:47:23	17:17:19	05:40:57	17:35:30	05:32:08	17:15:14
08 Jul	05:47:57	17:19:07	05:41:56	17:36:52	05:32:55	17:16:48
15 Jul	05:47:54	17:20:49	05:42:29	17:37:58	05:33:12	17:18:12
22 Jul	05:47:11	17:22:20	05:42:32	17:38:43	05:32:54	17:19:17
29 Jul	05:45:47	17:23:34	05:42:02	17:39:03	05:31:59	17:20:03
05 Ago	05:43:43	17:24:31	05:40:59	17:38:57	05:30:28	17:20:26
12 Ago	05:41:02	17:25:07	05:39:25	17:38:26	05:28:22	17:20:26
19 Ago	05:37:45	17:25:24	05:37:20	17:37:31	05:25:44	17:20:04
26 Ago	05:33:59	17:25:23	05:34:50	17:36:14	05:22:39	17:19:23
02 Set	05:29:51	17:25:10	05:32:01	17:34:42	05:19:13	17:18:28
09 Set	05:25:27	17:24:49	05:28:57	17:33:00	05:15:32	17:17:23
16 Set	05:20:54	17:24:24	05:25:46	17:31:13	05:11:43	17:16:14
23 Set	05:16:19	17:24:01	05:22:34	17:29:27	05:07:52	17:15:07
30 Set	05:11:52	17:23:47	05:19:30	17:27:50	05:04:09	17:14:08
07 Out	05:07:39	17:23:48	05:16:40	17:26:28	05:00:41	17:13:25
14 Out	05:03:49	17:24:09	05:14:11	17:25:28	04:57:34	17:13:03
21 Out	05:00:28	17:24:55	05:12:10	17:24:54	04:54:56	17:13:06
28 Out	04:57:44	17:26:10	05:10:43	17:24:53	04:52:53	17:13:40
04 Nov	04:55:45	17:27:58	05:09:57	17:25:28	04:51:33	17:14:49
11 Nov	04:54:35	17:30:18	05:09:54	17:26:42	04:50:59	17:16:33
18 Nov	04:54:17	17:33:07	05:10:35	17:28:32	04:51:13	17:18:50
25 Nov	04:54:51	17:36:22	05:12:01	17:30:56	04:52:15	17:21:39
02 Dez	04:56:19	17:39:57	05:14:09	17:33:52	04:54:04	17:24:52
09 Dez	04:58:34	17:43:42	05:16:53	17:37:09	04:56:34	17:28:22
16 Dez	05:01:29	17:47:25	05:20:03	17:40:37	04:59:37	17:31:57
23 Dez	05:04:53	17:50:53	05:23:30	17:44:05	05:03:03	17:35:25
30 Dez	05:08:38	17:53:58	05:27:02	17:47:22	05:06:41	17:38:37

# Nascer e Ocaso do Sol

## Região Nordeste – Parte II

Maceió – AL			Natal – RN			Recife – PE		
Coorde- nadas	TU – 03:00 $\varphi = 9^{\circ} 40' 00'' S$ $L = 35^{\circ} 44' 00 W$ Altitude = 30 Mts		TU – 03:00 $\varphi = 5^{\circ} 45' 54'' S$ $L = 35^{\circ} 12' 04'' W$ Altitude = 31 Mts		TU – 03:00 $\varphi = 8^{\circ} 10' 52'' S$ $L = 34^{\circ} 54' 47'' W$ Altitude = 30 Mts			
Data	Nascer	Ocaso	Nascer	Ocaso	Nascer	Ocaso		
01 Jan	05:06:17	17:46:59	05:10:57	17:38:05	05:05:36	17:41:06		
08 Jan	05:10:03	17:49:25	05:14:28	17:40:47	05:09:17	17:43:38		
15 Jan	05:13:42	17:51:09	05:17:45	17:42:53	05:12:47	17:45:31		
22 Jan	05:17:02	17:52:05	05:20:37	17:44:17	05:15:56	17:46:37		
29 Jan	05:19:56	17:52:09	05:22:58	17:44:55	05:18:38	17:46:55		
05 Fev	05:22:20	17:51:25	05:24:45	17:44:48	05:20:48	17:46:25		
12 Fev	05:24:14	17:49:55	05:25:58	17:43:57	05:22:26	17:45:10		
19 Fev	05:25:36	17:47:42	05:26:38	17:42:28	05:23:32	17:43:14		
26 Fev	05:26:29	17:44:53	05:26:47	17:40:23	05:24:08	17:40:41		
04 Mar	05:26:57	17:41:35	05:26:30	17:37:50	05:24:18	17:37:41		
11 Mar	05:27:06	17:37:56	05:25:53	17:34:57	05:24:10	17:34:19		
18 Mar	05:27:01	17:34:04	05:25:02	17:31:51	05:23:48	17:30:45		
25 Mar	05:26:48	17:30:05	05:24:03	17:28:38	05:23:17	17:27:04		
01 Abr	05:26:33	17:26:08	05:23:02	17:25:26	05:22:44	17:23:24		
08 Abr	05:26:22	17:22:22	05:22:07	17:22:24	05:22:16	17:19:55		
15 Abr	05:26:21	17:18:52	05:21:23	17:19:38	05:21:59	17:16:42		
22 Abr	05:26:33	17:15:45	05:20:53	17:17:12	05:21:55	17:13:50		
29 Abr	05:27:01	17:13:06	05:20:42	17:15:13	05:22:08	17:11:26		
06 Mai	05:27:49	17:11:01	05:20:53	17:13:44	05:22:42	17:09:35		
13 Mai	05:28:57	17:09:33	05:21:27	17:12:49	05:23:37	17:08:20		
20 Mai	05:30:21	17:08:42	05:22:23	17:12:26	05:24:50	17:07:40		
27 Mai	05:31:59	17:08:28	05:23:37	17:12:36	05:26:19	17:07:35		
03 Jun	05:33:46	17:08:49	05:25:06	17:13:16	05:27:59	17:08:03		
10 Jun	05:35:36	17:09:42	05:26:43	17:14:20	05:29:44	17:09:01		
17 Jun	05:37:20	17:10:59	05:28:21	17:15:43	05:31:26	17:10:20		
24 Jun	05:38:49	17:12:32	05:29:50	17:17:15	05:32:55	17:11:52		
01 Jul	05:39:56	17:14:14	05:31:04	17:18:48	05:34:04	17:13:31		
08 Jul	05:40:34	17:15:57	05:31:57	17:20:18	05:34:48	17:15:09		
15 Jul	05:40:38	17:17:33	05:32:20	17:21:34	05:35:00	17:16:37		
22 Jul	05:40:03	17:18:55	05:32:10	17:22:31	05:34:34	17:17:50		
29 Jul	05:38:49	17:20:00	05:31:25	17:23:06	05:33:31	17:18:43		
05 Ago	05:36:56	17:20:45	05:30:06	17:23:18	05:31:51	17:19:16		
12 Ago	05:34:26	17:21:10	05:28:13	17:23:05	05:29:35	17:19:26		
19 Ago	05:31:22	17:21:14	05:25:48	17:22:30	05:26:47	17:19:15		
26 Ago	05:27:50	17:21:00	05:22:57	17:21:34	05:23:30	17:18:45		
02 Set	05:23:56	17:20:33	05:19:46	17:20:24	05:19:52	17:18:02		
09 Set	05:19:46	17:19:57	05:16:20	17:19:05	05:16:00	17:17:09		
16 Set	05:15:28	17:19:18	05:12:47	17:17:40	05:11:58	17:16:12		
23 Set	05:11:08	17:18:40	05:09:12	17:16:17	05:07:55	17:15:17		
30 Set	05:06:55	17:18:11	05:05:44	17:15:03	05:04:00	17:14:31		
07 Out	05:02:57	17:17:58	05:02:31	17:14:04	05:00:19	17:14:00		
14 Out	04:59:21	17:18:04	04:59:40	17:13:26	04:57:00	17:13:50		
21 Out	04:56:14	17:18:36	04:57:16	17:13:15	04:54:10	17:14:05		
28 Out	04:53:44	17:19:38	04:55:29	17:13:35	04:51:56	17:14:50		
04 Nov	04:51:58	17:21:12	04:54:22	17:14:30	04:50:25	17:16:10		
11 Nov	04:51:00	17:23:20	04:54:00	17:16:01	04:49:41	17:18:04		
18 Nov	04:50:52	17:25:59	04:54:25	17:18:08	04:49:46	17:20:30		
25 Nov	04:51:36	17:29:05	04:55:37	17:20:47	04:50:40	17:23:26		
02 Dez	04:53:10	17:32:33	04:57:34	17:23:53	04:52:23	17:26:46		
09 Dez	04:55:30	17:36:13	05:00:10	17:27:18	04:54:50	17:30:20		
16 Dez	04:58:28	17:39:53	05:03:16	17:30:50	04:57:50	17:33:57		
23 Dez	05:01:53	17:43:22	05:06:42	17:34:18	05:01:16	17:37:25		
30 Dez	05:05:36	17:46:28	05:10:17	17:37:32	05:04:56	17:40:34		

# Nascer e Ocaso do Sol

## Região Nordeste – Parte III

Salvador – BA			São Luís – MA			Teresina – PI		
Coorde-	TU – 03:00 φ = 12° 55' 34"S L = 38° 31' 13"W Altitude = 30 Mts		TU – 03:00 φ = 2° 33' 00"S L = 44° 18' 00"W Altitude = 30 Mts			TU – 03:00 φ = 5° 05' 13"S L = 42° 48' 42"W Altitude = 100 Mts		
Data	Nascer	Ocaso	Nascer	Ocaso	Nascer	Ocaso	Nascer	Ocaso
01 Jan	05:11:37	18:03:57	05:52:52	18:08:59	05:42:34	18:07:22		
08 Jan	05:15:36	18:06:09	05:56:10	18:11:54	05:46:03	18:10:06		
15 Jan	05:19:34	18:07:34	05:59:09	18:14:19	05:49:15	18:12:17		
22 Jan	05:23:18	18:08:05	06:01:38	18:16:05	05:52:02	18:13:45		
29 Jan	05:26:40	18:07:41	06:03:32	18:17:10	05:54:18	18:14:29		
05 Fev	05:29:36	18:06:25	06:04:50	18:17:33	05:55:59	18:14:28		
12 Fev	05:32:03	18:04:20	06:05:30	18:17:15	05:57:05	18:13:44		
19 Fev	05:34:02	18:01:31	06:05:36	18:16:20	05:57:37	18:12:22		
26 Fev	05:35:32	17:58:04	06:05:08	18:14:51	05:57:38	18:10:24		
04 Mar	05:36:39	17:54:07	06:04:14	18:12:55	05:57:13	18:07:59		
11 Mar	05:37:27	17:49:49	06:03:00	18:10:39	05:56:29	18:05:14		
18 Mar	05:38:02	17:45:18	06:01:32	18:08:10	05:55:30	18:02:16		
25 Mar	05:38:28	17:40:40	05:59:56	18:05:35	05:54:23	17:59:11		
01 Abr	05:38:51	17:36:04	05:58:18	18:03:00	05:53:14	17:56:07		
08 Abr	05:39:19	17:31:40	05:56:46	18:00:34	05:52:11	17:53:13		
15 Abr	05:39:55	17:27:33	05:55:27	17:58:23	05:51:19	17:50:34		
22 Abr	05:40:42	17:23:51	05:54:23	17:56:31	05:50:43	17:48:15		
29 Abr	05:41:44	17:20:38	05:53:40	17:55:04	05:50:25	17:46:23		
06 Mai	05:43:03	17:18:02	05:53:22	17:54:04	05:50:30	17:45:00		
13 Mai	05:44:39	17:16:06	05:53:29	17:53:36	05:50:59	17:44:11		
20 Mai	05:46:29	17:14:51	05:54:02	17:53:37	05:51:50	17:43:54		
27 Mai	05:48:27	17:14:17	05:54:56	17:54:06	05:52:59	17:44:08		
03 Jun	05:50:30	17:14:23	05:56:10	17:55:01	05:54:25	17:44:50		
10 Jun	05:52:31	17:15:05	05:57:37	17:56:15	05:56:00	17:45:57		
17 Jun	05:54:20	17:16:17	05:59:10	17:57:42	05:57:37	17:47:21		
24 Jun	05:55:48	17:17:51	06:00:40	17:59:13	05:59:06	17:48:52		
01 Jul	05:56:48	17:19:39	06:02:00	18:00:41	06:00:22	17:50:25		
08 Jul	05:57:15	17:21:34	06:03:03	18:01:58	06:01:16	17:51:51		
15 Jul	05:57:02	17:23:28	06:03:42	18:02:58	06:01:43	17:53:04		
22 Jul	05:56:06	17:25:12	06:03:53	18:03:35	06:01:37	17:53:57		
29 Jul	05:54:26	17:26:42	06:03:31	18:03:45	06:00:57	17:54:27		
05 Ago	05:52:05	17:27:56	06:02:39	18:03:30	05:59:43	17:54:32		
12 Ago	05:49:04	17:28:52	06:01:15	18:02:47	05:57:56	17:54:14		
19 Ago	05:45:26	17:29:30	05:59:23	18:01:40	05:55:39	17:53:31		
26 Ago	05:41:19	17:29:51	05:57:05	18:00:10	05:52:55	17:52:29		
02 Set	05:36:48	17:30:01	05:54:29	17:58:25	05:49:51	17:51:11		
09 Set	05:32:01	17:30:03	05:51:39	17:56:30	05:46:33	17:49:44		
16 Set	05:27:04	17:30:01	05:48:42	17:54:29	05:43:07	17:48:12		
23 Set	05:22:05	17:30:02	05:45:44	17:52:29	05:39:40	17:46:41		
30 Set	05:17:14	17:30:12	05:42:53	17:50:38	05:36:20	17:45:19		
07 Out	05:12:37	17:30:37	05:40:17	17:49:02	05:33:15	17:44:13		
14 Out	05:08:23	17:31:22	05:38:02	17:47:49	05:30:31	17:43:27		
21 Out	05:04:39	17:32:31	05:36:14	17:47:02	05:28:15	17:43:08		
28 Out	05:01:34	17:34:08	05:35:00	17:46:48	05:26:35	17:43:21		
04 Nov	04:59:14	17:36:17	05:34:26	17:47:11	05:25:35	17:44:10		
11 Nov	04:57:44	17:38:56	05:34:34	17:48:13	05:25:20	17:45:35		
18 Nov	04:57:08	17:42:02	05:35:25	17:49:54	05:25:50	17:47:36		
25 Nov	04:57:28	17:45:32	05:37:00	17:52:10	05:27:07	17:50:10		
02 Dez	04:58:44	17:49:19	05:39:15	17:54:59	05:29:08	17:53:13		
09 Dez	05:00:51	17:53:12	05:42:04	17:58:12	05:31:47	17:56:35		
16 Dez	05:03:41	17:56:59	05:45:17	18:01:37	05:34:54	18:00:05		
23 Dez	05:07:05	18:00:27	05:48:43	18:05:05	05:38:20	18:03:34		
30 Dez	05:10:54	18:03:28	05:52:14	18:08:25	05:41:55	18:06:49		

## Nascer e Ocaso do Sol

### Região Centro-Oeste

Brasília – DF			Campo Grande – MS			Cuiabá – MT			Goiânia – GO		
Coorde-	TU – 03:00 φ = 15° 46' 45" S L = 47° 55' 46" Altitude = 1100		TU – 04:00 φ = 21° 34' 00" S L = 54° 54' 54" W Altitude = 532 Mts			TU – 04:00 φ = 15° 35' 36" S L = 56° 06' 01" W Altitude = 177 Mts			TU – 03:00 φ = 16° 40' 21" S L = 49° 15' 29" W Altitude = 750 Mts		
Data	Nascer	Ocaso	Nascer	Ocaso	Nascer	Ocaso	Nascer	Ocaso	Nascer	Ocaso	
01 Jan	05:44:01	18:46:49	05:00:45	18:25:58	05:17:04	18:19:10	05:47:40	18:53:49			
08 Jan	05:48:13	18:48:49	05:05:22	18:27:31	05:21:15	18:21:11	05:51:55	18:55:45			
15 Jan	05:52:27	18:49:56	05:10:14	18:28:00	05:25:28	18:22:18	05:56:15	18:56:46			
22 Jan	05:56:33	18:50:05	05:15:05	18:27:22	05:29:32	18:22:29	06:00:27	18:56:48			
29 Jan	06:00:20	18:49:16	05:19:47	18:25:37	05:33:18	18:21:41	06:04:23	18:55:50			
05 Fev	06:03:44	18:47:30	05:24:12	18:22:50	05:36:40	18:19:57	06:07:56	18:53:56			
12 Fev	06:06:43	18:44:54	05:28:17	18:19:08	05:39:36	18:17:23	06:11:04	18:51:10			
19 Fev	06:09:14	18:41:33	05:31:57	18:14:36	05:42:05	18:14:03	06:13:46	18:47:37			
26 Fev	06:11:18	18:37:32	05:35:14	18:09:23	05:44:07	18:10:05	06:16:01	18:43:26			
04 Mar	06:12:59	18:33:00	05:38:08	18:03:38	05:45:46	18:05:35	06:17:53	18:38:43			
11 Mar	06:14:22	18:28:07	05:40:46	17:57:30	05:47:07	18:00:44	06:19:28	18:33:39			
18 Mar	06:15:32	18:23:00	05:43:11	17:51:08	05:48:14	17:55:40	06:20:49	18:28:21			
25 Mar	06:16:34	18:17:47	05:45:27	17:44:41	05:49:13	17:50:29	06:22:01	18:22:56			
01 Abr	06:17:32	18:12:37	05:47:39	17:38:17	05:50:09	17:45:21	06:23:10	18:17:35			
08 Abr	06:18:33	18:07:38	05:49:53	17:32:06	05:51:08	17:40:25	06:24:23	18:12:26			
15 Abr	06:19:42	18:02:59	05:52:13	17:26:16	05:52:15	17:35:48	06:25:43	18:07:36			
22 Abr	06:21:02	17:58:45	05:54:40	17:20:55	05:53:33	17:31:36	06:27:12	18:03:11			
29 Abr	06:22:34	17:55:02	05:57:17	17:16:08	05:55:03	17:27:56	06:28:54	17:59:20			
06 Mai	06:24:22	17:51:59	06:00:04	17:12:05	05:56:48	17:24:54	06:30:51	17:56:07			
13 Mai	06:26:23	17:49:37	06:03:00	17:08:50	05:58:48	17:22:34	06:33:00	17:53:37			
20 Mai	06:28:35	17:48:00	06:06:00	17:06:26	06:00:59	17:20:59	06:35:19	17:51:53			
27 Mai	06:30:52	17:47:08	06:08:57	17:04:54	06:03:15	17:20:08	06:37:42	17:50:55			
03 Jun	06:33:09	17:47:00	06:11:45	17:04:16	06:05:31	17:20:01	06:40:04	17:50:43			
10 Jun	06:35:19	17:47:33	06:14:15	17:04:30	06:07:40	17:20:35	06:42:17	17:51:13			
17 Jun	06:37:13	17:48:41	06:16:19	17:05:29	06:09:33	17:21:43	06:44:12	17:52:19			
24 Jun	06:38:40	17:50:16	06:17:45	17:07:05	06:11:01	17:23:18	06:45:39	17:53:55			
01 Jul	06:39:35	17:52:10	06:18:27	17:09:13	06:11:56	17:25:12	06:46:32	17:55:51			
08 Jul	06:39:51	17:54:16	06:18:20	17:11:42	06:12:12	17:27:17	06:46:45	17:58:01			
15 Jul	06:39:23	17:56:25	06:17:19	17:14:24	06:11:45	17:29:25	06:46:12	18:00:14			
22 Jul	06:38:07	17:58:28	06:15:22	17:17:09	06:10:31	17:31:27	06:44:50	18:02:24			
29 Jul	06:36:05	18:00:21	06:12:31	17:19:51	06:08:29	17:33:19	06:42:40	18:04:24			
05 Ago	06:33:17	18:02:01	06:08:48	17:22:27	06:05:43	17:34:57	06:39:44	18:06:13			
12 Ago	06:29:48	18:03:26	06:04:19	17:24:52	06:02:16	17:36:19	06:36:06	18:07:46			
19 Ago	06:25:40	18:04:34	05:59:07	17:27:04	05:58:10	17:37:25	06:31:49	18:09:03			
26 Ago	06:21:01	18:05:27	05:53:20	17:29:04	05:53:33	17:38:16	06:26:59	18:10:07			
02 Set	06:15:57	18:06:09	05:47:07	17:30:57	05:48:31	17:38:56	06:21:45	18:11:00			
09 Set	06:10:36	18:06:45	05:40:34	17:32:44	05:43:13	17:39:30	06:16:14	18:11:46			
16 Set	06:05:05	18:07:18	05:33:50	17:34:30	05:37:44	17:40:00	06:10:32	18:12:30			
23 Set	05:59:32	18:07:53	05:27:04	17:36:19	05:32:13	17:40:34	06:04:47	18:13:16			
30 Set	05:54:06	18:08:38	05:20:24	17:38:18	05:26:49	17:41:16	05:59:10	18:14:12			
07 Out	05:48:55	18:09:38	05:13:59	17:40:31	05:21:40	17:42:14	05:53:48	18:15:23			
14 Out	05:44:07	18:10:57	05:07:59	17:43:03	05:16:54	17:43:30	05:48:49	18:16:53			
21 Out	05:39:50	18:12:39	05:02:31	17:45:56	05:12:40	17:45:10	05:44:21	18:18:46			
28 Out	05:36:12	18:14:48	04:57:45	17:49:14	05:09:04	17:47:18	05:40:34	18:21:05			
04 Nov	05:33:22	18:17:28	04:53:50	17:52:58	05:06:16	17:49:55	05:37:34	18:23:54			
11 Nov	05:31:24	18:20:35	04:50:52	17:57:05	05:04:21	17:53:01	05:35:27	18:27:10			
18 Nov	05:30:23	18:24:06	04:48:57	18:01:31	05:03:22	17:56:31	05:34:18	18:30:50			
25 Nov	05:30:22	18:27:58	04:48:09	18:06:08	05:03:22	18:00:21	05:34:10	18:34:48			
02 Dez	05:31:20	18:32:01	04:48:31	18:10:48	05:04:22	18:04:23	05:35:03	18:38:57			
09 Dez	05:33:15	18:36:06	04:50:00	18:15:18	05:06:17	18:08:27	05:36:54	18:43:06			
16 Dez	05:35:59	18:39:59	04:52:29	18:19:23	05:09:02	18:12:19	05:39:35	18:47:00			
23 Dez	05:39:23	18:43:28	04:55:52	18:22:52	05:12:26	18:15:48	05:42:59	18:50:29			
30 Dez	05:43:16	18:46:22	04:59:57	18:25:34	05:16:19	18:18:43	05:46:54	18:53:22			

**Planetas**  
**Mercúrio**

Data	$\alpha$	$\delta$	$\emptyset$	Elong. °	DT (ua)*	Ang. PH	Fase	Mag.	Distância média (ua)	Período de Revolução	Inclinação Equatorial	Diâm. Equatorial
									0,39	88 dias	7°	4.879
									00:00 Hora – Tempo Universal			
01 Jan	19h 16m 43.16s	-24° 23' 17.0"	4.84	7.3	1.3895374	16.7	0.979	-1.0				
08 Jan	20h 05m 56.37s	-22° 25' 43.5"	5.13	11.5	1.3105967	29.4	0.936	-0.9				
15 Jan	20h 52m 30.10s	-19° 15' 16.3"	5.65	15.5	1.1900132	47.4	0.838	-0.9				
22 Jan	21h 31m 13.93s	-15° 15' 37.5"	6.56	18.4	1.0240556	73.8	0.639	-0.7				
29 Jan	21h 51m 04.09s	-11° 42' 28.3"	8.06	17.0	0.8333383	110.7	0.323	0.2				
05 Fev	21h 39m 33.83s	-10° 42' 17.4"	9.80	8.1	0.6857685	154.4	0.049	3.0				
12 Fev	21h 08m 25.01s	-12° 37' 40.0"	10.35	8.3	0.6493458	156.5	0.042	3.3				
19 Fev	20h 50m 45.14s	-14° 57' 43.7"	9.46	19.5	0.7101489	124.0	0.221	1.2				
26 Fev	20h 56m 33.98s	-16° 07' 04.8"	8.27	25.3	0.8121689	101.0	0.404	0.4				
05 Mar	21h 18m 33.10s	-15° 55' 14.5"	7.30	27.2	0.9210084	85.1	0.543	0.2				
12 Mar	21h 49m 42.74s	-14° 28' 56.1"	6.56	26.7	1.0238248	73.1	0.646	0.1				
19 Mar	22h 26m 06.78s	-11° 54' 50.0"	6.02	24.5	1.1168557	62.9	0.728	-0.0				
26 Mar	23h 05m 55.99s	-08° 18' 17.9"	5.61	21.0	1.1988828	53.2	0.800	-0.2				
02 Abr	23h 48m 39.93s	-03° 44' 06.4"	5.30	16.4	1.2678744	42.4	0.869	-0.5				
09 Abr	00h 34m 41.65s	+01° 41' 48.0"	5.10	10.6	1.3181508	28.9	0.938	-1.0				
16 Abr	01h 24m 53.54s	+07° 47' 16.6"	5.03	3.6	1.3371570	10.5	0.992	-1.8				
23 Abr	02h 19m 35.90s	+14° 02' 38.9"	5.15	4.5	1.3047098	14.7	0.984	-1.9				
30 Abr	03h 16m 19.73s	+19° 30' 52.2"	5.57	12.4	1.2068886	44.0	0.859	-1.2				
07 Mai	04h 09m 06.95s	+23° 14' 36.4"	6.34	18.4	1.0606906	72.0	0.654	-0.6				
14 Mai	04h 52m 06.88s	+24° 59' 41.9"	7.44	21.6	0.9026875	95.6	0.451	0.1				
21 Mai	05h 21m 32.76s	+25° 05' 47.0"	8.85	21.5	0.7596746	116.1	0.280	0.9				
28 Mai	05h 34m 55.24s	+23° 58' 48.6"	10.40	17.7	0.6463223	136.1	0.140	2.0				
04 Jun	05h 31m 56.62s	+22° 04' 06.8"	11.72	10.3	0.5734405	157.0	0.040	3.7				
11 Jun	05h 17m 50.56s	+19° 57' 01.1"	12.20	3.2	0.5505965	173.1	0.004	5.4				
18 Jun	05h 03m 59.81s	+18° 29' 31.1"	11.55	10.9	0.5819629	155.2	0.046	3.5				
25 Jun	05h 01m 05.76s	+18° 20' 20.3"	10.14	17.9	0.6630027	134.2	0.151	1.9				
02 Jul	05h 13m 44.24s	+19° 25' 27.6"	8.57	21.3	0.7841746	113.9	0.297	0.8				
09 Jul	05h 42m 27.83s	+21° 08' 23.9"	7.19	20.9	0.9342356	92.4	0.479	0.0				
16 Jul	06h 26m 39.87s	+22° 35' 34.5"	6.13	17.3	1.0961032	67.4	0.692	-0.7				
23 Jul	07h 23m 40.37s	+22° 43' 14.6"	5.42	10.9	1.2387795	38.5	0.892	-1.3				
30 Jul	08h 26m 03.37s	+20° 47' 21.1"	5.07	3.3	1.3265042	10.6	0.991	-1.9				
06 Ago	09h 25m 05.65s	+17° 01' 58.6"	4.98	5.1	1.3501750	14.9	0.983	-1.5				
13 Ago	10h 17m 00.31s	+12° 14' 39.4"	5.06	11.6	1.3270078	31.4	0.927	-0.8				
20 Ago	11h 02m 03.90s	+07° 04' 47.9"	5.27	17.1	1.2752179	43.9	0.860	-0.4				
27 Ago	11h 41m 33.40s	+01° 56' 39.4"	5.58	21.4	1.2051469	54.3	0.792	-0.1				
03 Set	12h 16m 24.18s	-02° 54' 04.9"	5.99	24.5	1.1212164	64.1	0.719	0.0				
10 Set	12h 46m 39.20s	-07° 13' 42.7"	6.56	26.4	1.0250075	74.6	0.632	0.1				
17 Set	13h 10m 58.56s	-10° 44' 25.4"	7.32	26.6	0.9180156	87.6	0.521	0.2				
24 Set	13h 25m 46.12s	-12° 55' 20.7"	8.34	24.0	0.8055356	105.2	0.369	0.5				
01 Out	13h 24m 34.49s	-12° 49' 08.2"	9.54	17.0	0.7047492	130.9	0.173	1.5				
08 Out	13h 03m 41.03s	-09° 22' 55.5"	10.21	4.4	0.6584352	167.3	0.012	4.5				
15 Out	12h 40m 25.42s	-04° 27' 56.4"	9.29	10.5	0.7231232	144.7	0.092	2.2				
22 Out	12h 42m 20.20s	-02° 47' 44.4"	7.55	17.7	0.8905557	100.7	0.407	-0.1				
29 Out	13h 09m 09.76s	-05° 02' 31.2"	6.22	17.7	1.0805610	66.1	0.703	-0.8				
05 Nov	13h 47m 28.81s	-09° 06' 47.7"	5.44	14.4	1.2354955	41.8	0.872	-0.9				
12 Nov	14h 29m 42.50s	-13° 30' 08.4"	5.00	10.1	1.3437567	25.3	0.952	-0.9				
19 Nov	15h 13m 31.68s	-17° 31' 47.4"	4.76	5.9	1.4113598	13.3	0.987	-1.0				
26 Nov	15h 58m 35.35s	-20° 53' 42.9"	4.65	1.8	1.4453196	3.9	0.999	-1.2				
03 Dez	16h 44m 59.32s	-23° 25' 33.9"	4.63	2.4	1.4498649	5.0	0.998	-1.1				
10 Dez	17h 32m 42.40s	-24° 59' 04.4"	4.71	6.2	1.4263158	13.4	0.986	-0.9				
17 Dez	18h 21m 19.07s	-25° 26' 36.7"	4.89	10.1	1.3734268	23.1	0.960	-0.8				
24 Dez	19h 09m 42.74s	-24° 42' 00.8"	5.22	13.9	1.2874245	35.4	0.908	-0.7				
31 Dez	19h 55m 23.22s	-22° 44' 21.7"	5.78	17.3	1.1627521	52.6	0.804	-0.7				

## Vênus

Data	$\alpha$	$\delta$	$\oslash$	Elong. °	DT (ua)*	Ang. PH	Inclinação Equatorial		Diâm. Equatorial 12.103	
							00:00 Hora – Tempo Universal			
							3,4°			
01 Jan	17h 17m 12.70s	-22° 24' 44.9"	10.69	20.4	1.5599096	28.2	0.941		-3.9	
08 Jan	17h 55m 09.97s	-23° 04' 08.4"	10.53	18.7	1.5839811	25.8	0.950		-3.9	
15 Jan	18h 33m 21.38s	-23° 09' 07.0"	10.39	17.1	1.6061566	23.5	0.959		-3.9	
22 Jan	19h 11m 25.65s	-22° 39' 16.2"	10.26	15.4	1.6264367	21.1	0.966		-3.9	
29 Jan	19h 49m 03.33s	-21° 35' 31.4"	10.14	13.8	1.6448908	18.8	0.973		-3.9	
05 Fev	20h 25m 58.90s	-19° 59' 59.1"	10.04	12.1	1.6615403	16.5	0.979		-3.9	
12 Fev	21h 02m 02.12s	-17° 55' 39.7"	9.95	10.5	1.6763024	14.3	0.985		-3.9	
19 Fev	21h 37m 07.60s	-15° 26' 17.7"	9.88	8.8	1.6891125	12.0	0.989		-3.9	
26 Fev	22h 11m 16.18s	-12° 36' 01.2"	9.81	7.2	1.6999860	9.8	0.993		-3.9	
05 Mar	22h 44m 33.98s	-09° 29' 06.7"	9.76	5.5	1.7089265	7.5	0.996		-3.9	
12 Mar	23h 17m 11.10s	-06° 09' 48.6"	9.72	3.8	1.7158257	5.3	0.998		-3.9	
19 Mar	23h 49m 19.09s	-02° 42' 24.4"	9.69	2.3	1.7205483	3.2	0.999		-3.9	
26 Mar	00h 21m 11.21s	+00° 48' 51.5"	9.68	1.4	1.7230404	1.9	1.000		-3.9	
02 Abr	00h 53m 01.76s	+04° 19' 49.8"	9.68	2.1	1.7232822	2.9	0.999		-3.9	
09 Abr	01h 25m 05.67s	+07° 46' 26.7"	9.69	3.7	1.7211681	5.1	0.998		-3.9	
16 Abr	01h 57m 36.28s	+11° 04' 30.7"	9.72	5.4	1.7165324	7.5	0.996		-3.9	
23 Abr	02h 30m 45.10s	+14° 09' 45.5"	9.76	7.2	1.7092869	10.0	0.992		-3.9	
30 Abr	03h 04m 41.20s	+16° 57' 53.6"	9.82	9.0	1.6994213	12.6	0.988		-3.9	
07 Mai	03h 39m 30.81s	+19° 24' 45.8"	9.89	10.8	1.6868931	15.2	0.983		-3.9	
14 Mai	04h 15m 14.67s	+21° 26' 18.2"	9.98	12.6	1.6715798	17.9	0.976		-3.9	
21 Mai	04h 51m 47.20s	+22° 58' 48.3"	10.09	14.5	1.6534234	20.6	0.968		-3.9	
28 Mai	05h 28m 56.61s	+23° 59' 13.0"	10.22	16.3	1.6324710	23.4	0.959		-3.9	
04 Jun	06h 06m 26.81s	+24° 25' 29.1"	10.37	18.2	1.6087960	26.1	0.949		-3.9	
11 Jun	06h 43m 58.13s	+24° 16' 38.4"	10.54	20.0	1.5823839	29.0	0.937		-3.9	
18 Jun	07h 21m 09.30s	+23° 32' 58.6"	10.74	21.9	1.5532516	31.8	0.925		-3.9	
25 Jun	07h 57m 40.83s	+22° 16' 00.6"	10.96	23.7	1.5215208	34.7	0.911		-3.9	
02 Jul	08h 33m 18.61s	+20° 28' 19.5"	11.21	25.5	1.4873801	37.6	0.896		-3.9	
09 Jul	09h 07m 54.65s	+18° 13' 11.8"	11.50	27.3	1.4509314	40.4	0.881		-3.9	
16 Jul	09h 41m 26.02s	+15° 34' 26.0"	11.81	29.1	1.4122561	43.3	0.864		-3.9	
23 Jul	10h 13m 54.53s	+12° 36' 07.3"	12.16	30.8	1.3715115	46.2	0.846		-3.9	
30 Jul	10h 45m 26.78s	+09° 22' 24.8"	12.55	32.5	1.3289410	49.1	0.827		-3.9	
06 Ago	11h 16m 13.20s	+05° 57' 17.5"	12.98	34.2	1.2847128	52.0	0.808		-4.0	
13 Ago	11h 46m 25.41s	+02° 24' 41.1"	13.46	35.8	1.2389238	54.9	0.788		-4.0	
20 Ago	12h 16m 15.31s	-01° 11' 28.9"	14.00	37.3	1.1917031	57.8	0.767		-4.0	
27 Ago	12h 45m 55.23s	-04° 47' 20.6"	14.59	38.8	1.1432741	60.7	0.745		-4.0	
03 Set	13h 15m 38.29s	-08° 19' 13.3"	15.25	40.2	1.0938137	63.6	0.722		-4.0	
10 Set	13h 45m 36.11s	-11° 43' 24.9"	15.99	41.5	1.0434015	66.6	0.699		-4.1	
17 Set	14h 15m 57.47s	-14° 56' 04.9"	16.81	42.7	0.9921072	69.6	0.674		-4.1	
24 Set	14h 46m 47.74s	-17° 53' 19.9"	17.74	43.9	0.9401044	72.7	0.649		-4.1	
01 Out	15h 18m 09.70s	-20° 31' 30.3"	18.79	44.9	0.8875669	75.9	0.622		-4.2	
08 Out	15h 50m 00.77s	-22° 47' 10.2"	19.99	45.7	0.8345813	79.2	0.594		-4.2	
15 Out	16h 22m 10.47s	-24° 37' 11.3"	21.35	46.4	0.7812006	82.6	0.564		-4.3	
22 Out	16h 54m 19.16s	-25° 59' 01.6"	22.92	46.8	0.7275982	86.3	0.532		-4.3	
29 Out	17h 26m 00.95s	-26° 51' 14.4"	24.75	47.0	0.6740175	90.2	0.498		-4.4	
05 Nov	17h 56m 43.22s	-27° 13' 37.9"	26.87	46.9	0.6206709	94.5	0.461		-4.5	
12 Nov	18h 25m 45.26s	-27° 07' 18.5"	29.38	46.3	0.5677644	99.2	0.420		-4.5	
19 Nov	18h 52m 16.96s	-26° 34' 48.2"	32.34	45.2	0.5156923	104.4	0.376		-4.6	
26 Nov	19h 15m 23.20s	-25° 40' 04.6"	35.86	43.4	0.4650790	110.4	0.326		-4.6	
03 Dez	19h 34m 01.93s	-24° 28' 11.9"	40.03	40.7	0.4167231	117.3	0.271		-4.7	
10 Dez	19h 46m 59.23s	-23° 05' 00.7"	44.88	36.7	0.3716757	125.4	0.210		-4.7	
17 Dez	19h 52m 48.12s	-21° 36' 50.4"	50.31	31.1	0.3315562	135.1	0.146		-4.6	
24 Dez	19h 50m 16.32s	-20° 09' 44.0"	55.84	23.7	0.2987173	146.7	0.082		-4.5	
31 Dez	19h 39m 21.90s	-18° 48' 50.3"	60.43	14.5	0.2760017	160.0	0.030		-4.3	

# Marte

Distância média (ua)		Período de Revolução			Inclinação Equatorial		Diâm. Equatorial	
	1,52	687 dias			1,9°	6.779		
00:00 Hora – Tempo Universal								
Data	α	δ	∅	Elong. °	DT (ua)*	Ang. PH	Fase	Mag.
01 Jan	01h 39m 11.27s	+11° 14' 20.0"	10.42	106.6	0.8985344	38.6	0.891	-0.2
08 Jan	01h 50m 57.73s	+12° 28' 24.2"	9.72	102.6	0.9627057	39.2	0.887	-0.1
15 Jan	02h 03m 38.58s	+13° 43' 34.6"	9.10	98.8	1.0284135	39.5	0.886	0.1
22 Jan	02h 17m 07.88s	+14° 58' 48.6"	8.55	95.1	1.0952687	39.6	0.885	0.2
29 Jan	02h 31m 19.74s	+16° 13' 00.1"	8.05	91.7	1.1629317	39.6	0.885	0.4
05 Fev	02h 46m 09.24s	+17° 25' 06.7"	7.60	88.3	1.2311878	39.3	0.887	0.5
12 Fev	03h 01m 33.74s	+18° 34' 19.4"	7.20	85.1	1.2998354	39.0	0.889	0.6
19 Fev	03h 17m 30.52s	+19° 39' 50.9"	6.84	81.9	1.3685567	38.5	0.891	0.8
26 Fev	03h 33m 56.29s	+20° 40' 51.9"	6.51	78.9	1.4370613	37.9	0.894	0.9
05 Mar	03h 50m 47.73s	+21° 36' 35.7"	6.22	75.9	1.5051765	37.3	0.898	1.0
12 Mar	04h 08m 03.00s	+22° 26' 26.1"	5.95	73.0	1.5727534	36.5	0.902	1.1
19 Mar	04h 25m 39.88s	+23° 09' 49.1"	5.71	70.1	1.6395250	35.7	0.906	1.1
26 Mar	04h 43m 35.32s	+23° 46' 12.3"	5.49	67.3	1.7052362	34.9	0.910	1.2
02 Abr	05h 01m 45.83s	+24° 15' 06.2"	5.29	64.6	1.7697455	34.0	0.915	1.3
09 Abr	05h 20m 09.03s	+24° 36' 11.1"	5.11	61.9	1.8329529	33.0	0.919	1.4
16 Abr	05h 38m 42.33s	+24° 49' 10.2"	4.94	59.2	1.8946394	32.0	0.924	1.4
23 Abr	05h 57m 22.45s	+24° 53' 51.3"	4.79	56.6	1.9545844	30.9	0.929	1.5
30 Abr	06h 16m 05.67s	+24° 50' 06.3"	4.65	54.1	2.0126747	29.8	0.934	1.5
07 Mai	06h 34m 49.47s	+24° 37' 55.1"	4.52	51.6	2.0688558	28.7	0.938	1.6
14 Mai	06h 53m 31.53s	+24° 17' 20.5"	4.41	49.1	2.1229553	27.6	0.943	1.6
21 Mai	07h 12m 09.15s	+23° 48' 30.6"	4.30	46.6	2.1747851	26.4	0.948	1.7
28 Mai	07h 30m 39.51s	+23° 11' 37.1"	4.21	44.2	2.2242560	25.2	0.952	1.7
04 Jun	07h 49m 01.00s	+22° 26' 57.4"	4.12	41.8	2.2713524	24.0	0.957	1.7
11 Jun	08h 07m 12.63s	+21° 34' 48.7"	4.04	39.4	2.3159460	22.8	0.961	1.8
18 Jun	08h 25m 13.20s	+20° 35' 33.1"	3.97	37.0	2.3578763	21.6	0.965	1.8
25 Jun	08h 43m 01.53s	+19° 29' 35.0"	3.90	34.6	2.3970742	20.3	0.969	1.8
02 Jul	09h 00m 37.50s	+18° 17' 21.2"	3.85	32.3	2.4335553	19.0	0.973	1.8
09 Jul	09h 18m 01.70s	+16° 59' 15.7"	3.79	30.0	2.4672324	17.8	0.976	1.8
16 Jul	09h 35m 14.51s	+15° 35' 46.4"	3.75	27.7	2.4979701	16.5	0.980	1.8
23 Jul	09h 52m 16.29s	+14° 07' 22.5"	3.71	25.4	2.5257157	15.1	0.983	1.8
30 Jul	10h 09m 08.10s	+12° 34' 33.8"	3.67	23.1	2.5505114	13.8	0.986	1.8
06 Ago	10h 25m 51.74s	+10° 57' 45.9"	3.64	20.8	2.5723104	12.5	0.988	1.8
13 Ago	10h 42m 28.67s	+09° 17' 27.5"	3.61	18.5	2.5910031	11.1	0.991	1.8
20 Ago	10h 59m 00.24s	+07° 34' 09.4"	3.59	16.2	2.6065529	9.8	0.993	1.8
27 Ago	11h 15m 28.21s	+05° 48' 22.3"	3.57	13.9	2.6190290	8.4	0.995	1.8
03 Set	11h 31m 55.04s	+04° 00' 32.5"	3.56	11.6	2.6284269	7.0	0.996	1.8
10 Set	11h 48m 22.83s	+02° 11' 09.7"	3.55	9.3	2.6346687	5.7	0.998	1.8
17 Set	12h 04m 53.45s	+00° 20' 46.4"	3.55	7.0	2.6377379	4.3	0.999	1.7
24 Set	12h 21m 28.94s	-01° 30' 03.7"	3.55	4.7	2.6377351	2.9	0.999	1.7
01 Out	12h 38m 12.11s	-03° 20' 51.5"	3.55	2.5	2.6347038	1.5	1.000	1.7
08 Out	12h 55m 05.28s	-05° 11' 03.4"	3.56	0.6	2.6286080	0.3	1.000	1.6
15 Out	13h 12m 10.50s	-07° 00' 03.0"	3.57	2.3	2.6194575	1.4	1.000	1.6
22 Out	13h 29m 29.81s	-08° 47' 10.1"	3.59	4.6	2.6073917	2.8	0.999	1.7
29 Out	13h 47m 05.87s	-10° 31' 49.3"	3.61	6.9	2.5925089	4.2	0.999	1.7
05 Nov	14h 05m 00.88s	-12° 13' 20.7"	3.64	9.2	2.5748254	5.6	0.998	1.6
12 Nov	14h 23m 16.54s	-13° 51' 00.1"	3.66	11.4	2.5543845	7.1	0.996	1.6
19 Nov	14h 41m 54.16s	-15° 24' 00.4"	3.70	13.7	2.5313678	8.5	0.995	1.6
26 Nov	15h 00m 55.61s	-16° 51' 38.4"	3.74	16.0	2.5059327	9.9	0.993	1.6
03 Dez	15h 20m 22.04s	-18° 13' 07.9"	3.78	18.3	2.4781519	11.3	0.990	1.6
10 Dez	15h 40m 13.82s	-19° 27' 39.6"	3.82	20.5	2.4481037	12.7	0.988	1.6
17 Dez	16h 00m 30.44s	-20° 34' 23.2"	3.87	22.7	2.4160061	14.2	0.985	1.6
24 Dez	16h 21m 11.72s	-21° 32' 34.4"	3.93	24.9	2.3820699	15.6	0.982	1.6
31 Dez	16h 42m 16.62s	-22° 21' 28.9"	3.99	27.1	2.3464164	16.9	0.978	1.5

## Longitude do Meridiano Central de Marte

00:00 Hora – Tempo Universal

	<b>Jan</b>	<b>Fev</b>	<b>Mar</b>	<b>Abr</b>	<b>Mai</b>	<b>Jun</b>	<b>Jul</b>	<b>Ago</b>	<b>Set</b>	<b>Out</b>	<b>Nov</b>	<b>Dez</b>
1	163.5	225.0	314.5	14.9	84.9	144.8	213.3	270.7	326.7	32.0	88.0	154.8
2	153.9	215.4	304.8	5.2	75.3	135.1	203.6	260.9	316.9	22.2	78.2	145.0
3	144.3	205.7	295.2	355.6	65.6	125.4	193.9	251.1	307.0	12.3	68.4	135.3
4	134.7	196.1	285.5	345.9	55.9	115.7	184.1	241.3	297.2	2.5	58.6	125.5
5	125.1	186.4	275.8	336.2	46.3	106.0	174.4	231.5	287.4	352.7	48.8	115.7
6	115.5	176.8	266.2	326.6	36.6	96.3	164.6	221.7	277.6	342.9	39.0	106.0
7	105.9	167.1	256.5	316.9	26.9	86.6	154.9	211.9	267.8	333.1	29.2	96.2
8	96.3	157.4	246.8	307.3	17.2	76.9	145.1	202.1	257.9	323.3	19.5	86.5
9	86.7	147.8	237.2	297.6	7.6	67.2	135.4	192.3	248.1	313.4	9.7	76.7
10	77.1	138.1	227.5	287.9	357.9	57.5	125.6	182.5	238.3	303.6	359.9	67.0
11	67.5	128.4	217.8	278.3	348.2	47.8	115.9	172.7	228.5	293.8	350.1	57.2
12	57.9	118.8	208.2	268.6	338.5	38.1	106.1	162.9	218.6	284.0	340.3	47.5
13	48.3	109.1	198.5	258.9	328.9	28.4	96.4	153.1	208.8	274.2	330.6	37.7
14	38.6	99.5	188.8	249.3	319.2	18.7	86.6	143.3	199.0	264.4	320.8	28.0
15	29.0	89.8	179.2	239.6	309.5	8.9	76.8	133.5	189.2	254.6	311.0	18.3
16	19.4	80.1	169.5	229.9	299.8	359.2	67.1	123.7	179.3	244.8	301.2	8.5
17	9.7	70.5	159.8	220.3	290.1	349.5	57.3	113.9	169.5	235.0	291.5	358.8
18	0.1	60.8	150.2	210.6	280.5	339.8	47.6	104.1	159.7	225.1	281.7	349.0
19	350.5	51.1	140.5	200.9	270.8	330.1	37.8	94.3	149.9	215.3	271.9	339.3
20	340.8	41.5	130.9	191.3	261.1	320.4	28.0	84.5	140.0	205.5	262.2	329.5
21	331.2	31.8	121.2	181.6	251.4	310.6	18.3	74.7	130.2	195.7	252.4	319.8
22	321.5	22.1	111.5	172.0	241.7	300.9	8.5	64.9	120.4	185.9	242.6	310.0
23	311.9	12.5	101.9	162.3	232.0	291.2	358.7	55.0	110.6	176.1	232.9	300.3
24	302.3	2.8	92.2	152.6	222.3	281.5	348.9	45.2	100.7	166.3	223.1	290.6
25	292.6	353.1	82.5	143.0	212.7	271.7	339.2	35.4	90.9	156.5	213.3	280.8
26	283.0	343.5	72.9	133.3	203.0	262.0	329.4	25.6	81.1	146.7	203.6	271.1
27	273.3	333.8	63.2	123.6	193.3	252.3	319.6	15.8	71.3	136.9	193.8	261.3
28	263.7	324.1	53.5	113.9	183.6	242.5	309.8	6.0	61.4	127.1	184.0	251.6
29	254.0		43.9	104.3	173.9	232.8	300.0	356.1	51.6	117.3	174.3	241.8
30	244.4		34.2	94.6	164.2	223.1	290.3	346.3	41.8	107.5	164.5	232.1
31	234.7		24.6		154.5		280.5	336.5		97.8		222.4

## Movimento do Meridiano Central Marciano

00:00 Hora – Tempo Universal

Minuto	0h o	1h o	2h o	3h o	4h o	5h o	6h o	7h o	8h o	9h o	10h o	11h o
0	0.0	14.6	29.2	43.9	58.5	73.1	87.7	102.3	117.0	131.6	146.2	160.8
10	2.4	17.1	31.7	46.3	60.9	75.5	90.2	104.8	119.4	134.0	148.6	163.3
20	4.9	19.5	34.1	48.7	63.4	78.0	92.6	107.2	121.8	136.5	151.1	165.7
30	7.3	21.9	36.6	51.2	65.8	80.4	95.0	109.7	124.3	138.9	153.5	168.1
40	9.7	24.4	39.0	53.6	68.2	82.8	97.5	112.1	126.7	141.3	156.0	170.6
50	12.2	26.8	41.4	56.0	70.7	85.3	99.9	114.5	129.1	143.8	158.4	173.0
60	14.6	29.2	43.9	58.5	73.1	87.7	102.3	117.0	131.6	146.2	160.8	175.4

## Júpiter

Data	Distância média (ua)		Período de Revolução			Inclinação Equatorial		Diâm. Equatorial	
	5,20		11,86 anos			1,3°		142.984	
	00:00 Hora – Tempo Universal								
Data	α	δ	∅	Elong. °	DT (ua)*	Ang. PH	Fase	Mag.	
01 Jan	20h 19m 31.71s	-20° 04' 45.8"	32.85	22.0	5.9939753	4.1	0.999	-2.0	
08 Jan	20h 26m 12.24s	-19° 42' 44.7"	32.66	16.5	6.0285904	3.1	0.999	-1.9	
15 Jan	20h 32m 57.17s	-19° 19' 29.9"	32.53	11.0	6.0531224	2.1	1.000	-1.9	
22 Jan	20h 39m 44.12s	-18° 55' 08.8"	32.45	5.5	6.0673232	1.1	1.000	-1.9	
29 Jan	20h 46m 31.18s	-18° 29' 49.5"	32.43	0.7	6.0711591	0.1	1.000	-2.0	
05 Fev	20h 53m 16.43s	-18° 03' 38.6"	32.46	5.4	6.0646712	1.0	1.000	-1.9	
12 Fev	20h 59m 58.35s	-17° 36' 46.5"	32.55	10.8	6.0478593	2.1	1.000	-2.0	
19 Fev	21h 06m 34.83s	-17° 09' 23.7"	32.70	16.3	6.0208287	3.1	0.999	-2.0	
26 Fev	21h 13m 04.13s	-16° 41' 41.5"	32.90	21.7	5.9838876	4.1	0.999	-2.0	
05 Mar	21h 19m 24.59s	-16° 13' 51.6"	33.16	27.1	5.9374092	5.1	0.998	-2.0	
12 Mar	21h 25m 34.75s	-15° 46' 05.8"	33.47	32.6	5.8817131	6.1	0.997	-2.0	
19 Mar	21h 31m 32.59s	-15° 18' 38.1"	33.84	38.0	5.8172256	6.9	0.996	-2.0	
26 Mar	21h 37m 16.43s	-14° 51' 42.7"	34.27	43.5	5.7445635	7.8	0.995	-2.0	
02 Abr	21h 42m 44.58s	-14° 25' 34.0"	34.76	49.1	5.6643981	8.6	0.994	-2.1	
09 Abr	21h 47m 55.51s	-14° 00' 25.7"	35.30	54.6	5.5773374	9.3	0.993	-2.1	
16 Abr	21h 52m 47.09s	-13° 36' 34.3"	35.90	60.2	5.4841016	9.9	0.993	-2.1	
23 Abr	21h 57m 17.48s	-13° 14' 15.8"	36.56	65.9	5.3855953	10.5	0.992	-2.2	
30 Abr	22h 01m 24.86s	-12° 53' 45.8"	37.27	71.7	5.2827708	10.9	0.991	-2.2	
07 Mai	22h 05m 07.48s	-12° 35' 19.0"	38.03	77.5	5.1765162	11.2	0.990	-2.3	
14 Mai	22h 08m 23.10s	-12° 19' 12.2"	38.85	83.4	5.0678440	11.5	0.990	-2.3	
21 Mai	22h 11m 09.76s	-12° 05' 41.1"	39.71	89.5	4.9579508	11.6	0.990	-2.3	
28 Mai	22h 13m 25.72s	-11° 54' 59.1"	40.61	95.6	4.8480719	11.5	0.990	-2.4	
04 Jun	22h 15m 09.38s	-11° 47' 17.9"	41.54	101.9	4.7393774	11.3	0.990	-2.4	
11 Jun	22h 16m 18.92s	-11° 42' 48.9"	42.49	108.3	4.6331666	11.0	0.991	-2.5	
18 Jun	22h 16m 53.12s	-11° 41' 40.6"	43.45	114.8	4.5309027	10.5	0.992	-2.6	
25 Jun	22h 16m 51.47s	-11° 43' 54.9"	44.40	121.5	4.4340422	9.9	0.993	-2.6	
02 Jul	22h 16m 13.97s	-11° 49' 30.1"	45.32	128.4	4.3439334	9.1	0.994	-2.6	
09 Jul	22h 15m 01.05s	-11° 58' 20.3"	46.19	135.4	4.2620011	8.2	0.995	-2.7	
16 Jul	22h 13m 14.35s	-12° 10' 12.5"	46.99	142.5	4.1897294	7.1	0.996	-2.7	
23 Jul	22h 10m 56.92s	-12° 24' 44.2"	47.69	149.8	4.1284511	5.8	0.997	-2.8	
30 Jul	22h 08m 12.70s	-12° 41' 27.7"	48.26	157.2	4.0792491	4.5	0.998	-2.8	
06 Ago	22h 05m 06.53s	-12° 59' 50.3"	48.69	164.7	4.0431281	3.0	0.999	-2.8	
13 Ago	22h 01m 44.58s	-13° 19' 13.8"	48.96	172.3	4.0209474	1.6	1.000	-2.9	
20 Ago	21h 58m 14.24s	-13° 38' 54.0"	49.06	178.7	4.0132031	0.3	1.000	-2.9	
27 Ago	21h 54m 42.97s	-13° 58' 09.2"	48.98	172.3	4.0199918	1.6	1.000	-2.9	
03 Set	21h 51m 18.25s	-14° 16' 19.5"	48.72	164.7	4.0412174	3.0	0.999	-2.8	
10 Set	21h 48m 07.59s	-14° 32' 48.8"	48.30	157.1	4.0765351	4.5	0.998	-2.8	
17 Set	21h 45m 18.21s	-14° 47' 03.2"	47.73	149.5	4.1251991	5.8	0.997	-2.8	
24 Set	21h 42m 55.75s	-14° 58' 39.4"	47.03	142.1	4.1861398	7.1	0.996	-2.8	
01 Out	21h 41m 04.81s	-15° 07' 19.6"	46.24	134.8	4.2582132	8.2	0.995	-2.7	
08 Out	21h 39m 48.91s	-15° 12' 52.5"	45.36	127.6	4.3401535	9.1	0.994	-2.7	
15 Out	21h 39m 10.67s	-15° 15' 09.4"	44.44	120.5	4.4304631	9.9	0.993	-2.6	
22 Out	21h 39m 10.86s	-15° 14' 09.8"	43.48	113.5	4.5275394	10.5	0.992	-2.6	
29 Out	21h 39m 49.51s	-15° 09' 55.6"	42.52	106.7	4.6298945	11.0	0.991	-2.5	
05 Nov	21h 41m 05.88s	-15° 02' 31.1"	41.57	100.1	4.7360667	11.2	0.990	-2.5	
12 Nov	21h 42m 58.91s	-14° 52' 00.2"	40.64	93.5	4.8445045	11.4	0.990	-2.4	
19 Nov	21h 45m 26.35s	-14° 38' 31.6"	39.74	87.1	4.9536917	11.4	0.990	-2.4	
26 Nov	21h 48m 25.90s	-14° 22' 13.4"	38.89	80.8	5.0623194	11.2	0.990	-2.3	
03 Dez	21h 51m 55.14s	-14° 03' 14.3"	38.09	74.6	5.1691608	11.0	0.991	-2.3	
10 Dez	21h 55m 51.77s	-13° 41' 41.4"	37.34	68.5	5.2729519	10.6	0.992	-2.2	
17 Dez	22h 00m 12.82s	-13° 17' 45.4"	36.65	62.6	5.3725144	10.1	0.992	-2.2	
24 Dez	22h 04m 55.65s	-12° 51' 36.1"	36.01	56.7	5.4668996	9.5	0.993	-2.2	
31 Dez	22h 09m 57.75s	-12° 23' 23.2"	35.44	50.8	5.5552474	8.8	0.994	-2.1	

## Longitude do Meridiano Central de Júpiter, Sistema I

00:00 Hora – Tempo Universal

	<b>Jan</b>	<b>Fev</b>	<b>Mar</b>	<b>Abr</b>	<b>Mai</b>	<b>Jun</b>	<b>Jul</b>	<b>Ago</b>	<b>Set</b>	<b>Out</b>	<b>Nov</b>	<b>Dez</b>
1	44.1	251.4	346.5	196.3	250.3	104.4	163.1	21.9	240.9	299.6	152.6	204.5
2	201.8	49.0	144.2	354.1	48.1	262.3	321.1	179.9	38.9	97.5	310.3	2.2
3	359.4	206.7	302.0	151.8	205.9	60.2	119.1	338.0	196.9	255.4	108.1	159.9
4	157.0	4.4	99.7	309.6	3.8	218.2	277.1	136.0	354.9	53.3	265.9	317.5
5	314.7	162.0	257.4	107.4	161.6	16.1	75.1	294.1	152.9	211.2	63.7	115.2
6	112.3	319.7	55.1	265.1	319.5	174.0	233.1	92.1	310.9	9.1	221.4	272.9
7	270.0	117.4	212.8	62.9	117.3	331.9	31.2	250.2	108.9	166.9	19.2	70.6
8	67.6	275.1	10.5	220.7	275.2	129.9	189.2	48.2	266.9	324.8	176.9	228.3
9	225.3	72.7	168.2	18.5	73.0	287.8	347.2	206.2	64.9	122.7	334.7	25.9
10	22.9	230.4	326.0	176.3	230.9	85.8	145.2	4.3	222.8	280.6	132.4	183.6
11	180.6	28.1	123.7	334.1	28.7	243.7	303.2	162.3	20.8	78.4	290.2	341.3
12	338.2	185.8	281.4	131.8	186.6	41.6	101.2	320.4	178.8	236.3	87.9	138.9
13	135.9	343.4	79.1	289.6	344.5	199.6	259.2	118.4	336.8	34.1	245.7	296.6
14	293.5	141.1	236.9	87.4	142.3	357.5	57.3	276.4	134.7	192.0	43.4	94.3
15	91.2	298.8	34.6	245.2	300.2	155.5	215.3	74.5	292.7	349.8	201.1	251.9
16	248.8	96.5	192.3	43.0	98.1	313.5	13.3	232.5	90.7	147.7	358.9	49.6
17	46.5	254.2	350.1	200.8	255.9	111.4	171.3	30.6	248.6	305.5	156.6	207.3
18	204.1	51.9	147.8	358.6	53.8	269.4	329.4	188.6	46.6	103.3	314.3	4.9
19	1.8	209.6	305.5	156.4	211.7	67.3	127.4	346.6	204.5	261.2	112.0	162.6
20	159.4	7.3	103.3	314.2	9.6	225.3	285.4	144.7	2.5	59.0	269.7	320.2
21	317.1	164.9	261.0	112.0	167.5	23.3	83.5	302.7	160.4	216.8	67.5	117.9
22	114.7	322.6	58.8	269.8	325.4	181.3	241.5	100.7	318.4	14.6	225.2	275.6
23	272.4	120.3	216.5	67.7	123.2	339.2	39.5	258.7	116.3	172.4	22.9	73.2
24	70.1	278.0	14.2	225.5	281.1	137.2	197.6	56.8	274.2	330.2	180.6	230.9
25	227.7	75.7	172.0	23.3	79.0	295.2	355.6	214.8	72.1	128.0	338.3	28.5
26	25.4	233.4	329.7	181.1	236.9	93.2	153.7	12.8	230.1	285.8	136.0	186.2
27	183.0	31.1	127.5	338.9	34.8	251.2	311.7	170.8	28.0	83.6	293.7	343.8
28	340.7	188.8	285.3	136.8	192.7	49.2	109.7	328.9	185.9	241.4	91.4	141.5
29	138.4		83.0	294.6	350.6	207.1	267.8	126.9	343.8	39.2	249.1	299.1
30	296.0		240.8	92.4	148.6	5.1	65.8	284.9	141.7	197.0	46.8	96.8
31	93.7		38.5		306.5		223.9	82.9		354.8		254.4

## Movimento do Meridiano Central, Sistema I

Minuto	0h o	1h o	2h o	3h o	4h o	5h o	6h o	7h o	8h o	9h o	10h o	11h o
0	0.0	36.6	73.2	109.7	146.3	182.9	219.5	256.1	292.6	329.2	5.8	42.4
10	6.1	42.7	79.3	115.8	152.4	189.0	225.6	262.2	298.7	335.3	11.9	48.5
20	12.2	48.8	85.4	121.9	158.5	195.1	231.7	268.2	304.8	341.4	18.0	54.6
30	18.3	54.9	91.4	128.0	164.6	201.2	237.8	274.3	310.9	347.5	24.1	60.7
40	24.4	61.0	97.5	134.1	170.7	207.3	243.9	280.4	317.0	353.6	30.2	66.8
50	30.5	67.1	103.6	140.2	176.8	213.4	250.0	286.5	323.1	359.7	36.3	72.9
60	36.6	73.2	109.7	146.3	182.9	219.5	256.1	292.6	329.2	5.8	42.4	79.0

## Longitude do Meridiano Central de Júpiter, Sistema II

00:00 Hora – Tempo Universal

	<b>Jan</b>	<b>Fev</b>	<b>Mar</b>	<b>Abr</b>	<b>Mai</b>	<b>Jun</b>	<b>Jul</b>	<b>Ago</b>	<b>Set</b>	<b>Out</b>	<b>Nov</b>	<b>Dez</b>
1	174.7	145.4	26.9	0.1	185.2	162.8	352.6	334.8	317.3	147.1	123.5	306.6
2	324.7	295.4	177.0	150.3	335.4	313.0	142.9	125.2	107.6	297.4	273.7	96.6
3	114.7	85.5	327.1	300.4	125.6	103.3	293.3	275.6	258.0	87.6	63.8	246.7
4	264.7	235.5	117.2	90.5	275.8	253.6	83.7	66.0	48.4	237.9	214.0	36.7
5	54.7	25.5	267.2	240.7	66.0	43.9	234.1	216.5	198.8	28.2	4.1	186.8
6	204.7	175.6	57.3	30.8	216.2	194.2	24.4	6.9	349.1	178.4	154.2	336.8
7	354.7	325.6	207.4	181.0	6.4	344.5	174.8	157.3	139.5	328.7	304.4	126.9
8	144.8	115.7	357.5	331.1	156.7	134.8	325.2	307.7	289.8	118.9	94.5	276.9
9	294.8	265.7	147.6	121.3	306.9	285.1	115.6	98.1	80.2	269.1	244.6	67.0
10	84.8	55.8	297.7	271.4	97.1	75.4	266.0	248.5	230.5	59.4	34.7	217.0
11	234.8	205.8	87.8	61.6	247.3	225.8	56.4	38.9	20.9	209.6	184.9	7.1
12	24.8	355.9	237.9	211.7	37.6	16.1	206.7	189.3	171.2	359.8	335.0	157.1
13	174.9	145.9	27.9	1.9	187.8	166.4	357.1	339.7	321.6	150.1	125.1	307.2
14	324.9	296.0	178.0	152.1	338.0	316.7	147.5	130.2	111.9	300.3	275.2	97.2
15	114.9	86.0	328.1	302.2	128.3	107.0	297.9	280.6	262.3	90.5	65.3	247.2
16	264.9	236.1	118.2	92.4	278.5	257.4	88.3	71.0	52.6	240.7	215.4	37.3
17	54.9	26.1	268.3	242.6	68.8	47.7	238.7	221.4	202.9	30.9	5.5	187.3
18	205.0	176.2	58.5	32.7	219.0	198.0	29.1	11.8	353.2	181.1	155.6	337.3
19	355.0	326.2	208.6	182.9	9.3	348.4	179.5	162.2	143.6	331.3	305.7	127.4
20	145.0	116.3	358.7	333.1	159.5	138.7	329.9	312.6	293.9	121.5	95.8	277.4
21	295.0	266.4	148.8	123.3	309.8	289.0	120.3	103.0	84.2	271.7	245.8	67.4
22	85.1	56.4	298.9	273.4	100.0	79.4	270.7	253.4	234.5	61.9	35.9	217.4
23	235.1	206.5	89.0	63.6	250.3	229.7	61.1	43.8	24.8	212.1	186.0	7.5
24	25.1	356.6	239.1	213.8	40.5	20.1	211.5	194.2	175.1	2.2	336.1	157.5
25	175.1	146.6	29.2	4.0	190.8	170.4	1.9	344.6	325.4	152.4	126.2	307.5
26	325.2	296.7	179.4	154.2	341.1	320.8	152.3	135.0	115.7	302.6	276.2	97.5
27	115.2	86.8	329.5	304.4	131.4	111.1	302.7	285.4	266.0	92.8	66.3	247.5
28	265.2	236.8	119.6	94.6	281.6	261.5	93.2	75.7	56.3	242.9	216.4	37.6
29	55.3		269.7	244.8	71.9	51.9	243.6	226.1	206.6	33.1	6.4	187.6
30	205.3		59.9	35.0	222.2	202.2	34.0	16.5	356.8	183.2	156.5	337.6
31	355.3		210.0		12.5		184.4	166.9		333.4		127.6

## Movimento do Meridiano Central, Sistema II

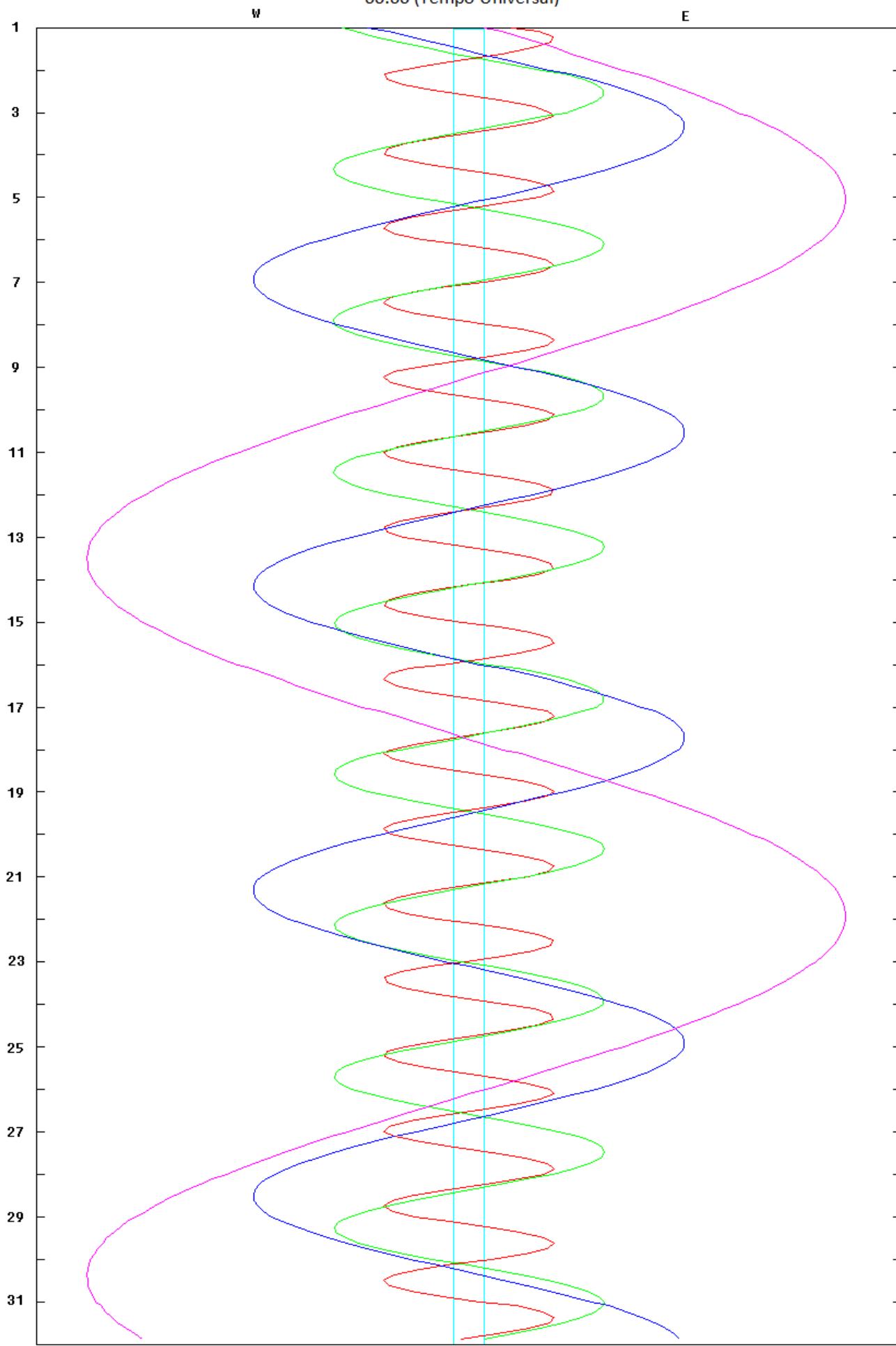
Minuto	0h o	1h o	2h o	3h o	4h o	5h o	6h o	7h o	8h o	9h o	10h o	11h o
0	0.0	36.3	72.5	108.8	145.0	181.3	217.6	253.8	290.1	326.4	2.6	38.9
10	6.0	42.3	78.6	114.8	151.1	187.3	223.6	259.9	296.1	332.4	8.7	44.9
20	12.1	48.3	84.6	120.9	157.1	193.4	229.7	265.9	302.2	338.4	14.7	51.0
30	18.1	54.4	90.7	126.9	163.2	199.4	235.7	272.0	308.2	344.5	20.7	57.0
40	24.2	60.4	96.7	133.0	169.2	205.5	241.7	278.0	314.3	350.5	26.8	63.0
50	30.2	66.5	102.7	139.0	175.3	211.5	247.8	284.0	320.3	356.6	32.8	69.1
60	36.3	72.5	108.8	145.0	181.3	217.6	253.8	290.1	326.4	2.6	38.9	75.1

# Diagrama dos Satélites galileanos

Janeiro 2021

1 = Io (**Vermelho**), 2 = Europa (**Verde**), 3 = Ganimedes (**Azul**), 4 = Callisto (**Rosa**)

00:00 (Tempo Universal)



## Eventos mútuos em Janeiro 2021

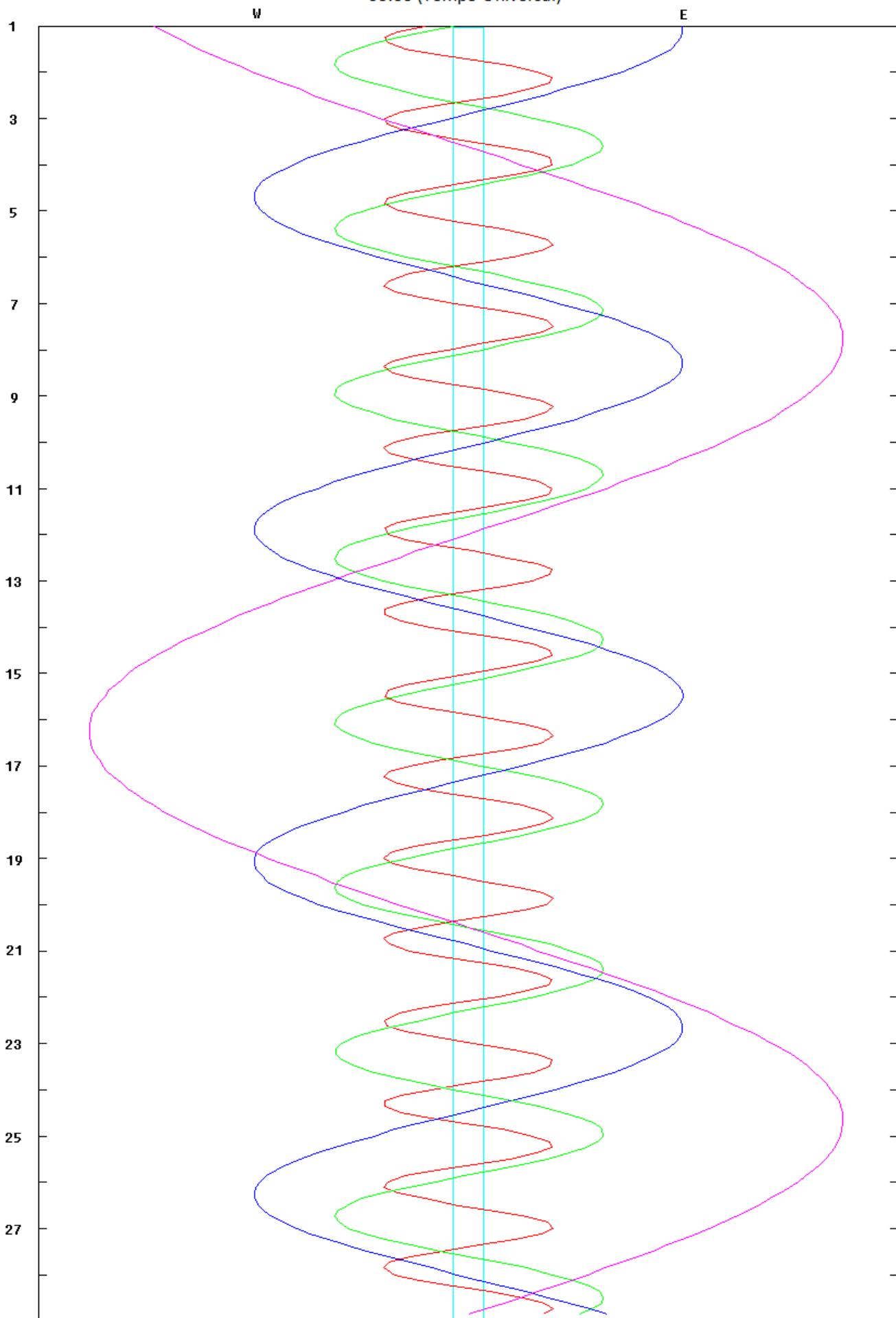
1	1	58.4	4.Oc.D	11	17	20.3	1.Oc.D	21	11	8.5	1.Tr.I	
2	16.6	1.Oc.D		19	57.6	1.Ec.R		11	16.4	1.Sh.I		
5	4.8	1.Ec.R		12	13	31.2	3.Tr.I	11	46.0	2.Tr.I		
11	14.9	4.EC.R		14	12.1	2.Oc.D		12	2.3	2.Sh.I		
18	50.3	3.Oc.D		14	36.4	1.Tr.I		13	26.1	1.Tr.E		
21	58.3	2.Oc.D		14	41.0	3.Sh.I		13	34.1	1.Sh.E		
23	34.0	1.Tr.I		14	53.5	1.Sh.I		14	40.8	2.Tr.E		
2	0	1.8	1.Sh.I	16	53.9	1.Tr.E		14	57.2	2.Sh.E		
	0	19.4	3.EC.R	17	5.3	3.Tr.E		22	8	24.1	1.Oc.D	
1	45.5	2.Ec.R		17	11.1	1.Sh.E		10	50.2	1.Ec.R		
1	51.3	1.Tr.E		17	38.0	2.Ec.R		23	5	38.9	1.Tr.I	
2	19.3	1.Sh.E		18	16.7	3.Sh.E			5	45.0	1.Sh.I	
20	47.2	1.Oc.D		13	11	50.9	1.Oc.D		6	26.3	2.Oc.D	
23	33.6	1.Ec.R		14	26.3	1.Ec.R			7	56.6	1.Tr.E	
3	16	34.0	2.Tr.I	14	8	52.8	2.Tr.I		8	2.7	1.Sh.E	
	17	27.9	2.Sh.I		9	6.8	1.Tr.I		8	20.8	3.Oc.D	
18	4.4	1.Tr.I			9	22.1	1.Sh.I		9	30.2	2.Ec.R	
18	30.5	1.Sh.I			9	24.4	2.Sh.I		12	21.0	3.Ec.R	
19	28.0	2.Tr.E			11	24.3	1.Tr.E		24	2	54.7	1.Oc.D
20	21.7	1.Tr.E			11	39.7	1.Sh.E			5	18.9	1.Ec.R
20	22.4	2.Sh.E			11	47.4	2.Tr.E		25	0	9.4	1.Tr.I
20	47.9	1.Sh.E			12	19.2	2.Sh.E			0	13.6	1.Sh.I
4	15	17.8	1.Oc.D	15	6	21.6	1.Oc.D		1	13.0	2.Tr.I	
	18	2.4	1.Ec.R		8	55.2	1.Ec.R			1	21.7	2.Sh.I
5	9	1.2	3.Tr.I	16	3	36.8	2.Oc.D		2	27.1	1.Tr.E	
10	40.8	3.Sh.I			3	37.2	1.Tr.I			2	31.3	1.Sh.E
11	22.8	2.Oc.D			3	50.0	3.Oc.D			4	8.0	2.Tr.E
12	34.3	3.Tr.E			3	50.7	1.Sh.I			4	16.6	2.Sh.E
12	34.7	1.Tr.I			5	54.8	1.Tr.E			21	25.3	1.Oc.D
12	59.1	1.Sh.I			6	8.3	1.Sh.E			23	47.6	1.Ec.R
14	16.0	3.Sh.E			6	55.4	2.Ec.R		26	7	40.8	4.Tr.I
14	52.1	1.Tr.E			8	20.4	3.Ec.R			8	7.4	4.Sh.I
15	3.0	2.Ec.R		17	0	52.1	1.Oc.D		12	28.5	4.Tr.E	
15	16.6	1.Sh.E			3	23.8	1.Ec.R			12	55.9	4.Sh.E
6	9	48.4	1.Oc.D	22	7.6	1.Tr.I			18	39.8	1.Tr.I	
12	31.2	1.Ec.R		22	19.3	1.Sh.I			18	42.1	1.Sh.I	
7	5	59.9	2.Tr.I	22	19.8	2.Tr.I			19	51.1	2.Oc.D	
	6	46.5	2.Sh.I	22	43.8	2.Sh.I			20	57.5	1.Tr.E	
7	5.1	1.Tr.I		22	49.0	4.Oc.D			20	59.9	1.Sh.E	
7	27.7	1.Sh.I		18	0	25.3	1.Tr.E		22	32.5	3.Tr.I	
8	8	54.1	2.Tr.E		0	37.0	1.Sh.E			22	41.1	3.Sh.I
9	22.6	1.Tr.E			1	14.5	2.Tr.E			22	47.7	2.Ec.R
	9	41.1	2.Sh.E		1	38.7	2.Sh.E		27	2	8.4	3.Tr.E
	9	45.2	1.Sh.E		5	25.0	4.Ec.R			2	17.5	3.Sh.E
8	4	19.1	1.Oc.D	19	22.8	1.Oc.D			15	55.9	1.Oc.D	
	7	0.0	1.Ec.R	21	52.7	1.Ec.R			18	16.3	1.Ec.R	
	23	19.7	3.Oc.D	19	16	38.1	1.Tr.I		28	13	10.2	1.Tr.I
9	0	47.4	2.Oc.D		16	47.9	1.Sh.I			13	10.7	1.Sh.I
	1	35.5	1.Tr.I		17	1.6	2.Oc.D			14	39.2	2.Tr.I
	1	56.3	1.Sh.I		18	2.0	3.Tr.I			14	40.1	2.Sh.I
	3	53.0	1.Tr.E		18	41.4	3.Sh.I			15	27.9	1.Tr.E
	4	13.9	1.Sh.E		18	55.7	1.Tr.E			15	28.4	1.Sh.E
	4	19.8	3.Ec.R		19	5.5	1.Sh.E			17	34.2	2.Tr.E
	4	20.5	2.Ec.R		20	12.8	2.Ec.R			17	35.0	2.Sh.E
10	10	43.8	4.Tr.I		21	37.1	3.Tr.E		29	10	26.2	1.Ec.D
13	58.2	4.Sh.I			22	17.5	3.Sh.E			12	45.6	1.Oc.R
15	26.3	4.Tr.E		20	13	53.4	1.Oc.D		30	7	39.3	1.Sh.I
18	44.8	4.Sh.E			16	21.4	1.Ec.R			7	40.6	1.Tr.I
	22	49.6	1.Oc.D							9	13.0	2.Ec.D
10	1	28.8	1.Ec.R							9	57.0	1.Sh.E
	19	26.8	2.Tr.I							9	58.4	1.Tr.E
20	5.9	2.Sh.I								12	8.0	2.Oc.R
20	6.0	1.Tr.I								12	45.6	3.Ec.D
20	24.9	1.Sh.I								16	28.9	3.Oc.R
22	21.2	2.Tr.E							31	4	54.8	1.Ec.D
22	23.5	1.Tr.E								7	16.1	1.Oc.R
22	42.5	1.Sh.E										
23	0.6	2.Sh.E										

# Diagrama dos Satélites galileanos

Fevereiro 2021

1 = Io (Vermelho), 2 = Europa (Verde), 3 = Ganimedes (Azul), 4 = Callisto (Rosa)

00:00 (Tempo Universal)



## Eventos mútuos em Fevereiro 2021

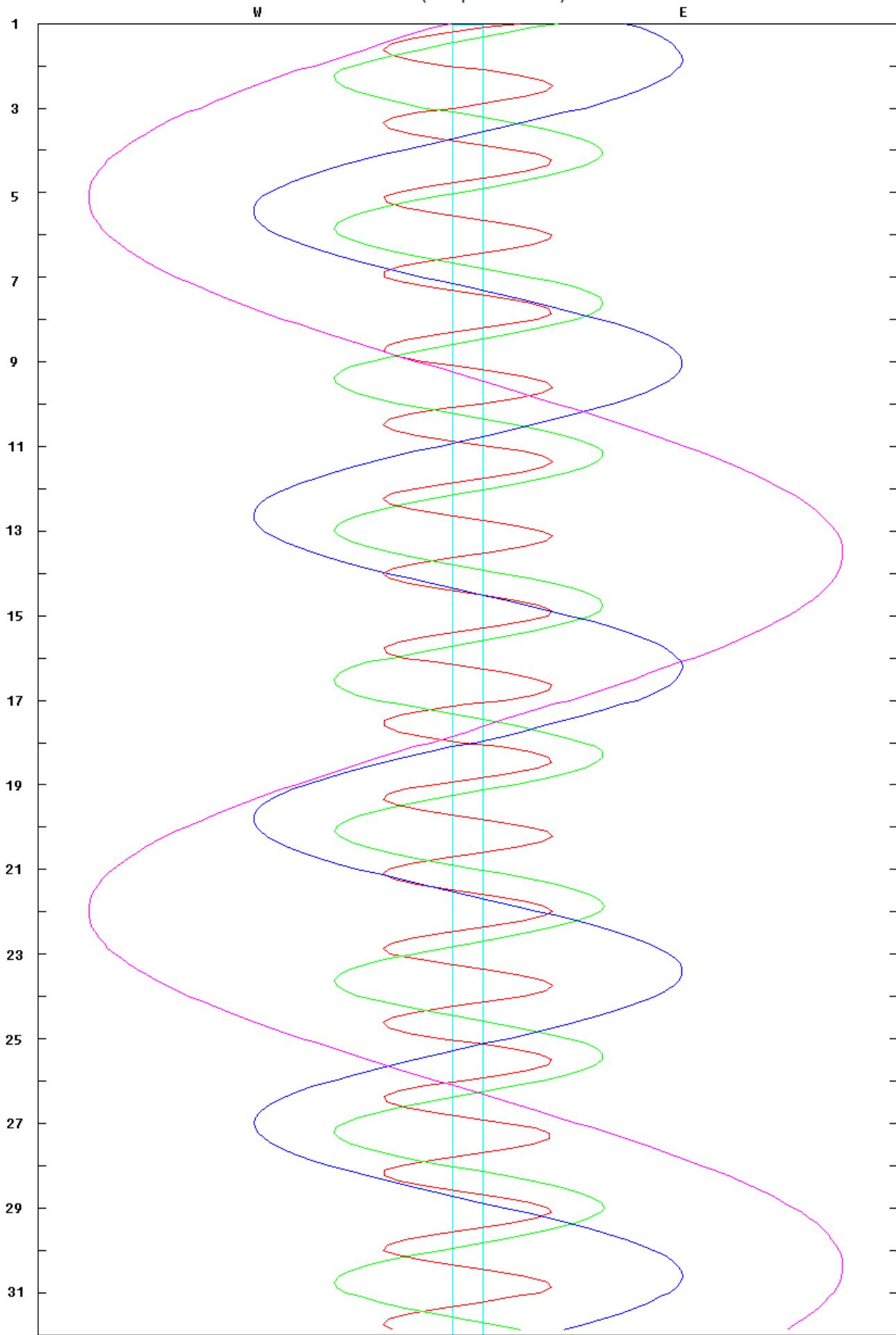
1	2	7.8	1.Sh.I	11	16	59.0	1.Sh.I	21	0	46.2	3.Ec.D
2	11.0	1.Tr.I		17	13.4	1.Tr.I		6	2.3	3.Oc.R	
3	59.4	2.Sh.I		19	16.8	1.Sh.E		10	39.0	1.Ec.D	
4	6.2	2.Tr.I		19	31.2	1.Tr.E		13	22.8	1.Oc.R	
4	25.6	1.Sh.E		19	55.4	2.Sh.I		22	7	50.2	1.Sh.I
4	28.8	1.Tr.E		20	25.2	2.Tr.I		8	15.4	1.Tr.I	
6	54.3	2.Sh.E		22	50.2	2.Sh.E		10	7.9	1.Sh.E	
7	1.3	2.Tr.E		23	20.3	2.Tr.E		10	33.3	1.Tr.E	
23	23.6	1.Ec.D		12	2	16.8	4.Sh.I	11	52.0	2.Sh.I	
2	1	46.8	1.Oc.R		4	40.1	4.Tr.I	12	44.2	2.Tr.I	
20	36.4	1.Sh.I			7	6.6	4.Sh.E	14	46.6	2.Sh.E	
20	41.4	1.Tr.I			9	31.4	4.Tr.E	15	39.1	2.Tr.E	
22	30.3	2.Ec.D			14	15.7	1.Ec.D	23	5	7.7	1.Ec.D
22	54.1	1.Sh.E			16	50.3	1.Oc.R		7	53.3	1.Oc.R
22	59.2	1.Tr.E		13	11	27.6	1.Sh.I	24	2	18.7	1.Sh.I
3	1	32.9	2.Oc.R		11	43.7	1.Tr.I		2	45.6	1.Tr.I
2	40.6	3.Sh.I			13	45.3	1.Sh.E		4	36.4	1.Sh.E
3	2.8	3.Tr.I			14	1.6	1.Tr.E		5	3.5	1.Tr.E
6	17.4	3.Sh.E			14	22.2	2.Ec.D		6	14.1	2.Ec.D
6	39.5	3.Tr.E			17	47.3	2.Oc.R		10	1.3	2.Oc.R
17	52.3	1.Ec.D			20	46.5	3.Ec.D		14	41.0	3.Sh.I
18	45.6	4.Ec.D		14	1	32.1	3.Oc.R		16	33.9	3.Tr.I
20	17.4	1.Oc.R			8	44.4	1.Ec.D		18	18.4	3.Sh.E
4	0	32.7	4.Oc.R		11	20.8	1.Oc.R		20	12.4	3.Tr.E
15	4.9	1.Sh.I		15	5	56.1	1.Sh.I		23	36.3	1.Ec.D
15	11.8	1.Tr.I			6	14.1	1.Tr.I	25	2	23.7	1.Oc.R
17	17.8	2.Sh.I			8	13.9	1.Sh.E		20	47.2	1.Sh.I
17	22.6	1.Sh.E			8	32.0	1.Tr.E		21	15.9	1.Tr.I
17	29.7	1.Tr.E			9	14.5	2.Sh.I		23	4.9	1.Sh.E
17	32.3	2.Tr.I			9	51.9	2.Tr.I		23	33.8	1.Tr.E
20	12.7	2.Sh.E			12	9.3	2.Sh.E	26	1	10.2	2.Sh.I
20	27.5	2.Tr.E			12	47.0	2.Tr.E		2	9.7	2.Tr.I
5	12	21.0	1.Ec.D	16	3	13.1	1.Ec.D		4	4.8	2.Sh.E
14	48.0	1.Oc.R			5	51.4	1.Oc.R		5	4.6	2.Tr.E
6	9	33.4	1.Sh.I	17	0	24.6	1.Sh.I		18	5.0	1.Ec.D
	9	42.2	1.Tr.I		0	44.4	1.Tr.I		20	54.2	1.Oc.R
11	47.6	2.Ec.D			2	42.4	1.Sh.E	27	15	15.7	1.Sh.I
11	51.2	1.Sh.E			3	2.3	1.Tr.E		15	46.1	1.Tr.I
12	0.1	1.Tr.E			3	39.5	2.Ec.D		17	33.4	1.Sh.E
14	57.7	2.Oc.R			7	12.0	2.Oc.R		18	4.0	1.Tr.E
16	45.9	3.Ec.D		10	40.2	3.Sh.I		19	31.4	2.Ec.D	
21	0.6	3.Oc.R			12	3.5	3.Tr.I		23	25.7	2.Oc.R
7	6	49.6	1.Ec.D		14	17.5	3.Sh.E	28	4	45.7	3.Ec.D
9	18.6	1.Oc.R			15	41.5	3.Tr.E		10	31.5	3.Oc.R
8	4	2.0	1.Sh.I		21	41.7	1.Ec.D		12	33.5	1.Ec.D
	4	12.6	1.Tr.I	18	0	21.8	1.Oc.R		15	24.5	1.Oc.R
6	19.7	1.Sh.E			18	53.1	1.Sh.I		20	26.1	4.Sh.I
6	30.5	1.Tr.E			19	14.7	1.Tr.I				
6	37.0	2.Sh.I			21	10.9	1.Sh.E				
6	59.3	2.Tr.I			21	32.6	1.Tr.E				
9	31.9	2.Sh.E			22	32.8	2.Sh.I				
9	54.4	2.Tr.E			23	17.7	2.Tr.I				
9	1	18.4	1.Ec.D	19	1	27.6	2.Sh.E				
	3	49.2	1.Oc.R		2	12.7	2.Tr.E				
22	30.5	1.Sh.I			16	10.4	1.Ec.D				
22	43.0	1.Tr.I			18	52.4	1.Oc.R				
10	0	48.3	1.Sh.E	20	12	53.0	4.Ec.D				
1	0.9	1.Tr.E			13	21.6	1.Sh.I				
1	4.9	2.Ec.D			13	45.1	1.Tr.I				
4	22.5	2.Oc.R			15	39.4	1.Sh.E				
6	40.4	3.Sh.I			16	2.9	1.Tr.E				
7	33.3	3.Tr.I			16	56.8	2.Ec.D				
10	17.4	3.Sh.E			20	36.7	2.Oc.R				
11	10.7	3.Tr.E			21	28.3	4.Oc.R				
19	47.0	1.Ec.D									
22	19.7	1.Oc.R									

# Diagrama dos Satélites galileanos

Março 2021

1 = Io (**Vermelho**), 2 = Europa (**Verde**), 3 = Ganimedes (**Azul**), 4 = Callisto (**Rosa**)

00:00 (Tempo Universal)



## Eventos mútuos em Março 2021

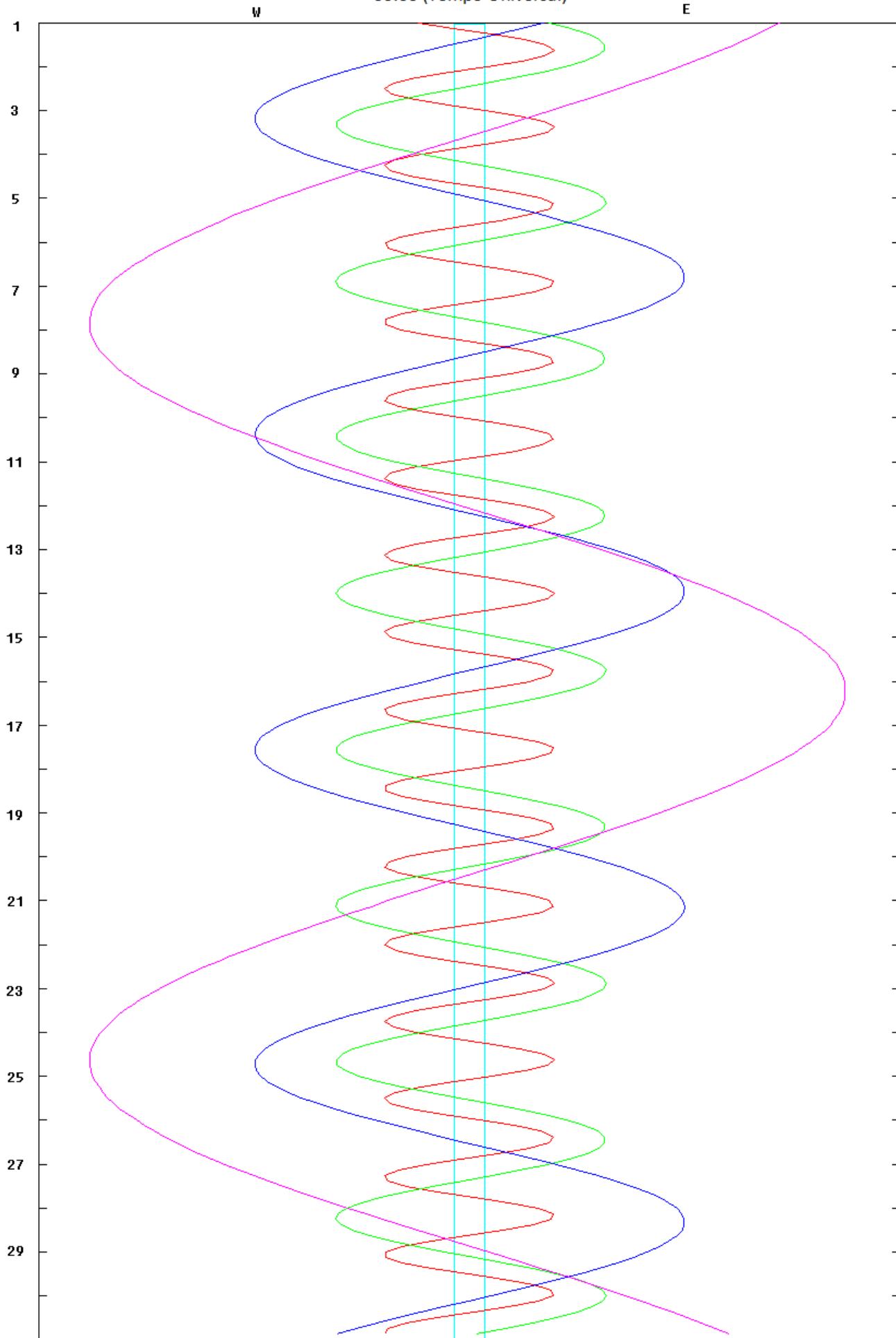
1	1	16.6	4.Sh.E	11	1	30.6	3.Tr.I	21	0	5.3	1.Tr.E
	1	33.8	4.Tr.I		2	18.7	3.Sh.E		3	15.4	2.EC.D
6	26.9	4.Tr.E		3	25.1	1.EC.D		7	50.1	2.OC.R	
9	44.2	1.Sh.I		5	9.5	3.Tr.E		16	45.8	3.EC.D	
10	16.4	1.Tr.I		6	26.4	1.Oc.R		18	16.5	1.EC.D	
12	1.9	1.Sh.E	12	0	35.2	1.Sh.I		21	27.2	1.OC.R	
12	34.3	1.Tr.E		1	17.4	1.Tr.I		23	53.6	3.Oc.R	
14	29.2	2.Sh.I		2	52.8	1.Sh.E	22	15	26.1	1.Sh.I	
15	35.8	2.Tr.I		3	35.2	1.Tr.E	16	17.6	1.Tr.I		
17	23.7	2.Sh.E		6	24.4	2.Sh.I	17	43.6	1.Sh.E		
18	30.5	2.Tr.E		7	51.6	2.Tr.I	18	35.3	1.Tr.E		
2	7	2.2	1.Ec.D		9	18.6	2.Sh.E	22	19.9	2.Sh.I	
	9	54.9	1.Oc.R		10	45.9	2.Tr.E	23	0	5.9	2.Tr.I
3	4	12.7	1.Sh.I	21	53.8	1.Ec.D		1	13.6	2.Sh.E	
	4	46.6	1.Tr.I	13	0	56.6	1.Oc.R	2	59.5	2.Tr.E	
6	30.4	1.Sh.E		19	3.7	1.Sh.I	12	45.1	1.Ec.D		
7	4.5	1.Tr.E		19	47.5	1.Tr.I	15	57.3	1.Oc.R		
8	48.7	2.Ec.D		21	21.2	1.Sh.E	24	9	54.6	1.Sh.I	
12	50.1	2.Oc.R		22	5.3	1.Tr.E	10	47.5	1.Tr.I		
18	41.0	3.Sh.I	14	0	40.7	2.Ec.D	12	12.0	1.Sh.E		
21	2.8	3.Tr.I		5	2.5	2.Oc.R	13	5.2	1.Tr.E		
22	18.5	3.Sh.E		12	45.3	3.Ec.D	16	32.7	2.Ec.D		
4	0	41.5	3.Tr.E		16	22.3	1.Ec.D	21	13.5	2.Oc.R	
	1	30.7	1.Ec.D		19	26.8	1.Oc.R	25	6	40.2	3.Sh.I
4	25.2	1.Oc.R		19	27.2	3.Oc.R		7	13.6	1.Ec.D	
22	41.2	1.Sh.I	15	13	32.2	1.Sh.I	10	17.7	3.Sh.E		
23	16.8	1.Tr.I		14	17.6	1.Tr.I	10	20.8	3.Tr.I		
5	0	58.9	1.Sh.E		15	49.7	1.Sh.E	10	27.3	1.Oc.R	
	1	34.7	1.Tr.E		16	35.4	1.Tr.E	13	59.7	3.Tr.E	
3	47.4	2.Sh.I		19	43.2	2.Sh.I	26	1	8.2	4.Ec.D	
5	1.0	2.Tr.I		21	16.8	2.Tr.I		4	23.0	1.Sh.I	
6	41.8	2.Sh.E		22	37.2	2.Sh.E		5	17.4	1.Tr.I	
7	55.6	2.Tr.E	16	0	10.9	2.Tr.E		5	59.0	4.Ec.R	
19	59.4	1.Ec.D		10	50.9	1.Ec.D		6	40.5	1.Sh.E	
22	55.6	1.Oc.R		13	57.0	1.Oc.R		7	35.1	1.Tr.E	
6	17	9.7	1.Sh.I	17	8	0.6	1.Sh.I		9	48.6	4.Oc.D
	17	47.0	1.Tr.I		8	47.6	1.Tr.I	11	37.9	2.Sh.I	
19	27.3	1.Sh.E		10	18.2	1.Sh.E	13	29.8	2.Tr.I		
20	4.8	1.Tr.E		11	5.4	1.Tr.E	14	31.5	2.Sh.E		
22	6.0	2.Ec.D		13	58.0	2.Ec.D	14	40.2	4.Oc.R		
7	2	14.4	2.Oc.R	14	35.7	4.Sh.I	16	23.2	2.Tr.E		
	8	45.5	3.Ec.D	18	26.4	2.Oc.R	27	1	42.2	1.Ec.D	
14	27.9	1.Ec.D		19	26.2	4.Sh.E		4	57.3	1.Oc.R	
15	0.0	3.Oc.R		22	15.1	4.Tr.I	22	51.5	1.Sh.I		
17	25.8	1.Oc.R	18	2	40.7	3.Sh.I	23	47.3	1.Tr.I		
8	11	38.2	1.Sh.I		3	8.0	4.Tr.E	28	1	8.9	1.Sh.E
12	17.2	1.Tr.I		5	19.4	1.Ec.D		2	4.9	1.Tr.E	
13	55.8	1.Sh.E		5	56.5	3.Tr.I		5	50.1	2.Ec.D	
14	35.0	1.Tr.E		6	18.3	3.Sh.E		10	36.9	2.Oc.R	
17	6.3	2.Sh.I		8	27.1	1.Oc.R		20	10.7	1.Ec.D	
18	26.8	2.Tr.I		9	35.4	3.Tr.E		20	45.7	3.Ec.D	
20	0.5	2.Sh.E	19	2	29.1	1.Sh.I		23	27.2	1.Oc.R	
	21	21.2	2.Tr.E		3	17.6	1.Tr.I	29	0	24.2	3.Ec.R
9	7	0.9	4.Ec.D		4	46.7	1.Sh.E		0	37.7	3.Oc.D
	8	56.6	1.Ec.D		5	35.4	1.Tr.E		4	17.4	3.Oc.R
11	51.2	4.Ec.R		9	1.3	2.Sh.I		17	20.0	1.Sh.I	
11	56.1	1.Oc.R		10	41.2	2.Tr.I		18	17.2	1.Tr.I	
13	21.0	4.Oc.D		11	55.1	2.Sh.E		19	37.4	1.Sh.E	
18	13.4	4.Oc.R		13	35.1	2.Tr.E		20	34.8	1.Tr.E	
10	6	6.7	1.Sh.I	23	48.0	1.Ec.D	30	0	56.5	2.Sh.I	
	6	47.3	1.Tr.I	20	2	57.2	1.Oc.R		2	53.9	2.Tr.I
8	24.3	1.Sh.E		20	57.6	1.Sh.I		3	49.9	2.Sh.E	
9	5.1	1.Tr.E		21	47.6	1.Tr.I		5	47.1	2.Tr.E	
11	23.3	2.Ec.D		23	15.1	1.Sh.E		14	39.3	1.Ec.D	
15	38.5	2.Oc.R						17	57.1	1.Oc.R	
22	41.2	3.Sh.I					31	11	48.5	1.Sh.I	
								12	47.0	1.Tr.I	
								14	5.9	1.Sh.E	
								15	4.6	1.Tr.E	
								19	7.5	2.Ec.D	
								23	59.9	2.Oc.R	

# Diagrama dos Satélites galileanos

Abril 2021

1 = Io (**Vermelho**), 2 = Europa (**Verde**), 3 = Ganimedes (**Azul**), 4 = Callisto (**Rosa**)

00:00 (Tempo Universal)



## Eventos mútuos em Abril 2021

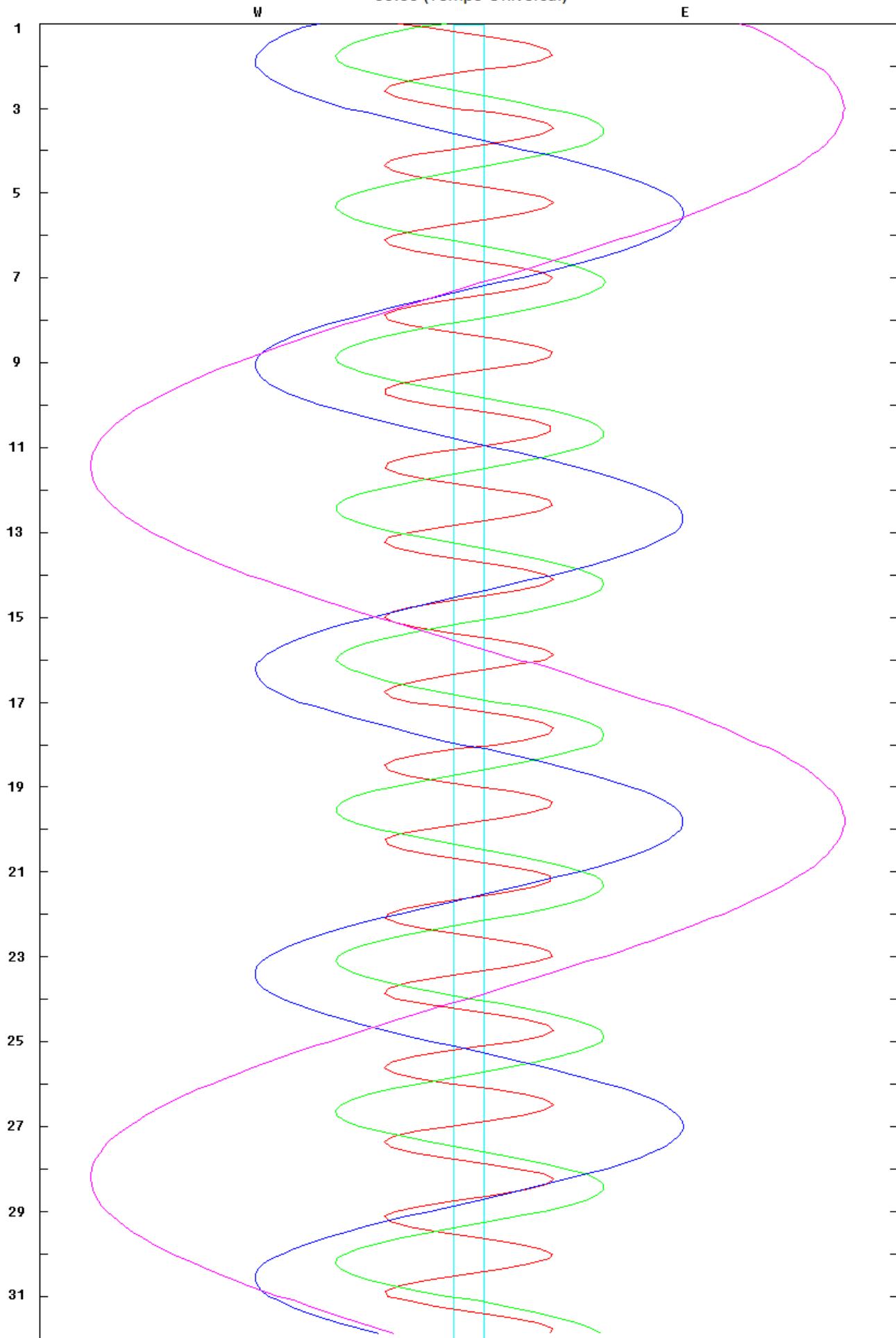
1	9	7.8	1.Ec.D	11	2	39.2	1.Sh.I	21	17	30.0	1.Sh.I
	10	39.9	3.Sh.I		3	45.2	1.Tr.I		18	42.2	1.Tr.I
	12	26.9	1.Oc.R		4	56.5	1.Sh.E		19	47.2	1.Sh.E
	14	17.5	3.Sh.E		6	2.7	1.Tr.E		20	59.5	1.Tr.E
	14	43.6	3.Tr.I		10	59.9	2.Ec.D	22	2	52.4	2.Ec.D
	18	22.4	3.Tr.E		16	8.0	2.Oc.R		8	13.3	2.Oc.R
2	6	16.9	1.Sh.I		19	15.7	4.Ec.D		14	49.6	1.Ec.D
	7	16.8	1.Tr.I		23	58.8	1.Ec.D		18	22.0	1.Oc.R
	8	34.3	1.Sh.E	12	0	6.3	4.Ec.R		22	40.3	3.Sh.I
	9	34.4	1.Tr.E		3	25.2	1.Oc.R	23	2	17.7	3.Sh.E
	14	14.4	2.Sh.I		4	44.9	3.Ec.D		3	39.5	3.Tr.I
	16	17.2	2.Tr.I		5	52.6	4.Oc.D		7	17.3	3.Tr.E
	17	7.6	2.Sh.E		8	23.7	3.Ec.R		11	58.5	1.Sh.I
	19	10.1	2.Tr.E		9	18.5	3.Oc.D		13	11.5	1.Tr.I
3	3	36.3	1.Ec.D		10	41.7	4.Oc.R		14	15.7	1.Sh.E
	6	56.8	1.Oc.R		12	58.0	3.Oc.R		15	28.8	1.Tr.E
	8	45.7	4.Sh.I		21	7.8	1.Sh.I		22	2.6	2.Sh.I
	13	35.9	4.Sh.E		22	14.9	1.Tr.I	24	0	31.2	2.Tr.I
	18	36.9	4.Tr.I		23	25.0	1.Sh.E		0	54.8	2.Sh.E
	23	27.4	4.Tr.E	13	0	32.3	1.Tr.E		3	22.5	2.Tr.E
4	0	45.4	1.Sh.I		6	9.0	2.Sh.I		9	18.1	1.Ec.D
	1	46.5	1.Tr.I		8	26.1	2.Tr.I		12	51.3	1.Oc.R
	3	2.7	1.Sh.E		9	1.7	2.Sh.E	25	6	26.9	1.Sh.I
	4	4.1	1.Tr.E		11	18.1	2.Tr.E		7	40.8	1.Tr.I
	8	25.0	2.Ec.D		18	27.3	1.Ec.D		8	44.1	1.Sh.E
	13	22.9	2.Oc.R		21	54.8	1.Oc.R		9	58.1	1.Tr.E
	22	4.8	1.Ec.D	14	15	36.2	1.Sh.I		16	10.1	2.Ec.D
5	0	45.7	3.Ec.D		16	44.4	1.Tr.I		21	34.7	2.Oc.R
	1	26.5	1.Oc.R		17	53.4	1.Sh.E	26	3	46.5	1.Ec.D
	4	24.3	3.Ec.R		19	1.8	1.Tr.E		7	20.5	1.Oc.R
	4	59.5	3.Oc.D	15	0	17.3	2.Ec.D		12	43.5	3.Ec.D
	8	39.2	3.Oc.R		5	29.9	2.Oc.R		16	22.5	3.Ec.R
	19	13.9	1.Sh.I		12	55.7	1.Ec.D		17	49.0	3.Oc.D
	20	16.3	1.Tr.I		16	24.3	1.Oc.R		21	28.1	3.Oc.R
	21	31.2	1.Sh.E		18	40.4	3.Sh.I	27	0	55.4	1.Sh.I
	22	33.8	1.Tr.E		22	17.9	3.Sh.E		2	10.1	1.Tr.I
6	3	32.8	2.Sh.I		23	23.7	3.Tr.I		3	12.6	1.Sh.E
	5	40.7	2.Tr.I	16	3	1.8	3.Tr.E		4	27.3	1.Tr.E
	6	25.9	2.Sh.E		10	4.7	1.Sh.I		11	20.6	2.Sh.I
	8	33.3	2.Tr.E		11	13.9	1.Tr.I		13	52.3	2.Tr.I
	16	33.3	1.Ec.D		12	21.9	1.Sh.E		14	12.6	2.Sh.E
	19	56.3	1.Oc.R		13	31.3	1.Tr.E		16	43.3	2.Tr.E
7	13	42.3	1.Sh.I		19	26.8	2.Sh.I		22	15.0	1.Ec.D
	14	46.0	1.Tr.I		21	48.1	2.Tr.I	28	1	49.7	1.Oc.R
	15	59.7	1.Sh.E		22	19.3	2.Sh.E		13	23.5	4.Ec.D
	17	3.5	1.Tr.E	17	0	39.9	2.Tr.E		18	13.9	4.Ec.R
	21	42.4	2.Ec.D		7	24.3	1.Ec.D		19	23.8	1.Sh.I
8	2	45.4	2.Oc.R		10	53.8	1.Oc.R		20	39.3	1.Tr.I
	11	1.8	1.Ec.D	18	4	33.1	1.Sh.I		21	41.0	1.Sh.E
	14	25.9	1.Oc.R		5	43.3	1.Tr.I		22	56.5	1.Tr.E
	14	39.7	3.Sh.I		6	50.3	1.Sh.E	29	1	25.5	4.Oc.D
	18	17.2	3.Sh.E		8	0.7	1.Tr.E		5	27.6	2.Ec.D
	19	4.4	3.Tr.I		13	34.9	2.Ec.D		6	10.5	4.Oc.R
	22	42.9	3.Tr.E		18	51.9	2.Oc.R		10	55.3	2.Oc.R
9	8	10.8	1.Sh.I	19	1	52.7	1.Ec.D		16	43.4	1.Ec.D
	9	15.6	1.Tr.I		5	23.2	1.Oc.R		20	18.8	1.Oc.R
	10	28.1	1.Sh.E		8	44.0	3.Ec.D	30	2	40.4	3.Sh.I
	11	33.1	1.Tr.E		12	22.9	3.Ec.R		6	17.7	3.Sh.E
	16	50.7	2.Sh.I		13	34.9	3.Oc.D		7	52.5	3.Tr.I
	19	3.3	2.Tr.I		17	14.3	3.Oc.R		11	29.7	3.Tr.E
	19	43.6	2.Sh.E		23	1.6	1.Sh.I		13	52.3	1.Sh.I
	21	55.7	2.Tr.E	20	0	12.8	1.Tr.I		15	8.5	1.Tr.I
10	5	30.3	1.Ec.D		1	18.8	1.Sh.E		16	9.5	1.Sh.E
	8	55.6	1.Oc.R		2	30.1	1.Tr.E		17	25.7	1.Tr.E
					2	55.4	4.Sh.I				
					7	44.8	4.Sh.E				
					8	44.9	2.Sh.I				
					11	10.0	2.Tr.I				
					11	37.2	2.Sh.E				
					14	1.5	2.Tr.E				
					14	30.4	4.Tr.I				
					19	17.0	4.Tr.E				
					20	21.2	1.Ec.D				
					23	52.6	1.Oc.R				

# Diagrama dos Satélites galileanos

Maio 2021

1 = Io (Vermelho), 2 = Europa (Verde), 3 = Ganimedes (Azul), 4 = Callisto (Rosa)

00:00 (Tempo Universal)



## Eventos mútuos em Maio 2021

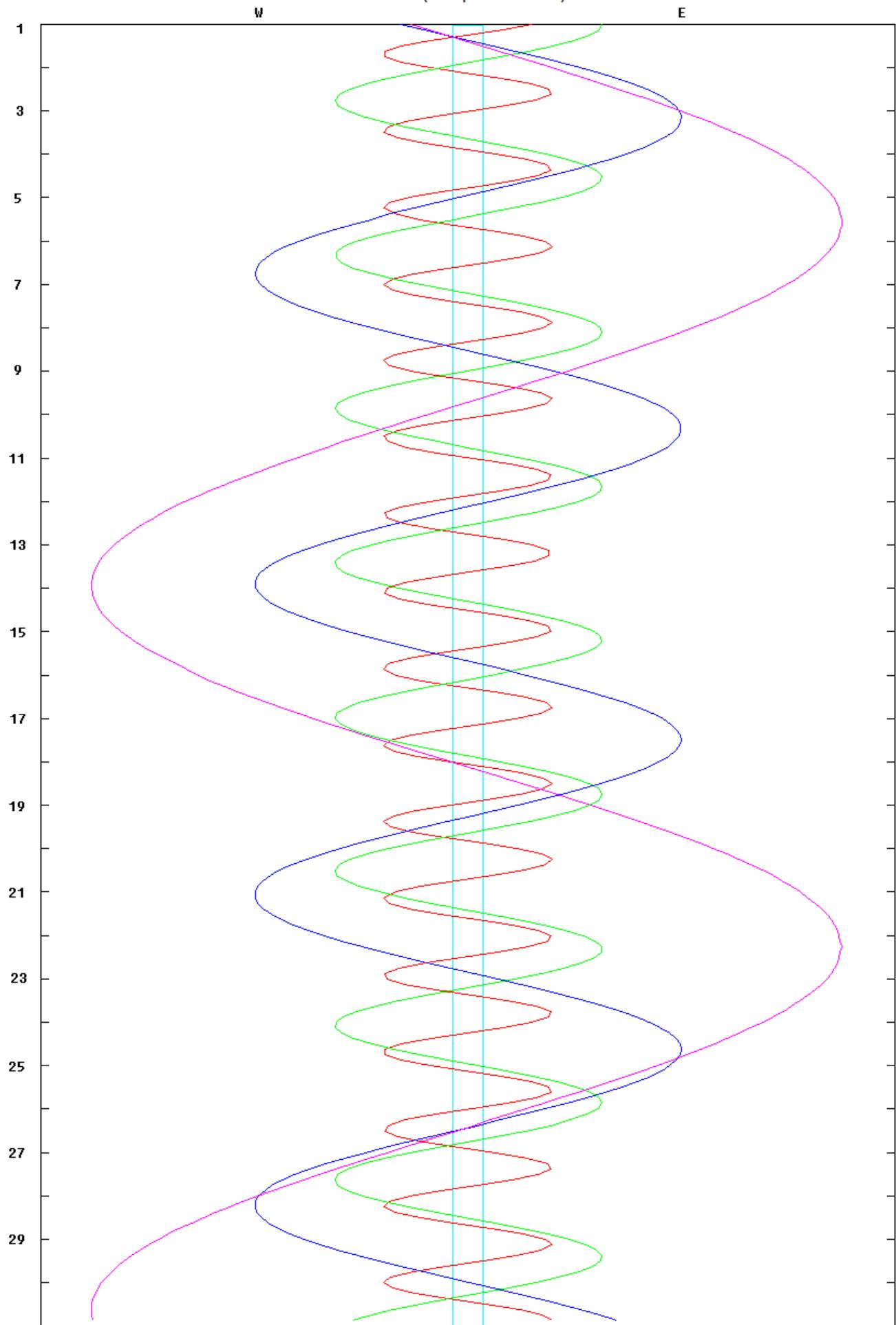
1	0	38.3	2.Sh.I	11	0	22.4	3.Ec.R	21	2	4.2	1.Oc.R	
	3	12.8	2.Tr.I		2	8.5	3.Oc.D		14	38.9	3.Sh.I	
	3	30.2	2.Sh.E		4	43.0	1.Sh.I		18	16.1	3.Sh.E	
	6	3.5	2.Tr.E		5	46.9	3.Oc.R		19	33.7	1.Sh.I	
	11	11.9	1.Ec.D		6	2.4	1.Tr.I		20	10.1	3.Tr.I	
	14	48.0	1.Oc.R		7	0.1	1.Sh.E		20	54.4	1.Tr.I	
2	8	20.7	1.Sh.I		8	19.5	1.Tr.E		21	50.9	1.Sh.E	
	9	37.5	1.Tr.I		16	31.4	2.Sh.I		23	11.5	1.Tr.E	
	10	37.9	1.Sh.E		19	11.7	2.Tr.I		23	45.8	3.Tr.E	
	11	54.7	1.Tr.E		19	22.8	2.Sh.E	22	8	23.9	2.Sh.I	
	18	45.3	2.Ec.D		22	1.6	2.Tr.E		11	6.1	2.Tr.I	
3	0	16.1	2.Oc.R	12	2	2.5	1.Ec.D		11	15.0	2.Sh.E	
	5	40.3	1.Ec.D		5	41.3	1.Oc.R		13	55.4	2.Tr.E	
	9	17.0	1.Oc.R		23	11.4	1.Sh.I		16	53.0	1.Ec.D	
	16	43.0	3.Ec.D	13	0	31.2	1.Tr.I		20	32.7	1.Oc.R	
	20	22.1	3.Ec.R		1	28.6	1.Sh.E	23	14	2.1	1.Sh.I	
	22	0.1	3.Oc.D		2	48.3	1.Tr.E		15	15.3	4.Sh.I	
4	1	38.8	3.Oc.R		10	38.3	2.Ec.D		15	22.9	1.Tr.I	
	2	49.2	1.Sh.I		16	15.1	2.Oc.R		16	19.3	1.Sh.E	
	4	6.6	1.Tr.I		20	30.9	1.Ec.D		17	39.9	1.Tr.E	
	5	6.3	1.Sh.E	14	0	10.0	1.Oc.R		20	2.8	4.Sh.E	
	6	23.8	1.Tr.E		10	39.2	3.Sh.I	24	2	32.1	2.Ec.D	
	13	56.1	2.Sh.I		14	16.4	3.Sh.E		4	21.0	4.Tr.I	
	16	32.9	2.Tr.I		16	7.6	3.Tr.I		8	10.8	2.Oc.R	
	16	47.8	2.Sh.E		17	39.9	1.Sh.I		8	56.5	4.Tr.E	
	19	23.3	2.Tr.E		19	0.0	1.Tr.I		11	21.4	1.Ec.D	
5	0	8.8	1.Ec.D		19	43.8	3.Tr.E		15	1.0	1.Oc.R	
	3	46.0	1.Oc.R		19	57.0	1.Sh.E	25	4	42.7	3.Ec.D	
	21	17.6	1.Sh.I		21	17.0	1.Tr.E		8	21.8	3.Ec.R	
	22	35.6	1.Tr.I	15	5	48.9	2.Sh.I		8	30.6	1.Sh.I	
	23	34.8	1.Sh.E		7	31.3	4.Ec.D		9	51.3	1.Tr.I	
6	0	52.8	1.Tr.E		8	30.3	2.Tr.I		10	12.9	3.Oc.D	
	8	2.9	2.Ec.D		8	40.2	2.Sh.E		10	47.8	1.Sh.E	
	13	36.0	2.Oc.R		11	20.0	2.Tr.E		12	8.4	1.Tr.E	
	18	37.2	1.Ec.D		12	20.8	4.Ec.R		13	50.3	3.Oc.R	
	21	5.3	4.Sh.I		14	59.3	1.Ec.D		21	41.4	2.Sh.I	
	22	14.9	1.Oc.R		18	38.7	1.Oc.R	26	0	23.3	2.Tr.I	
7	1	53.8	4.Sh.E		20	18.3	4.Oc.D		0	32.4	2.Sh.E	
	6	39.8	3.Sh.I		16	0	58.0	4.Oc.R		3	12.3	2.Tr.E
	9	48.2	4.Tr.I		12	8.3	1.Sh.I		5	49.8	1.Ec.D	
	10	17.0	3.Sh.E		13	28.6	1.Tr.I		9	29.3	1.Oc.R	
	12	1.8	3.Tr.I		14	25.4	1.Sh.E	27	2	59.0	1.Sh.I	
	14	29.6	4.Tr.E		15	45.7	1.Tr.E		4	19.6	1.Tr.I	
	15	38.5	3.Tr.E		23	56.3	2.Ec.D		5	16.2	1.Sh.E	
	15	46.1	1.Sh.I	17	5	34.3	2.Oc.R		6	36.7	1.Tr.E	
	17	4.6	1.Tr.I		9	27.7	1.Ec.D		15	49.7	2.Ec.D	
	18	3.2	1.Sh.E		13	7.3	1.Oc.R		21	28.0	2.Oc.R	
	19	21.8	1.Tr.E	18	0	42.9	3.Ec.D	28	0	18.2	1.Ec.D	
8	3	13.7	2.Sh.I		4	22.1	3.Ec.R		3	57.4	1.Oc.R	
	5	52.5	2.Tr.I		6	12.6	3.Oc.D		18	38.6	3.Sh.I	
	6	5.3	2.Sh.E		6	36.8	1.Sh.I		21	27.5	1.Sh.I	
	8	42.7	2.Tr.E		7	57.3	1.Tr.I		22	15.9	3.Sh.E	
	13	5.6	1.Ec.D		8	54.0	1.Sh.E		22	48.0	1.Tr.I	
	16	43.8	1.Oc.R		9	50.5	3.Oc.R		23	44.7	1.Sh.E	
9	10	14.5	1.Sh.I		10	14.4	1.Tr.E	29	0	8.5	3.Tr.I	
	11	33.5	1.Tr.I		19	6.5	2.Sh.I		1	5.0	1.Tr.E	
	12	31.6	1.Sh.E		21	48.5	2.Tr.I		3	43.8	3.Tr.E	
	13	50.6	1.Tr.E		21	57.7	2.Sh.E		10	58.7	2.Sh.I	
	21	20.8	2.Ec.D	19	0	38.0	2.Tr.E		13	39.8	2.Tr.I	
10	2	56.0	2.Oc.R		3	56.1	1.Ec.D		13	49.6	2.Sh.E	
	7	34.0	1.Ec.D		7	35.8	1.Oc.R		16	28.7	2.Tr.E	
	11	12.6	1.Oc.R	20	1	5.2	1.Sh.I		18	46.6	1.Ec.D	
	20	43.3	3.Ec.D		2	25.9	1.Tr.I		22	25.6	1.Oc.R	
					3	22.4	1.Sh.E	30	15	55.9	1.Sh.I	
					4	42.9	1.Tr.E		17	16.1	1.Tr.I	
					13	13.9	2.Ec.D		18	13.2	1.Sh.E	
					18	52.5	2.Oc.R		19	33.2	1.Tr.E	
					22	24.5	1.Ec.D	31	5	7.9	2.Ec.D	
									10	45.4	2.Oc.R	
									13	15.0	1.Ec.D	
									16	53.7	1.Oc.R	

# Diagrama dos Satélites galileanos

Junho 2021

1 = Io (**Vermelho**), 2 = Europa (**Verde**), 3 = Ganimedes (**Azul**), 4 = Callisto (**Rosa**)

00:00 (Tempo Universal)



## Eventos mútuos em Junho 2021

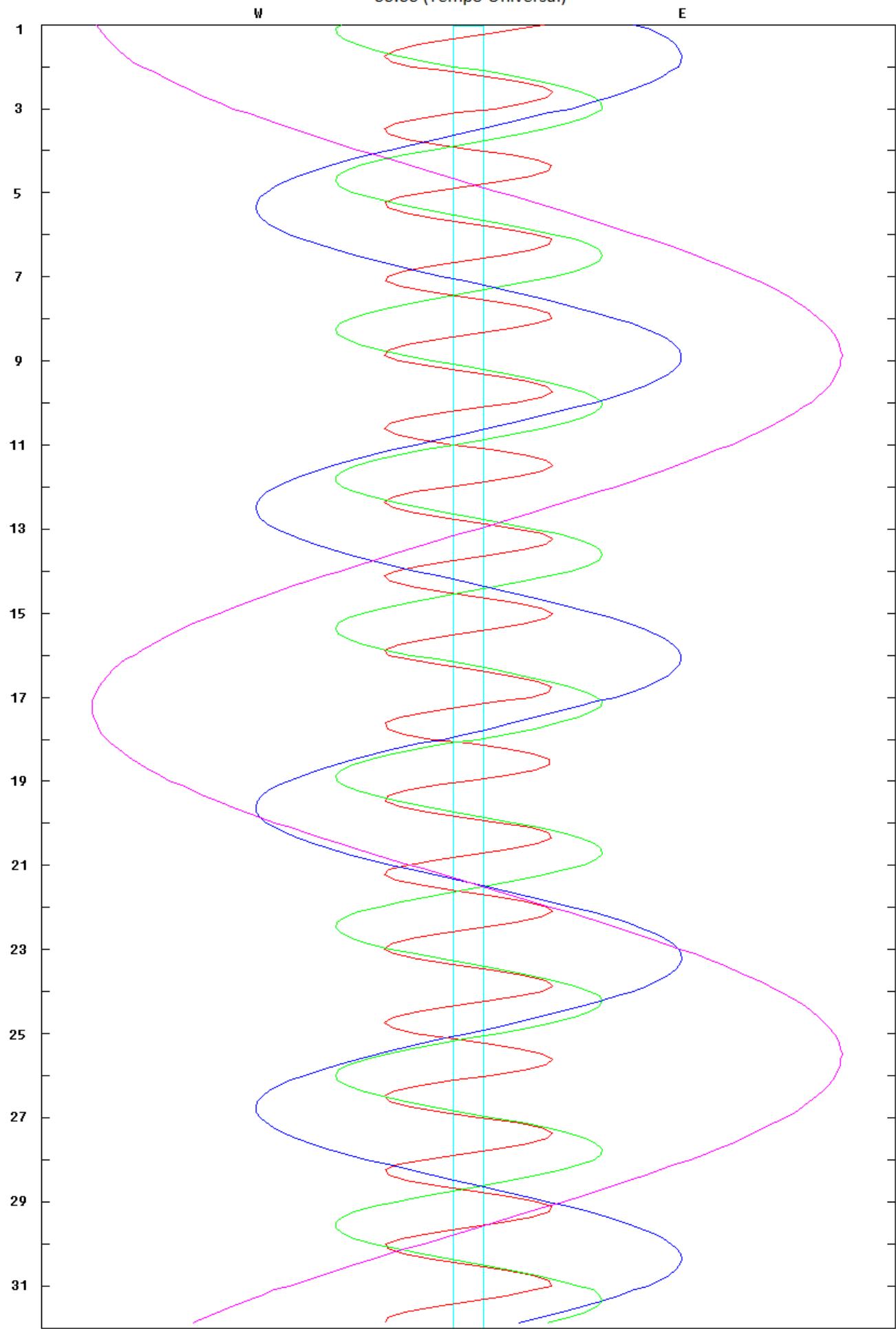
1	1	39.2	4.Ec.D	11	2	33.1	2.Oc.R	21	1	7.0	1.Tr.E
6	27.6	4.Ec.R		4	5.4	1.Ec.D		12	56.6	2.Ec.D	
8	41.9	3.Ec.D		7	40.7	1.Oc.R		18	16.8	2.Oc.R	
10	24.4	1.Sh.I		12	1	15.2	1.Sh.I	18	55.8	1.Ec.D	
11	44.3	1.Tr.I		2	32.0	1.Tr.I		22	25.4	1.Oc.R	
12	21.0	3.Ec.R		2	39.1	3.Sh.I		22	16	6.0	
12	41.7	1.Sh.E		3	32.6	1.Sh.E		17	17.2	1.Tr.I	
14	1.4	1.Tr.E		4	49.1	1.Tr.E		18	23.7	1.Sh.E	
14	8.5	3.Oc.D		6	16.5	3.Sh.E		19	34.5	1.Tr.E	
14	23.1	4.Oc.D		7	53.3	3.Tr.I		20	40.2	3.Ec.D	
17	45.3	3.Oc.R		11	27.8	3.Tr.E		23	0	19.2	
18	57.2	4.Oc.R		16	7.9	2.Sh.I		1	29.4	3.Oc.D	
2	0	16.1	2.Sh.I	18	40.6	2.Tr.I		5	4.9	3.Oc.R	
2	55.9	2.Tr.I		18	58.5	2.Sh.E		7	59.4	2.Sh.I	
3	6.9	2.Sh.E		21	28.9	2.Tr.E		10	20.1	2.Tr.I	
5	44.5	2.Tr.E		22	33.8	1.Ec.D		10	49.9	2.Sh.E	
7	43.4	1.Ec.D		13	2	8.4	1.Oc.R	13	8.1	2.Tr.E	
11	21.7	1.Oc.R		19	43.6	1.Sh.I		13	24.3	1.Ec.D	
3	4	52.9	1.Sh.I	20	59.6	1.Tr.I		16	52.6	1.Oc.R	
6	12.4	1.Tr.I		22	1.1	1.Sh.E		24	10	34.5	
7	10.1	1.Sh.E		23	16.8	1.Tr.E		11	44.5	1.Tr.I	
8	29.5	1.Tr.E		14	10	20.2	2.Ec.D	12	52.2	1.Sh.E	
18	25.7	2.Ec.D		15	48.5	2.Oc.R		14	1.8	1.Tr.E	
4	0	1.6	2.Oc.R	17	2.2	1.Ec.D		25	2	14.5	
2	11.8	1.Ec.D		20	35.9	1.Oc.R		7	29.7	2.Oc.R	
5	49.6	1.Oc.R		15	14	12.1	1.Sh.I	7	52.6	1.Ec.D	
22	39.2	3.Sh.I		15	27.3	1.Tr.I		11	19.7	1.Oc.R	
23	21.4	1.Sh.I		16	29.6	1.Sh.E		26	3	35.3	
5	0	40.5	1.Tr.I	16	40.5	3.Ec.D		5	3.0	1.Sh.I	
1	38.7	1.Sh.E		17	44.5	1.Tr.E		6	11.7	1.Tr.I	
2	16.6	3.Sh.E		20	19.6	3.Ec.R		7	20.8	1.Sh.E	
2	57.6	1.Tr.E		21	46.9	3.Oc.D		8	20.7	4.Sh.E	
4	3.6	3.Tr.I		16	1	22.8	3.Oc.R	8	29.1	1.Tr.E	
7	38.4	3.Tr.E		5	25.1	2.Sh.I		10	38.5	3.Sh.I	
13	33.4	2.Sh.I		7	54.3	2.Tr.I		14	16.3	3.Sh.E	
16	11.4	2.Tr.I		8	15.7	2.Sh.E		14	41.8	4.Tr.I	
16	24.1	2.Sh.E		10	42.5	2.Tr.E		15	18.4	3.Tr.I	
18	59.9	2.Tr.E		11	30.6	1.Ec.D		18	52.4	3.Tr.E	
20	40.2	1.Ec.D		15	3.4	1.Oc.R		19	6.6	4.Tr.E	
6	0	17.5	1.Oc.R	17	8	40.6	1.Sh.I	21	16.6	2.Sh.I	
17	49.8	1.Sh.I		9	54.8	1.Tr.I		23	32.2	2.Tr.I	
19	8.4	1.Tr.I		10	58.1	1.Sh.E		27	0	7.1	
20	7.1	1.Sh.E		12	12.0	1.Tr.E		2	20.1	2.Tr.E	
21	25.5	1.Tr.E		19	48.1	4.Ec.D		2	21.1	1.Ec.D	
7	7	44.0	2.Ec.D	23	38.0	2.Ec.D		5	46.8	1.Oc.R	
13	18.0	2.Oc.R		18	0	35.0	4.Ec.R	23	31.5	1.Sh.I	
15	8.6	1.Ec.D		5	2.5	2.Oc.R		28	0	38.8	
18	45.3	1.Oc.R		5	59.0	1.Ec.D		1	49.3	1.Sh.E	
8	12	18.3	1.Sh.I	7	33.0	4.Oc.D		2	56.2	1.Tr.E	
12	41.0	3.Ec.D		9	30.8	1.Oc.R		15	33.2	2.Ec.D	
13	36.4	1.Tr.I		12	1.4	4.Oc.R		20	42.9	2.Oc.R	
14	35.6	1.Sh.E		19	3	9.1	1.Sh.I	20	49.5	1.Ec.D	
15	53.4	1.Tr.E		4	22.4	1.Tr.I		29	0	13.8	
16	20.0	3.Ec.R		5	26.7	1.Sh.E		18	0.0	1.Sh.I	
17	59.7	3.Oc.D		6	39.0	3.Sh.I		19	6.0	1.Tr.I	
21	36.0	3.Oc.R		6	39.6	1.Tr.E		20	17.9	1.Sh.E	
9	2	50.7	2.Sh.I	10	16.6	3.Sh.E		21	23.4	1.Tr.E	
5	26.3	2.Tr.I		11	38.4	3.Tr.I		30	0	40.7	
5	41.3	2.Sh.E		15	12.6	3.Tr.E		4	19.6	3.Ec.R	
8	14.6	2.Tr.E		18	42.3	2.Sh.I		5	8.0	3.Oc.D	
9	25.1	4.Sh.I		21	7.6	2.Tr.I		8	43.1	3.Oc.R	
9	37.0	1.Ec.D		21	32.8	2.Sh.E		10	33.6	2.Sh.I	
13	13.1	1.Oc.R		23	55.6	2.Tr.E		12	43.6	2.Tr.I	
14	11.6	4.Sh.E		20	0	27.4	1.Ec.D	13	24.1	2.Sh.E	
22	0.7	4.Tr.I		3	58.1	1.Oc.R		15	17.9	1.Ec.D	
10	2	30.4	4.Tr.E	21	37.5	1.Sh.I		15	31.5	2.Tr.E	
6	46.7	1.Sh.I		22	49.8	1.Tr.I		18	40.7	1.Oc.R	
8	4.2	1.Tr.I		23	55.1	1.Sh.E					
9	4.1	1.Sh.E									
10	21.3	1.Tr.E									
21	1.8	2.Ec.D									

# Diagrama dos Satélites galileanos

Julho 2021

1 = Io (Vermelho), 2 = Europa (Verde), 3 = Ganimedes (Azul), 4 = Callisto (Rosa)

00:00 (Tempo Universal)



# Eventos mútuos em Julho 2021

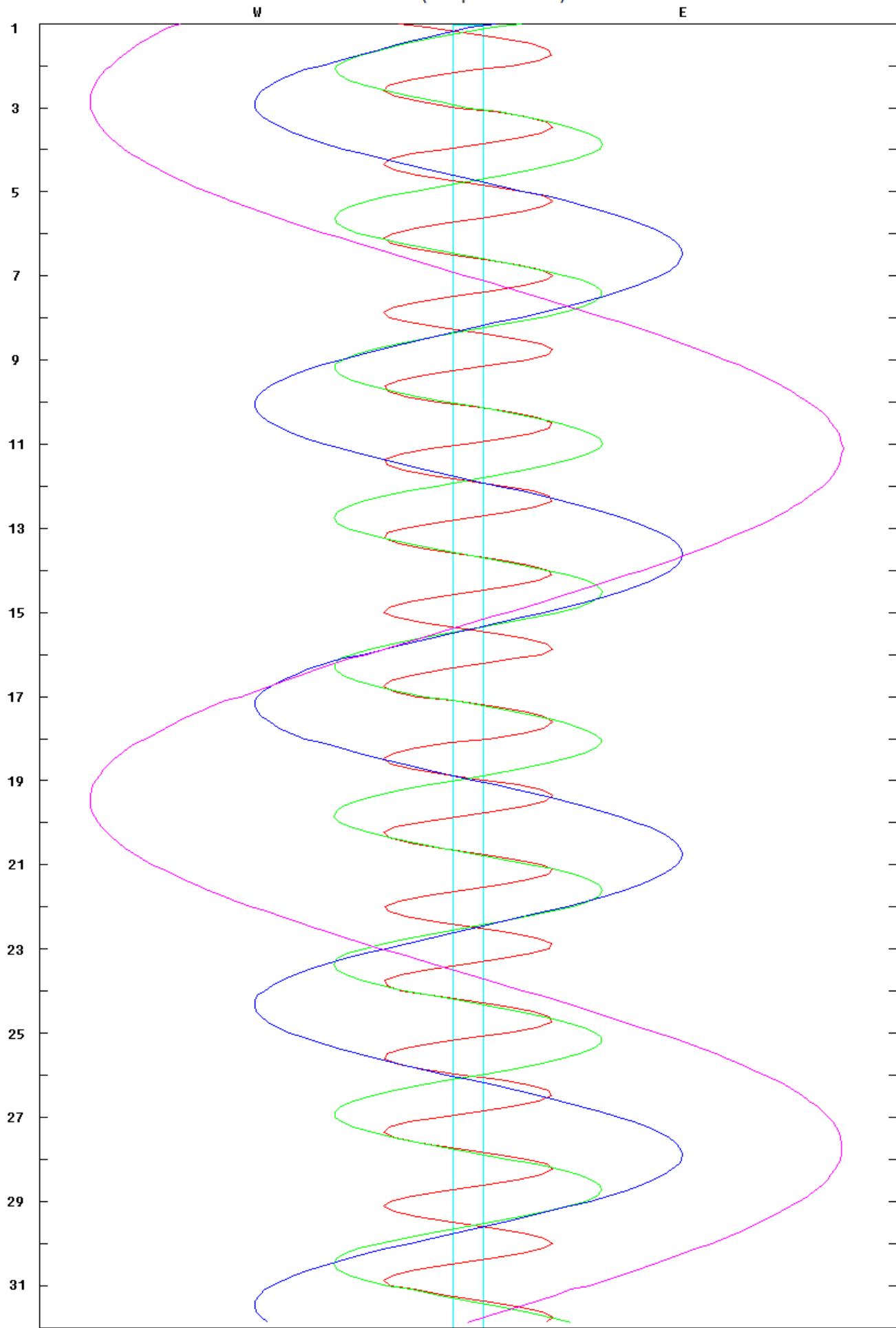
1	12	28.5	1.Sh.I	11	1	59.0	3.Tr.E	21	0	26.4	1.Tr.I	
	13	33.0	1.Tr.I		2	24.9	2.Sh.I		2	0.9	1.Sh.E	
	14	46.4	1.Sh.E		4	14.6	2.Tr.I		2	44.2	1.Tr.E	
	15	50.4	1.Tr.E		5	15.5	2.Sh.E		8	6.9	4.Ec.D	
2	4	51.1	2.Ec.D		6	8.5	1.Ec.D		12	40.3	3.Ec.D	
	9	46.3	1.Ec.D		7	2.6	2.Tr.E		12	49.8	4.Ec.R	
	9	54.7	2.Oc.R		9	20.9	1.Oc.R		14	58.9	4.Oc.D	
3	13	7.5	1.Oc.R	12	3	19.6	1.Sh.I		18	16.2	2.Sh.I	
	6	57.0	1.Sh.I		4	13.8	1.Tr.I		19	9.2	3.Oc.R	
	8	0.0	1.Tr.I		5	37.8	1.Sh.E		19	20.3	4.Oc.R	
	9	15.0	1.Sh.E		6	31.5	1.Tr.E		19	41.1	2.Tr.I	
	10	17.5	1.Tr.E		20	46.8	2.Ec.D		20	59.3	1.Ec.D	
	14	38.0	3.Sh.I		21	46.0	4.Sh.I		21	6.8	2.Sh.E	
	18	16.0	3.Sh.E	13	0	37.0	1.EC.D		22	29.2	2.Tr.E	
	18	53.8	3.Tr.I		1	28.6	2.Oc.R		23	59.1	1.Oc.R	
	22	27.7	3.Tr.E		2	30.3	4.Sh.E	22	18	11.0	1.Sh.I	
	23	50.8	2.Sh.I		3	47.4	1.Oc.R		18	52.7	1.Tr.I	
4	1	54.5	2.Tr.I		6	23.0	4.Tr.I		20	29.5	1.Sh.E	
	2	41.3	2.Sh.E		10	44.8	4.Tr.E		21	10.6	1.Tr.E	
	4	14.8	1.Ec.D		21	48.2	1.Sh.I	23	12	42.2	2.Ec.D	
	4	42.4	2.Tr.E		22	40.5	1.Tr.I		15	27.7	1.Ec.D	
	7	34.4	1.Oc.R	14	0	6.4	1.Sh.E		16	57.4	2.Oc.R	
	13	57.0	4.Ec.D		0	58.2	1.Tr.E		18	25.3	1.Oc.R	
	18	42.2	4.Ec.R		8	40.7	3.Ec.D	24	12	39.7	1.Sh.I	
	23	43.9	4.Oc.D		15	42.0	2.Sh.I		13	19.0	1.Tr.I	
5	1	25.5	1.Sh.I		15	44.8	3.Oc.R		14	58.2	1.Sh.E	
	2	26.8	1.Tr.I		17	23.9	2.Tr.I		15	36.9	1.Tr.E	
	3	43.5	1.Sh.E		18	32.5	2.Sh.E	25	2	39.3	3.Sh.I	
	4	7.9	4.Oc.R		19	5.4	1.Ec.D		5	16.3	3.Tr.I	
	4	44.4	1.Tr.E		20	11.9	2.Tr.E		6	17.8	3.Sh.E	
	18	9.9	2.Ec.D		22	13.9	1.Oc.R		7	33.4	2.Sh.I	
	22	43.2	1.Ec.D	15	16	16.7	1.Sh.I		8	49.1	2.Tr.I	
	23	6.8	2.Oc.R		17	7.0	1.Tr.I		8	50.4	3.Tr.E	
6	6	2	1.1	1.Oc.R		18	35.0	1.Sh.E		9	56.2	1.Ec.D
	19	54.1	1.Sh.I		19	24.8	1.Tr.E		10	23.9	2.Sh.E	
	20	53.7	1.Tr.I		16	10	5.0	2.Ec.D		11	37.3	2.Tr.E
	22	12.1	1.Sh.E		13	33.8	1.Ec.D		12	51.4	1.Oc.R	
	23	11.3	1.Tr.E		14	38.4	2.Oc.R	26	7	8.2	1.Sh.I	
7	7	4	40.6	3.Ec.D		16	40.2	1.OC.R		7	45.2	1.Tr.I
	8	19.4	3.Ec.R		17	10	45.3	1.Sh.I		9	26.7	1.Sh.E
	8	41.3	3.Oc.D		11	33.5	1.Tr.I		10	3.2	1.Tr.E	
	12	16.0	3.Oc.R		13	3.7	1.Sh.E	27	2	1.2	2.Ec.D	
	13	7.8	2.Sh.I		13	51.3	1.Tr.E		4	24.7	1.Ec.D	
	15	4.8	2.Tr.I		22	38.1	3.Sh.I		6	6.8	2.Oc.R	
	15	58.4	2.Sh.E	18	1	52.2	3.Tr.I		7	17.5	1.Oc.R	
	17	11.6	1.Ec.D		2	16.5	3.Sh.E	28	1	36.9	1.Sh.I	
	17	52.7	2.Tr.E		4	59.1	2.Sh.I		2	11.4	1.Tr.I	
	20	27.8	1.Oc.R		5	26.1	3.Tr.E		3	55.4	1.Sh.E	
8	14	22.6	1.Sh.I		6	32.7	2.Tr.I		4	29.5	1.Tr.E	
	15	20.5	1.Tr.I		7	49.7	2.Sh.E		16	40.0	3.Ec.D	
	16	40.6	1.Sh.E		8	2.3	1.Ec.D		20	50.5	2.Sh.I	
	17	38.1	1.Tr.E		9	20.8	2.Tr.E		21	56.6	2.Tr.I	
9	9	7	27.9	2.Ec.D	11	6.6	1.Oc.R		22	30.1	3.Oc.R	
	11	40.0	1.Ec.D	19	5	13.8	1.Sh.I		22	53.2	1.Ec.D	
	12	17.5	2.Oc.R		5	59.9	1.Tr.I		23	41.0	2.Sh.E	
	14	54.4	1.Oc.R		7	32.2	1.Sh.E	29	0	44.9	2.Tr.E	
10	10	8	51.1	1.Sh.I		8	17.7	1.Tr.E		1	43.6	1.Oc.R
	9	47.3	1.Tr.I		23	24.0	2.Ec.D		15	57.5	4.Sh.I	
	11	9.3	1.Sh.E	20	2	30.8	1.Ec.D		20	5.5	1.Sh.I	
	12	4.9	1.Tr.E		3	48.5	2.Oc.R		20	37.6	1.Tr.I	
	18	38.0	3.Sh.I		5	32.9	1.Oc.R		20	40.0	4.Sh.E	
	22	16.2	3.Sh.E		23	42.5	1.Sh.I		21	11.3	4.Tr.I	
	22	25.1	3.Tr.I						22	24.1	1.Sh.E	
									22	55.6	1.Tr.E	
								30	1	32.5	4.Tr.E	
								15	19.6	2.Ec.D		
								17	21.7	1.Ec.D		
								19	15.0	2.Oc.R		
								20	9.6	1.Oc.R		
								31	14	34.2	1.Sh.I	
								15	3.8	1.Tr.I		
								16	52.8	1.Sh.E		
								17	21.8	1.Tr.E		

# Diagrama dos Satélites galileanos

Agosto 2021

1 = Io (Vermelho), 2 = Europa (Verde), 3 = Ganimedes (Azul), 4 = Callisto (Rosa)

00:00 (Tempo Universal)



## Eventos mútuos em Agosto 2021

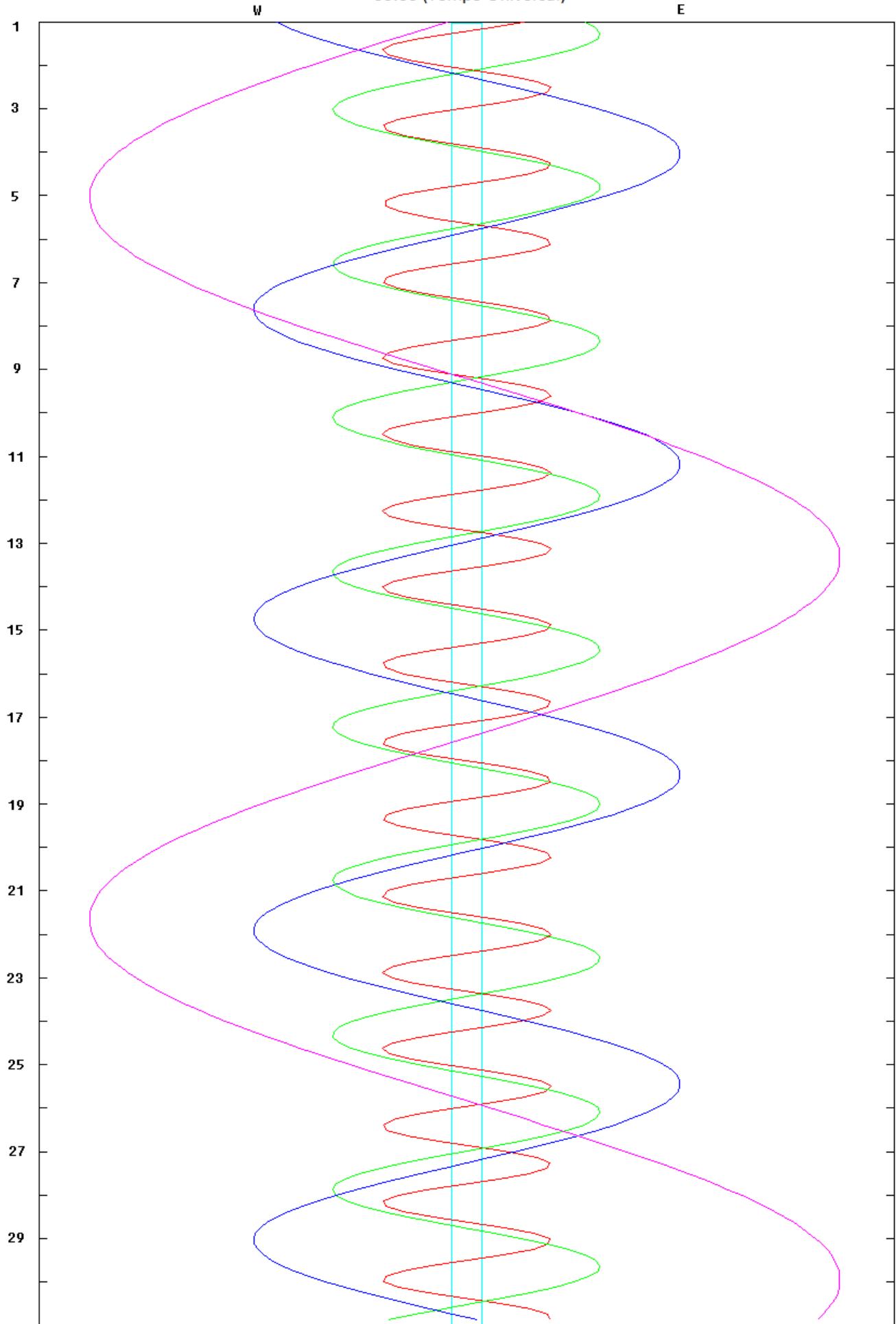
1	6	39.9	3.Sh.I	11	5	26.2	1.Sh.I	21	1	22.0	1.Ec.R
	8	36.4	3.Tr.I		5	40.0	1.Tr.I		2	6.3	2.Ec.R
10	7.7	2.Sh.I		7	44.9	1.Sh.E		20	15.9	1.Tr.I	
10	18.4	3.Sh.E		7	58.2	1.Tr.E		20	18.6	1.Sh.I	
11	3.9	2.Tr.I	12	0	40.6	3.Ec.D		22	34.2	1.Tr.E	
11	50.2	1.Ec.D		1	59.4	2.Sh.I		22	37.4	1.Sh.E	
12	10.8	3.Tr.E		2	24.3	2.Tr.I	22	17	28.8	1.Oc.D	
12	58.2	2.Sh.E		2	41.4	1.Ec.D		17	43.6	2.Tr.I	
13	52.3	2.Tr.E		4	49.9	2.Sh.E		17	51.5	2.Sh.I	
14	35.6	1.Oc.R		5	5.9	3.Oc.R		18	25.5	3.Tr.I	
2	9	2.7	1.Sh.I	13	5	11.0	1.Oc.R		18	42.0	3.Sh.I
	9	29.8	1.Tr.I		5	12.9	2.Tr.E		19	50.6	1.Ec.R
11	21.4	1.Sh.E		23	54.9	1.Sh.I		20	32.5	2.Tr.E	
11	47.9	1.Tr.E		13	0	5.9	1.Tr.I		20	41.8	2.Sh.E
3	4	38.7	2.Ec.D		2	13.6	1.Sh.E		22	0.5	3.Tr.E
	6	18.7	1.Ec.D		2	24.2	1.Tr.E		22	20.0	3.Sh.E
8	23.7	2.Oc.R		20	34.8	2.Ec.D	23	14	41.8	1.Tr.I	
9	1.5	1.Oc.R		21	10.0	1.Ec.D		14	47.3	1.Sh.I	
4	3	31.4	1.Sh.I		23	36.9	1.Oc.R		17	0.1	1.Tr.E
	3	55.9	1.Tr.I		23	46.9	2.Oc.R		17	6.0	1.Sh.E
	5	50.1	1.Sh.E	14	18	23.6	1.sh.I		19	39.5	4.Oc.D
	6	14.1	1.Tr.E		18	32.0	1.Tr.I	24	1	6.9	4.Ec.R
	20	40.2	3.Ec.D		20	42.4	1.Sh.E		11	54.7	1.Oc.D
	23	24.9	2.Sh.I		20	50.2	1.Tr.E		12	18.2	2.Oc.D
5	0	10.9	2.Tr.I	15	10	10.5	4.Sh.I		14	19.2	1.Ec.R
	0	47.3	1.Ec.D		11	25.4	4.Tr.I		15	25.6	2.Ec.R
1	49.0	3.Oc.R		14	41.2	3.Sh.I	25	9	7.9	1.Tr.I	
2	15.4	2.Sh.E		14	50.7	4.Sh.E		9	16.2	1.Sh.I	
2	59.3	2.Tr.E		15	10.1	3.Tr.I		11	26.2	1.Tr.E	
3	27.5	1.Oc.R		15	16.8	2.Sh.I		11	34.9	1.Sh.E	
22	0.1	1.Sh.I		15	30.8	2.Tr.I	26	6	20.5	1.Oc.D	
22	21.9	1.Tr.I		15	38.5	1.Ec.D		6	50.2	2.Tr.I	
6	0	18.8	1.Sh.E		15	48.1	4.Tr.E		7	9.0	2.Sh.I
	0	40.1	1.Tr.E		18	2.7	1.Oc.R		8	3.8	3.Oc.D
17	57.1	2.Ec.D		18	7.1	2.Sh.E		8	47.8	1.Ec.R	
19	15.8	1.Ec.D		18	19.4	2.Tr.E		9	39.1	2.Tr.E	
21	31.3	2.Oc.R		18	19.5	3.Sh.E		9	59.2	2.Sh.E	
21	53.4	1.Oc.R		18	44.9	3.Tr.E		12	20.2	3.Ec.R	
7	2	17.8	4.Ec.D	16	12	52.3	1.Sh.I	27	3	33.9	1.Tr.I
	9	51.5	4.Oc.R		12	57.9	1.Tr.I		3	44.9	1.Sh.I
16	28.8	1.Sh.I		15	11.0	1.Sh.E		5	52.2	1.Tr.E	
16	48.0	1.Tr.I		15	16.2	1.Tr.E		6	3.6	1.Sh.E	
18	47.5	1.Sh.E	17	9	54.2	2.Ec.D	28	0	46.4	1.Oc.D	
19	6.2	1.Tr.E		10	7.1	1.Ec.D		1	25.5	2.Oc.D	
8	10	40.7	3.Sh.I		12	28.6	1.Oc.R		3	16.4	1.Ec.R
11	54.3	3.Tr.I		12	55.0	2.Oc.R		4	44.1	2.Ec.R	
12	42.2	2.Sh.I	18	7	21.1	1.Sh.I		22	0.0	1.Tr.I	
13	17.7	2.Tr.I		7	23.9	1.Tr.I		22	13.8	1.Sh.I	
13	44.3	1.Ec.D		9	39.8	1.Sh.E	29	0	18.3	1.Tr.E	
14	19.1	3.Sh.E		9	42.2	1.Tr.E		0	32.4	1.Sh.E	
15	28.8	3.Tr.E	19	4	34.1	2.Sh.I		19	12.4	1.Oc.D	
15	32.6	2.Sh.E		4	35.7	1.Ec.D		19	56.9	2.Tr.I	
16	6.2	2.Tr.E		4	37.2	2.Tr.I		20	26.5	2.Sh.I	
16	19.3	1.Oc.R		4	41.9	3.Ec.D		21	41.7	3.Tr.I	
9	10	57.4	1.Sh.I		6	54.4	1.Oc.R		21	45.1	1.Ec.R
11	14.0	1.Tr.I		7	24.4	2.Sh.E		22	43.3	3.Sh.I	
13	16.1	1.Sh.E		7	25.9	2.Tr.E		22	45.8	2.Tr.E	
13	32.2	1.Tr.E		8	22.7	3.Oc.R		23	16.5	2.Sh.E	
10	7	16.4	2.Ec.D	20	1	49.8	1.Sh.I	30	1	17.1	3.Tr.E
	8	12.9	1.Ec.D		1	49.8	1.Tr.I		2	21.0	3.Sh.E
10	39.6	2.Oc.R		4	8.1	1.Tr.E		16	26.0	1.Tr.I	
10	45.2	1.Oc.R		4	8.5	1.Sh.E		16	42.5	1.Sh.I	
				23	2.9	1.Oc.D		18	44.3	1.Tr.E	
				23	10.1	2.Oc.D		19	1.1	1.Sh.E	
							31	13	38.4	1.Oc.D	
								14	33.8	2.Oc.D	
								16	13.7	1.Ec.R	
								18	3.4	2.Ec.R	

# Diagrama dos Satélites galileanos

Setembro 2021

1 = Io (Vermelho), 2 = Europa (Verde), 3 = Ganimedes (Azul), 4 = Callisto (Rosa)

00:00 (Tempo Universal)



## Eventos mútuos em Setembro 2021

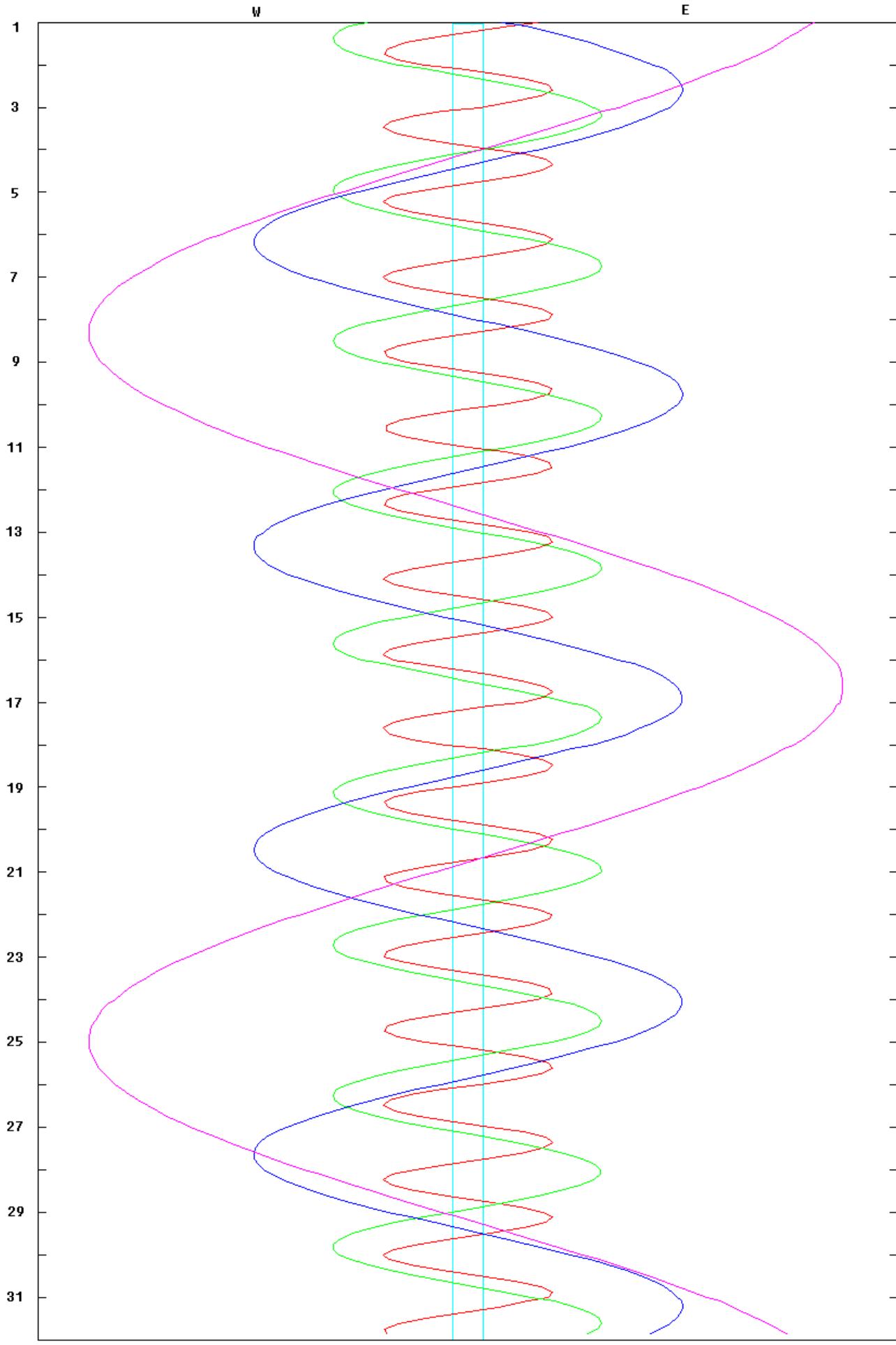
1	1	31.5	4.Tr.I	11	4	14.9	1.Oc.D	21	0	0.6	1.Tr.E
	4	25.2	4.Sh.I		5	58.7	2.Oc.D		0	46.8	1.Sh.E
	5	57.3	4.Tr.E		7	5.7	1.Ec.R		18	53.4	1.Oc.D
	9	1.8	4.Sh.E		9	59.9	2.Ec.R		21	27.9	2.Oc.D
10	52.2	1.Tr.I		12	1	29.9	1.Tr.I		21	58.0	1.Ec.R
11	11.4	1.Sh.I			2	4.4	1.Sh.I	22	1	57.4	2.Ec.R
13	10.5	1.Tr.E			3	48.0	1.Tr.E		16	9.5	1.Tr.I
13	30.0	1.Sh.E			4	22.7	1.Sh.E		16	57.7	1.Sh.I
2	8	4.4	1.Oc.D	13	22	41.2	1.Oc.D		18	27.4	1.Tr.E
	9	3.8	2.Tr.I		0	26.4	2.Tr.I		19	15.7	1.Sh.E
	9	44.0	2.Sh.I		1	34.4	1.Ec.R	23	13	20.0	1.Oc.D
	10	42.4	1.Ec.R		1	36.9	2.Sh.I		15	52.7	2.Tr.I
	11	20.8	3.Oc.D		3	15.5	2.Tr.E		16	26.7	1.Ec.R
	11	52.8	2.Tr.E		4	20.8	3.Tr.I		17	30.1	2.Sh.I
	12	33.9	2.Sh.E		4	26.3	2.Sh.E		18	41.8	2.Tr.E
	16	20.9	3.Ec.R		6	47.2	3.Sh.I		20	19.1	2.Sh.E
3	5	18.3	1.Tr.I		7	56.5	3.Tr.E		21	25.3	3.Oc.D
	5	40.2	1.Sh.I		10	24.0	3.Sh.E	24	4	22.6	3.Ec.R
	7	36.6	1.Tr.E		19	56.3	1.Tr.I		10	36.2	1.Tr.I
	7	58.7	1.Sh.E		20	33.2	1.Sh.I		11	26.5	1.Sh.I
4	2	30.4	1.Oc.D		22	14.4	1.Tr.E		12	54.1	1.Tr.E
	3	41.5	2.Oc.D		22	51.5	1.Sh.E		13	44.5	1.Sh.E
	5	11.0	1.Ec.R	14	17	7.5	1.Oc.D	25	7	46.7	1.Oc.D
	7	22.0	2.Ec.R		19	8.3	2.Oc.D		10	38.0	2.Oc.D
	23	44.6	1.Tr.I		20	3.1	1.Ec.R		10	55.4	1.Ec.R
5	0	9.0	1.Sh.I		23	19.3	2.Ec.R		15	16.0	2.Ec.R
	2	2.8	1.Tr.E	15	14	22.8	1.Tr.I	26	0	45.3	4.Oc.D
	2	27.5	1.Sh.E		15	2.1	1.Sh.I		5	3.2	1.Tr.I
	20	56.5	1.Oc.D		16	40.9	1.Tr.E		5	16.6	4.Oc.R
	22	11.0	2.Tr.I		17	20.4	1.Sh.E		5	55.5	1.Sh.I
	23	1.6	2.Sh.I	16	11	33.9	1.Oc.D		7	21.1	1.Tr.E
	23	39.7	1.Ec.R		13	34.7	2.Tr.I		8	13.4	1.Sh.E
6	0	59.6	3.Tr.I		14	31.8	1.Ec.R		8	56.3	4.Ec.D
	1	0.0	2.Tr.E		14	54.6	2.Sh.I		13	26.3	4.Ec.R
	1	51.3	2.Sh.E		16	23.8	2.Tr.E	27	2	13.4	1.Oc.D
	2	44.7	3.Sh.I		17	43.9	2.Sh.E		5	2.5	2.Tr.I
	4	35.1	3.Tr.E		18	0.2	3.Oc.D		5	24.2	1.Ec.R
	6	22.1	3.Sh.E	17	0	21.5	3.Ec.R		6	47.9	2.Sh.I
	18	10.8	1.Tr.I		8	49.3	1.Tr.I		7	51.6	2.Tr.E
	18	37.8	1.Sh.I		9	31.0	1.Sh.I		9	36.8	2.Sh.E
	20	29.0	1.Tr.E		11	7.4	1.Tr.E		11	12.2	3.Tr.I
	20	56.3	1.Sh.E		11	49.1	1.Sh.E		14	48.0	3.Tr.E
7	15	22.6	1.Oc.D		15	58.9	4.Tr.I		14	50.9	3.Sh.I
	16	50.4	2.Oc.D		20	28.1	4.Tr.E		18	26.4	3.Sh.E
	18	8.3	1.Ec.R		22	40.5	4.Sh.I		23	30.1	1.Tr.I
	20	41.4	2.Ec.R	18	3	12.8	4.Sh.E	28	0	24.3	1.Sh.I
8	12	37.1	1.Tr.I		6	0.3	1.Oc.D		1	47.9	1.Tr.E
	13	6.7	1.Sh.I		8	17.4	2.Oc.D		2	42.1	1.Sh.E
	14	55.3	1.Tr.E		9	0.5	1.Ec.R		20	40.3	1.Oc.D
	15	25.1	1.Sh.E		12	38.0	2.Ec.R		23	49.6	2.Oc.D
9	9	48.7	1.Oc.D	19	3	16.0	1.Tr.I		23	53.0	1.Ec.R
	9	55.4	4.Oc.D		3	59.9	1.Sh.I	29	4	35.4	2.Ec.R
	11	18.5	2.Tr.I		5	34.0	1.Tr.E		17	57.2	1.Tr.I
	12	19.2	2.Sh.I		6	18.0	1.Sh.E		18	53.3	1.Sh.I
	12	37.0	1.Ec.R	20	0	26.8	1.Oc.D		20	15.0	1.Tr.E
	14	7.6	2.Tr.E		2	43.4	2.Tr.I		21	11.0	1.Sh.E
	14	22.8	4.Oc.R		3	29.2	1.Ec.R	30	15	7.1	1.Oc.D
	14	39.1	3.Oc.D		4	12.3	2.Sh.I		18	12.8	2.Tr.I
	14	42.3	4.Ec.D		5	32.6	2.Tr.E		18	21.7	1.Ec.R
	15	8.9	2.Sh.E		7	1.5	2.Sh.E		20	5.8	2.Sh.I
	19	16.1	4.Ec.R		7	44.5	3.Tr.I		21	2.0	2.Tr.E
	20	21.2	3.Ec.R		10	49.0	3.Sh.I		22	54.5	2.Sh.E
10	7	3.4	1.Tr.I		11	20.2	3.Tr.E				
	7	35.5	1.Sh.I		14	25.2	3.Sh.E				
	9	21.6	1.Tr.E		21	42.7	1.Tr.I				
	9	53.9	1.Sh.E		22	28.7	1.Sh.I				

# Diagrama dos Satélites galileanos

## Outubro 2021

1 = Io (**Vermelho**), 2 = Europa (**Verde**), 3 = Ganimedes (**Azul**), 4 = Callisto (**Rosa**)

00:00 (Tempo Universal)



# Eventos mútuos em Outubro 2021

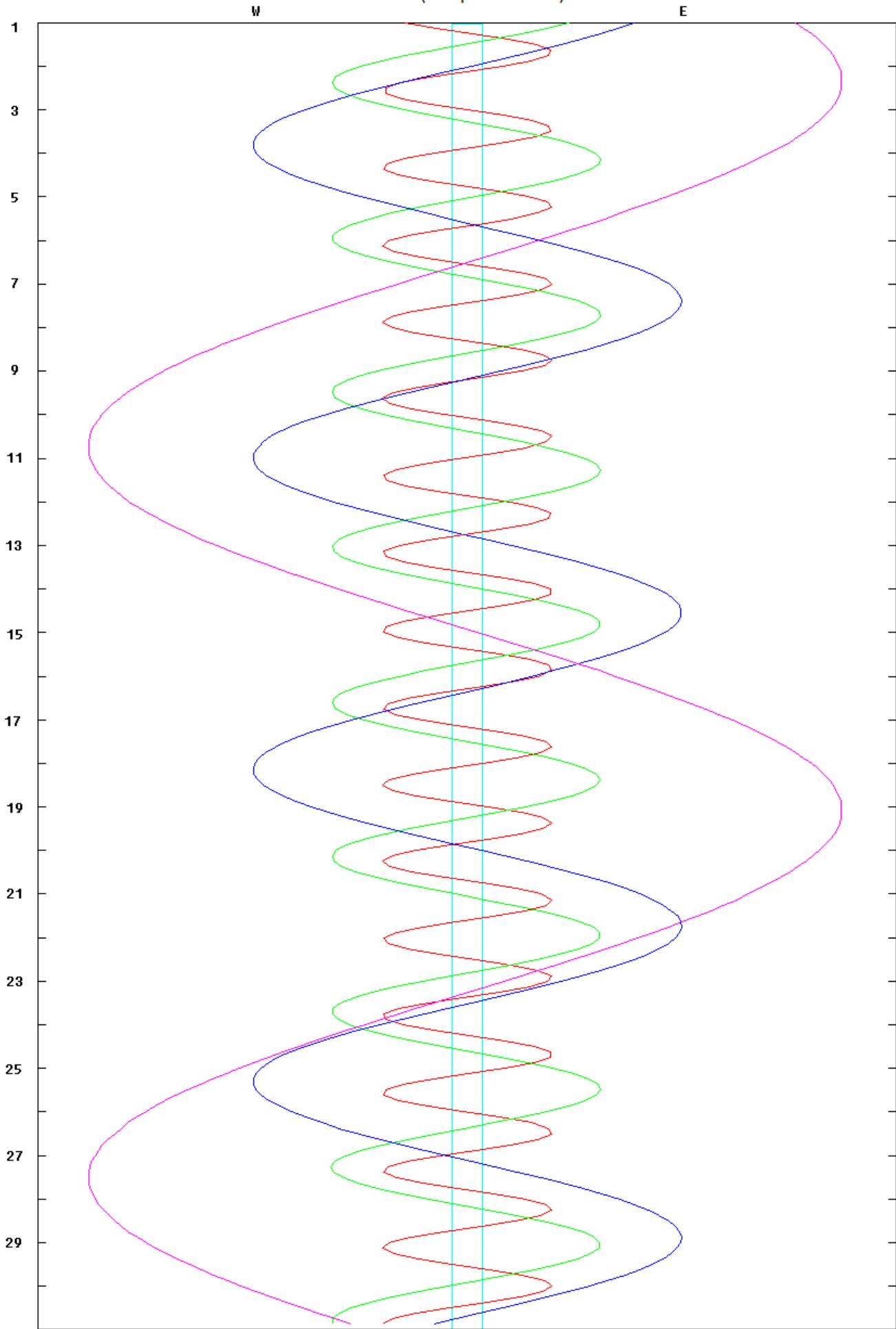
1	0	54.6	3.Oc.D	11	5	50.1	1.Oc.D	21	0	40.5	1.Sh.I
	4	31.2	3.Oc.R		9	14.4	1.Ec.R		1	44.8	1.Tr.E
	4	47.7	3.Ec.D		9	47.3	2.Tr.I		2	57.5	1.Sh.E
	8	23.7	3.Ec.R		11	59.7	2.Sh.I		3	59.4	4.Tr.E
	12	24.2	1.Tr.I		12	36.5	2.Tr.E		11	14.7	4.Sh.I
	13	22.2	1.Sh.I		14	47.9	2.Sh.E		15	36.8	4.Sh.E
	14	42.0	1.Tr.E		18	20.2	3.Tr.I		20	35.9	1.Oc.D
	15	39.8	1.Sh.E		21	56.0	3.Tr.E	22	0	7.4	1.Ec.R
2	9	34.1	1.Oc.D		22	54.0	3.Sh.I		1	27.4	2.Tr.I
	12	50.5	1.Ec.R	12	2	28.2	3.Sh.E		3	54.1	2.Sh.I
	13	0.8	2.Oc.D		3	8.4	1.Tr.I		4	16.6	2.Tr.E
	17	54.1	2.Ec.R		4	15.8	1.Sh.I		6	41.9	2.Sh.E
3	6	51.5	1.Tr.I		5	26.0	1.Tr.E		11	52.0	3.Oc.D
	7	51.2	1.Sh.I		6	33.0	1.Sh.E		15	29.3	3.Oc.R
	9	9.2	1.Tr.E		16	27.8	4.Oc.D		16	53.6	3.Ec.D
	10	8.8	1.Sh.E		21	2.4	4.Oc.R		17	55.4	1.Tr.I
4	4	1.2	1.Oc.D	13	0	17.6	1.Oc.D		19	9.4	1.Sh.I
	7	12.3	4.Tr.I		3	10.9	4.Ec.D		20	12.7	1.Tr.E
	7	19.3	1.Ec.R		3	43.3	1.Ec.R		20	28.3	3.Ec.R
	7	23.7	2.Tr.I		4	39.7	2.Oc.D		21	26.4	1.Sh.E
	9	23.7	2.Sh.I		7	36.6	4.Ec.R	23	15	3.8	1.Oc.D
	10	12.9	2.Tr.E		9	51.5	2.Ec.R		18	36.2	1.Ec.R
	11	44.4	4.Tr.E		21	36.1	1.Tr.I		20	23.3	2.Oc.D
	12	12.2	2.Sh.E		22	44.7	1.Sh.I	24	1	48.1	2.Ec.R
	14	43.8	3.Tr.I		23	53.6	1.Tr.E		12	23.5	1.Tr.I
	16	57.3	4.Sh.I		14	1	2.0		13	38.4	1.Sh.I
	18	19.6	3.Tr.E		18	45.1	1.Oc.D		14	40.8	1.Tr.E
	18	52.4	3.Sh.I		22	12.1	1.Ec.R		15	55.3	1.Sh.E
	21	24.6	4.Sh.E		23	0.1	2.Tr.I	25	9	31.8	1.Oc.D
	22	27.2	3.Sh.E	15	1	17.9	2.Sh.I		13	5.1	1.Ec.R
5	1	18.7	1.Tr.I		1	49.3	2.Tr.E		14	42.0	2.Tr.I
	2	20.0	1.Sh.I		4	5.9	2.Sh.E		17	12.3	2.Sh.I
	3	36.3	1.Tr.E		8	8.0	3.Oc.D		17	31.2	2.Tr.E
	4	37.6	1.Sh.E		11	45.2	3.Oc.R		20	0.0	2.Sh.E
	22	28.3	1.Oc.D		12	51.7	3.Ec.D	26	1	48.4	3.Tr.I
6	1	48.1	1.Ec.R		16	3.8	1.Tr.I		5	24.2	3.Tr.E
	2	13.5	2.Oc.D		16	26.9	3.Ec.R		6	51.6	1.Tr.I
	7	13.5	2.Ec.R		17	13.6	1.Sh.I		6	58.3	3.Sh.I
	19	46.0	1.Tr.I		18	21.2	1.Tr.E		8	7.3	1.Sh.I
	20	49.0	1.Sh.I		19	30.8	1.Sh.E		9	8.9	1.Tr.E
	22	3.7	1.Tr.E	16	13	12.6	1.Oc.D		10	24.2	1.Sh.E
	23	6.5	1.Sh.E		16	40.9	1.Ec.R		10	31.3	3.Sh.E
7	16	55.5	1.Oc.D		17	53.4	2.Oc.D	27	3	59.8	1.Oc.D
	20	16.8	1.Ec.R		23	10.1	2.Ec.R		7	34.0	1.Ec.R
	20	35.2	2.Tr.I	17	10	31.6	1.Tr.I		9	39.5	2.Oc.D
	22	41.7	2.Sh.I		11	42.6	1.Sh.I		15	7.3	2.Ec.R
	23	24.4	2.Tr.E		12	49.0	1.Tr.E	28	1	19.9	1.Tr.I
8	1	30.1	2.Sh.E	18	13	59.8	1.Sh.E		2	36.3	1.Sh.I
	4	29.2	3.Oc.D		11	9.7	1.Ec.R		3	37.1	1.Tr.E
	8	6.2	3.Oc.R		12	13.4	2.Tr.I		4	53.1	1.Sh.E
	8	50.0	3.Ec.D		14	36.0	2.Sh.I		22	28.0	1.Oc.D
	12	25.6	3.Ec.R		15	2.6	2.Tr.E	29	2	2.8	1.Ec.R
	14	13.4	1.Tr.I		17	23.9	2.Sh.E		3	57.2	2.Tr.I
	15	17.9	1.Sh.I		22	1.8	3.Tr.I		6	30.6	2.Sh.I
	16	31.0	1.Tr.E	19	1	37.6	3.Tr.E		6	46.4	2.Tr.E
	17	35.3	1.Sh.E		2	56.1	3.Sh.I		9	11.5	4.Oc.D
9	11	22.8	1.Oc.D		4	59.4	1.Tr.I		9	18.1	2.Sh.E
	14	45.6	1.Ec.R		6	11.5	1.Sh.I		13	48.2	4.Oc.R
	15	25.9	2.Oc.D		6	29.7	3.Sh.E		15	40.2	3.Oc.D
	20	32.1	2.Ec.R		7	16.8	1.Tr.E		19	17.7	3.Oc.R
10	8	41.0	1.Tr.I		8	28.6	1.Sh.E		19	48.2	1.Tr.I
	9	46.9	1.Sh.I	20	2	8.1	1.Oc.D		20	55.0	3.Ec.D
	10	58.5	1.Tr.E		5	38.6	1.Ec.R		21	5.3	1.Sh.I
	12	4.2	1.Sh.E		7	8.4	2.Oc.D		21	26.4	4.Ec.D
					12	29.4	2.Ec.R		22	5.4	1.Tr.E
					23	25.1	4.Tr.I	30	0	29.3	3.Ec.R
					23	27.4	1.Tr.I		1	47.4	4.Ec.R
									16	56.2	1.Oc.D
									20	31.7	1.Ec.R
									22	55.7	2.Oc.D
									31	4	25.9
									14	16.6	2.Ec.R
									15	34.3	1.Sh.I
									16	33.8	1.Tr.E
									17	51.0	1.Sh.E

# Diagrama dos Satélites galileanos

Novembro 2021

1 = Io (**Vermelho**), 2 = Europa (**Verde**), 3 = Ganimedes (**Azul**), 4 = Callisto (**Rosa**)

00:00 (Tempo Universal)



## Eventos mútuos em Novembro 2021

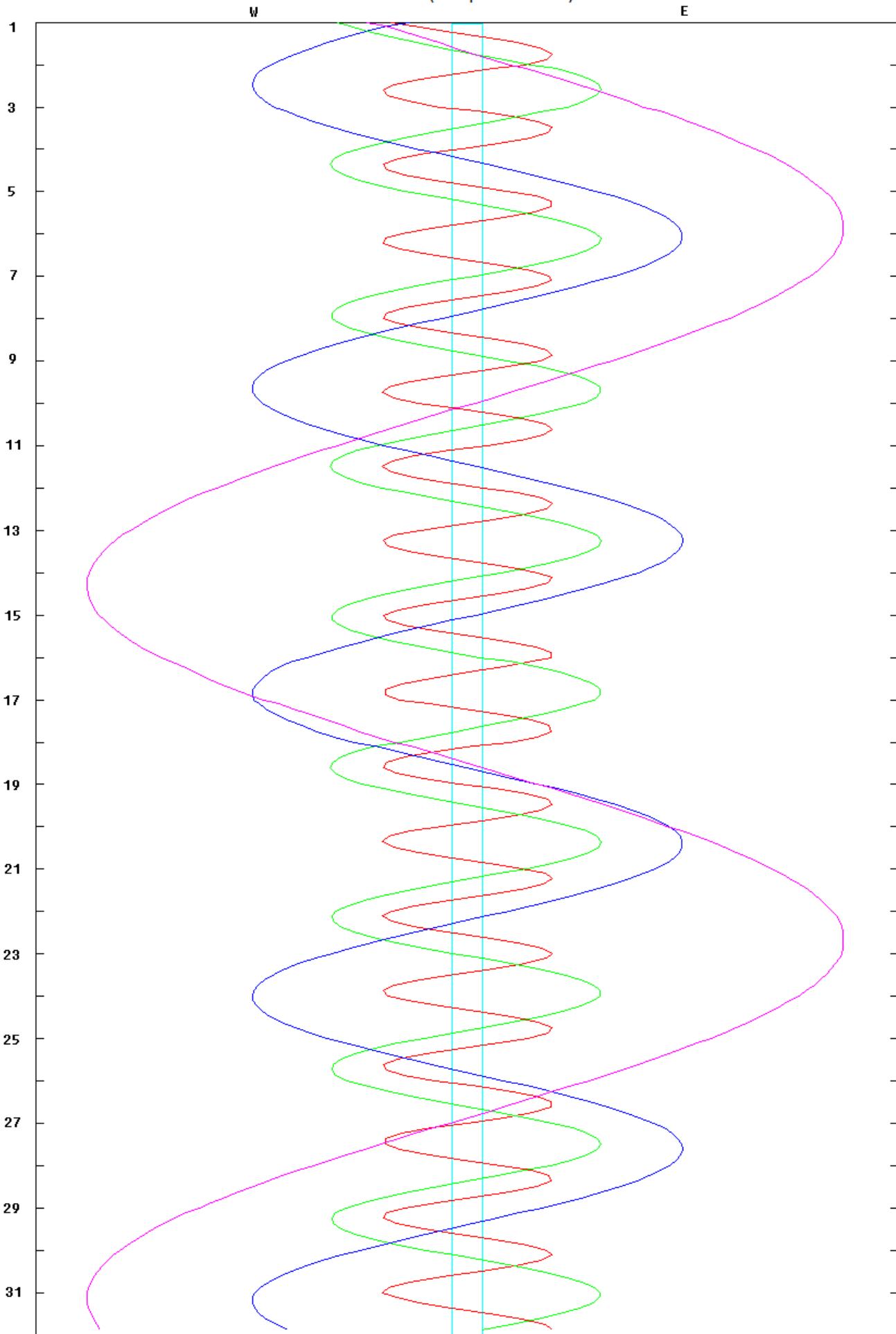
1	11	24.4	1.Oc.D	11	5	8.3	1.Tr.I	21	2	18.3	1.Ec.R
	15	0.5	1.Ec.R		6	28.0	1.Sh.I		6	46.0	2.Oc.D
	17	13.0	2.Tr.I		7	25.4	1.Tr.E		12	18.8	2.Ec.R
	19	48.9	2.Sh.I		8	44.5	1.Sh.E		20	2.3	1.Tr.I
	20	2.3	2.Tr.E	12	2	15.7	1.OC.D		21	21.7	1.Sh.I
	22	36.4	2.Sh.E		5	53.8	1.EC.R		22	19.3	1.Tr.E
2	5	40.7	3.Tr.I		9	4.0	2.Tr.I		23	38.0	1.Sh.E
	8	45.0	1.Tr.I	11	44.0	2.Sh.I		22	17	9.4	1.Oc.D
	9	16.6	3.Tr.E	11	53.4	2.Tr.E			20	47.1	1.Ec.R
	10	3.2	1.Sh.I	14	31.3	2.Sh.E	13	1	0.1	2.Tr.I	
	11	1.3	3.Sh.I	23	31.3	3.Oc.D		3	39.7	2.Sh.I	
	11	2.1	1.Tr.E	23	37.1	1.Tr.I		3	49.8	2.Tr.E	
	12	19.8	1.Sh.E	13	0	56.9	1.Sh.I	6	26.8	2.Sh.E	
	14	33.7	3.Sh.E		1	54.2	1.Tr.E	10	56.3	4.Tr.I	
3	5	52.8	1.Oc.D		3	9.1	3.Oc.R	14	31.5	1.Tr.I	
	9	29.4	1.Ec.R		3	13.4	1.Sh.E	15	31.9	4.Tr.E	
	12	13.0	2.Oc.D		4	58.4	3.EC.D	15	50.5	1.Sh.I	
	17	45.1	2.Ec.R		8	31.9	3.EC.R	16	48.5	1.Tr.E	
4	3	13.6	1.Tr.I	14	20	44.5	1.OC.D	17	42.5	3.Tr.I	
	4	32.2	1.Sh.I		0	22.7	1.EC.R	18	6.9	1.Sh.E	
	5	30.7	1.Tr.E		4	7.1	2.Oc.D	21	18.4	3.Tr.E	
	6	48.8	1.Sh.E		9	41.3	2.Ec.R	23	7.6	3.Sh.I	
5	0	21.2	1.Oc.D		18	6.1	1.Tr.I	23	51.6	4.Sh.I	
	3	58.3	1.Ec.R		19	25.9	1.Sh.I	24	2	38.4	3.Sh.E
	6	29.4	2.Tr.I		20	23.1	1.Tr.E		4	2.6	4.Sh.E
	9	7.2	2.Sh.I		21	42.3	1.Sh.E	11	38.6	1.Oc.D	
	9	18.7	2.Tr.E	15	2	56.9	4.OC.D	15	16.1	1.Ec.R	
	11	54.6	2.Sh.E		7	34.3	4.Oc.R	20	6.4	2.Oc.D	
	19	33.2	3.Oc.D		15	13.3	1.Oc.D	25	1	37.7	2.Ec.R
	21	42.1	1.Tr.I		15	42.5	4.Ec.D		9	0.8	1.Tr.I
	23	1.1	1.Sh.I		18	51.5	1.Ec.R	10	19.5	1.Sh.I	
	23	10.9	3.Oc.R		19	58.2	4.Ec.R	11	17.8	1.Tr.E	
	23	59.2	1.Tr.E		22	22.2	2.Tr.I	12	35.8	1.Sh.E	
6	0	56.4	3.Ec.D	16	1	2.6	2.Sh.I	26	6	7.8	1.Oc.D
	1	17.7	1.Sh.E		1	11.7	2.Tr.E		9	44.9	1.Ec.R
	4	30.3	3.Ec.R		3	49.8	2.Sh.E	14	19.8	2.Tr.I	
	16	40.7	4.Tr.I		12	35.0	1.Tr.I	16	58.2	2.Sh.I	
	18	49.7	1.Oc.D		13	37.9	3.Tr.I	17	9.5	2.Tr.E	
	21	16.3	4.Tr.E		13	54.8	1.Sh.I	19	45.3	2.Sh.E	
	22	27.1	1.Ec.R	17	9	52.0	1.Tr.E	27	3	30.1	1.Tr.I
7	1	30.3	2.Oc.D		16	11.2	1.Sh.E		4	48.4	1.Sh.I
	5	32.8	4.Sh.I		17	13.8	3.Tr.E		5	47.1	1.Tr.E
	7	3.7	2.Ec.R		19	5.8	3.Sh.I		7	4.7	1.Sh.E
	9	49.4	4.Sh.E		22	37.1	3.Sh.E		7	41.4	3.Oc.D
	16	10.8	1.Tr.I	17	9	42.3	1.Oc.D	11	19.2	3.Oc.R	
	17	30.1	1.Sh.I		13	20.5	1.Ec.R	13	3.2	3.Ec.D	
	18	27.9	1.Tr.E		17	26.6	2.Oc.D	16	35.7	3.Ec.R	
	19	46.6	1.Sh.E	18	2	0.3	2.Ec.R	28	0	37.1	1.Oc.D
8	13	18.3	1.Oc.D	19	4	11.2	1.Oc.D		4	13.9	1.Ec.R
	16	56.0	1.Ec.R		7	49.3	1.Ec.R		9	26.7	2.Oc.D
	19	46.4	2.Tr.I		11	40.9	2.Tr.I		14	56.2	2.Ec.R
	22	25.7	2.Sh.I		14	21.1	2.Sh.I		21	59.5	1.Tr.I
	22	35.8	2.Tr.E		10	40.1	1.Sh.E		23	17.4	1.Sh.I
9	1	13.0	2.Sh.E	19	4	11.2	1.Oc.D	29	0	16.5	1.Tr.E
	9	37.0	3.Tr.I		7	49.3	1.Ec.R		1	33.7	1.Sh.E
	10	39.5	1.Tr.I		11	40.9	2.Tr.I		19	6.4	1.Oc.D
	11	59.0	1.Sh.I		14	21.1	2.Sh.I		22	42.7	1.Ec.R
	12	56.6	1.Tr.E		14	30.4	2.Tr.E	30	3	40.1	2.Tr.I
	13	12.9	3.Tr.E		17	8.2	2.Sh.E		6	17.0	2.Sh.I
	14	15.5	1.Sh.E	20	1	33.1	1.Tr.I		6	29.9	2.Tr.E
	15	3.6	3.Sh.I		2	52.7	1.Sh.I		9	4.0	2.Sh.E
	18	35.4	3.Sh.E		3	33.9	3.Oc.D		16	28.9	1.Tr.I
10	7	47.0	1.Oc.D		3	50.1	1.Tr.E		17	46.3	1.Sh.I
	11	24.9	1.Ec.R		5	9.0	1.Sh.E		18	45.9	1.Tr.E
	14	48.8	2.Oc.D		7	11.7	3.Oc.R		20	2.6	1.Sh.E
	20	22.8	2.Ec.R		9	0.4	3.Ec.D		21	50.9	3.Tr.I
					12	33.4	3.Ec.R		22	40.3	1.Oc.D

# Diagrama dos Satélites galileanos

Dezembro 2021

1 = Io (**Vermelho**), 2 = Europa (**Verde**), 3 = Ganimedes (**Azul**), 4 = Callisto (**Rosa**)

00:00 (Tempo Universal)



## Eventos mútuos em Dezembro 2021

1	1	26.9	3.Tr.E	11	1	0.0	2.Sh.E	21	1	2.8	1.Oc.D
	3	9.4	3.Sh.I		7	26.4	1.Tr.I		4	29.6	1.Ec.R
	6	39.8	3.Sh.E		8	39.8	1.Sh.I		11	51.2	2.Tr.I
	13	35.9	1.Oc.D		9	43.5	1.Tr.E		14	9.7	2.Sh.I
	17	11.7	1.Ec.R		10	56.0	1.Sh.E		14	41.5	2.Tr.E
	21	37.1	4.Oc.D		16	6.4	3.Oc.D		16	56.7	2.Sh.E
	22	48.0	2.Oc.D		19	43.9	3.Oc.R		22	25.5	1.Tr.I
2	2	13.7	4.Oc.R		21	7.4	3.Ec.D		23	33.1	1.Sh.I
	4	14.9	2.Ec.R	12	0	38.8	3.Ec.R	22	0	42.6	1.Tr.E
	9	58.7	4.Ec.D		4	33.5	1.Oc.D		1	49.3	1.Sh.E
	10	58.4	1.Tr.I		8	5.1	1.Ec.R		10	38.9	3.Tr.I
	12	15.2	1.Sh.I		14	53.1	2.Oc.D		14	14.9	3.Tr.E
	13	15.4	1.Tr.E		20	10.3	2.Ec.R		15	16.9	3.Sh.I
	14	8.9	4.Ec.R	13	1	56.2	1.Tr.I		18	46.0	3.Sh.E
	14	31.5	1.Sh.E		3	8.7	1.Sh.I		19	32.8	1.Oc.D
3	8	5.3	1.Oc.D		4	13.3	1.Tr.E	22		58.5	1.Ec.R
	11	40.5	1.Ec.R		5	24.9	1.Sh.E	23	7	1.5	2.Oc.D
	17	0.8	2.Tr.I		23	3.2	1.Oc.D		12	5.5	2.Ec.R
	19	35.6	2.Sh.I	14	2	34.0	1.Ec.R		16	55.5	1.Tr.I
	19	50.7	2.Tr.E		9	5.8	2.Tr.I		18	2.0	1.Sh.I
	22	22.6	2.Sh.E		11	32.0	2.Sh.I		19	12.6	1.Tr.E
4	5	27.9	1.Tr.I		11	55.9	2.Tr.E		20	18.2	1.Sh.E
	6	44.1	1.Sh.I		14	19.0	2.Sh.E	24	14	2.8	1.Oc.D
	7	44.9	1.Tr.E		20	26.0	1.Tr.I		17	27.4	1.Ec.R
	9	0.4	1.Sh.E		21	37.6	1.Sh.I	25	1	14.3	2.Tr.I
	11	52.1	3.Oc.D		22	43.0	1.Tr.E		3	28.4	2.Sh.I
	15	29.7	3.Oc.R		23	53.8	1.Sh.E		4	4.6	2.Tr.E
	17	5.3	3.Ec.D	15	6	19.3	3.Tr.I		6	15.4	2.Sh.E
	20	37.2	3.Ec.R		9	55.2	3.Tr.E		11	25.5	1.Tr.I
5	2	34.9	1.Oc.D		11	13.9	3.Sh.I		12	30.8	1.Sh.I
	6	9.5	1.Ec.R		14	43.5	3.Sh.E		13	42.6	1.Tr.E
	12	9.1	2.Oc.D		17	33.1	1.Oc.D		14	47.1	1.Sh.E
	17	33.3	2.Ec.R		21	2.9	1.Ec.R	26	0	42.9	3.Oc.D
	23	57.5	1.Tr.I	16	4	15.7	2.Oc.D		4	19.8	3.Oc.R
6	1	13.1	1.Sh.I		9	28.9	2.Ec.R		5	10.6	3.Ec.D
	2	14.5	1.Tr.E		14	55.8	1.Tr.I		8	32.9	1.Oc.D
	3	29.3	1.Sh.E		16	6.5	1.Sh.I		8	40.8	3.Ec.R
	21	4.4	1.Oc.D		17	12.9	1.Tr.E		11	56.3	1.Ec.R
7	0	38.3	1.Ec.R		18	22.7	1.Sh.E	20		24.8	2.Oc.D
	6	22.1	2.Tr.I	17	12	2.9	1.Oc.D	27	1	23.8	2.Ec.R
	8	54.4	2.Sh.I		15	31.8	1.Ec.R		1	53.8	4.Tr.I
	9	12.1	2.Tr.E		22	28.2	2.Tr.I		5	55.6	1.Tr.I
	11	41.4	2.Sh.E	18	0	50.6	2.Sh.I		6	25.9	4.Tr.E
	18	27.1	1.Tr.I		1	18.3	2.Tr.E		6	59.7	1.Sh.I
	19	41.9	1.Sh.I		3	37.6	2.Sh.E		8	12.7	1.Tr.E
	20	44.1	1.Tr.E		9	25.7	1.Tr.I		9	16.0	1.Sh.E
	21	58.2	1.Sh.E		10	35.3	1.Sh.I		12	29.9	4.Sh.I
8	2	3.4	3.Tr.I		11	42.7	1.Tr.E		16	29.1	4.Sh.E
	5	39.4	3.Tr.E		12	51.6	1.Sh.E	28	3	3.0	1.Oc.D
	7	11.7	3.Sh.I		17	3.9	4.Oc.D		6	25.2	1.Ec.R
	10	41.7	3.Sh.E		20	23.2	3.Oc.D		14	38.1	2.Tr.I
	15	34.1	1.Oc.D		21	38.3	4.Oc.R		16	47.5	2.Sh.I
	19	7.3	1.Ec.R	19	0	0.5	3.Oc.R		17	28.5	2.Tr.E
9	1	31.1	2.Oc.D		1	9.0	3.Ec.D		19	34.6	2.Sh.E
	6	52.0	2.Ec.R		4	15.5	4.Ec.D	29	0	25.6	1.Tr.I
	12	56.7	1.Tr.I		4	39.8	3.Ec.R		1	28.5	1.Sh.I
	14	10.9	1.Sh.I		6	32.8	1.Oc.D		2	42.7	1.Tr.E
	15	13.8	1.Tr.E		8	19.5	4.Ec.R		3	44.8	1.Sh.E
	16	27.1	1.Sh.E		10	0.7	1.Ec.R		15	0.5	3.Tr.I
10	6	3.8	4.Tr.I		17	38.4	2.Oc.D		18	36.2	3.Tr.E
	10	3.7	1.Oc.D		22	47.1	2.Ec.R		19	18.9	3.Sh.I
	10	38.5	4.Tr.E	20	3	55.6	1.Tr.I		21	33.2	1.Oc.D
	13	36.2	1.Ec.R		5	4.2	1.Sh.I		22	47.7	3.Sh.E
	18	10.8	4.Sh.I		6	12.7	1.Tr.E	30	0	54.1	1.Ec.R
	19	43.6	2.Tr.I		7	20.5	1.Sh.E		9	48.5	2.Oc.D
	22	13.0	2.Sh.I						14	42.1	2.Ec.R
	22	16.1	4.Sh.E						18	55.7	1.Tr.I
	22	33.7	2.Tr.E						19	57.4	1.Sh.I
									21	12.8	1.Tr.E
									22	13.7	1.Sh.E
								31	16	3.3	1.Oc.D
									19	23.0	1.Ec.R

## Saturno

Data	$\alpha$	$\delta$	$\oslash$	Elong. °	DT (ua)*	Ang. PH	Inclinação Equatorial		Diâm. Equatorial	
							2,5°		116.464	
							2,5°	116.464		
							00:00 Hora – Tempo Universal			
01 Jan	20h 14m 37.28s	-20° 14' 22.8"	15.18	20.9	10.8997620	2.0	1.000	0.6		
08 Jan	20h 17m 58.72s	-20° 04' 00.6"	15.13	14.5	10.9347773	1.4	1.000	0.6		
15 Jan	20h 21m 23.73s	-19° 53' 12.6"	15.10	8.2	10.9573513	0.8	1.000	0.6		
22 Jan	20h 24m 50.39s	-19° 42' 04.6"	15.09	2.0	10.9671838	0.2	1.000	0.6		
29 Jan	20h 28m 17.08s	-19° 30' 41.9"	15.09	4.4	10.9642512	0.4	1.000	0.6		
05 Fev	20h 31m 42.20s	-19° 19' 10.9"	15.11	10.7	10.9486561	1.0	1.000	0.6		
12 Fev	20h 35m 04.29s	-19° 07' 37.1"	15.15	16.9	10.9205167	1.6	1.000	0.7		
19 Fev	20h 38m 21.54s	-18° 56' 08.0"	15.21	23.2	10.8801281	2.2	1.000	0.7		
26 Fev	20h 41m 32.49s	-18° 44' 50.4"	15.28	29.5	10.8280444	2.8	0.999	0.7		
05 Mar	20h 44m 35.63s	-18° 33' 51.7"	15.37	35.7	10.7649232	3.3	0.999	0.7		
12 Mar	20h 47m 29.67s	-18° 23' 18.7"	15.48	42.0	10.6914177	3.8	0.999	0.7		
19 Mar	20h 50m 12.96s	-18° 13' 19.5"	15.60	48.3	10.6083551	4.3	0.999	0.7		
26 Mar	20h 52m 44.23s	-18° 04' 01.4"	15.73	54.7	10.5167903	4.7	0.998	0.8		
02 Abr	20h 55m 02.20s	-17° 55' 31.7"	15.88	61.0	10.4178455	5.0	0.998	0.8		
09 Abr	20h 57m 05.79s	-17° 47' 56.9"	16.04	67.4	10.3126104	5.3	0.998	0.7		
16 Abr	20h 58m 53.65s	-17° 41' 23.9"	16.22	73.8	10.2023347	5.5	0.998	0.7		
23 Abr	21h 00m 24.84s	-17° 35' 58.9"	16.40	80.3	10.0884542	5.7	0.998	0.7		
30 Abr	21h 01m 38.50s	-17° 31' 46.9"	16.59	86.8	9.9724231	5.8	0.997	0.7		
07 Mai	21h 02m 33.99s	-17° 28' 51.8"	16.79	93.4	9.8556252	5.8	0.997	0.7		
14 Mai	21h 03m 10.56s	-17° 27' 17.2"	16.99	100.0	9.7395755	5.7	0.997	0.7		
21 Mai	21h 03m 27.93s	-17° 27' 05.1"	17.19	106.7	9.6259127	5.6	0.998	0.6		
28 Mai	21h 03m 26.07s	-17° 28' 15.3"	17.39	113.4	9.5162195	5.4	0.998	0.6		
04 Jun	21h 03m 05.24s	-17° 30' 46.6"	17.58	120.2	9.4119481	5.0	0.998	0.5		
11 Jun	21h 02m 25.77s	-17° 34' 35.7"	17.76	127.1	9.3146204	4.7	0.998	0.5		
18 Jun	21h 01m 28.58s	-17° 39' 38.4"	17.93	134.0	9.2257813	4.2	0.999	0.5		
25 Jun	21h 00m 15.01s	-17° 45' 46.6"	18.09	141.0	9.1468055	3.7	0.999	0.4		
02 Jul	20h 58m 46.69s	-17° 52' 52.3"	18.22	148.0	9.0788457	3.1	0.999	0.4		
09 Jul	20h 57m 05.45s	-18° 00' 45.1"	18.34	155.1	9.0230271	2.5	1.000	0.3		
16 Jul	20h 55m 13.69s	-18° 09' 14.0"	18.42	162.3	8.9803667	1.8	1.000	0.3		
23 Jul	20h 53m 14.21s	-18° 18' 05.3"	18.48	169.4	8.9515802	1.1	1.000	0.2		
30 Jul	20h 51m 09.86s	-18° 27' 06.6"	18.51	176.6	8.9370767	0.4	1.000	0.2		
06 Ago	20h 49m 03.63s	-18° 36' 04.7"	18.51	176.1	8.9371575	0.4	1.000	0.2		
13 Ago	20h 46m 58.70s	-18° 44' 47.2"	18.48	168.9	8.9519203	1.1	1.000	0.2		
20 Ago	20h 44m 58.44s	-18° 53' 00.8"	18.42	161.7	8.9810957	1.8	1.000	0.2		
27 Ago	20h 43m 05.74s	-19° 00' 35.6"	18.34	154.5	9.0241106	2.5	1.000	0.3		
03 Set	20h 41m 23.40s	-19° 07' 21.4"	18.22	147.3	9.0802969	3.1	0.999	0.3		
10 Set	20h 39m 54.00s	-19° 13' 11.0"	18.09	140.1	9.1487947	3.7	0.999	0.4		
17 Set	20h 38m 39.97s	-19° 17' 56.5"	17.93	133.0	9.2284268	4.2	0.999	0.4		
24 Set	20h 37m 42.94s	-19° 21' 33.7"	17.76	125.9	9.3178245	4.7	0.998	0.4		
01 Out	20h 37m 04.34s	-19° 23' 58.9"	17.57	118.9	9.4156265	5.1	0.998	0.5		
08 Out	20h 36m 45.16s	-19° 25' 10.1"	17.38	111.9	9.5203716	5.4	0.998	0.5		
15 Out	20h 36m 46.23s	-19° 25' 05.0"	17.18	105.0	9.6303967	5.6	0.998	0.5		
22 Out	20h 37m 07.52s	-19° 23' 44.4"	16.98	98.2	9.7439946	5.7	0.998	0.6		
29 Out	20h 37m 48.93s	-19° 21' 08.5"	16.78	91.4	9.8595810	5.7	0.997	0.6		
05 Nov	20h 38m 50.03s	-19° 17' 19.0"	16.59	84.6	9.9755674	5.7	0.998	0.6		
12 Nov	20h 40m 10.29s	-19° 12' 16.6"	16.40	77.9	10.0902688	5.6	0.998	0.6		
19 Nov	20h 41m 48.52s	-19° 06' 04.6"	16.22	71.3	10.2020737	5.4	0.998	0.7		
26 Nov	20h 43m 43.64s	-18° 58' 45.6"	16.05	64.7	10.3095749	5.2	0.998	0.7		
03 Dez	20h 45m 54.36s	-18° 50' 23.1"	15.89	58.1	10.4114235	4.8	0.998	0.7		
10 Dez	20h 48m 19.47s	-18° 40' 59.9"	15.75	51.6	10.5062454	4.5	0.998	0.7		
17 Dez	20h 50m 57.19s	-18° 30' 40.7"	15.62	45.1	10.5928159	4.0	0.999	0.7		
24 Dez	20h 53m 46.04s	-18° 19' 30.1"	15.51	38.7	10.6701590	3.6	0.999	0.7		
31 Dez	20h 56m 44.41s	-18° 07' 32.8"	15.41	32.3	10.7373877	3.0	0.999	0.7		

## Longitude do Meridiano Central de Saturno, Sistema I

00:00 Hora – Tempo Universal

	<b>Jan</b>	<b>Fev</b>	<b>Mar</b>	<b>Abr</b>	<b>Mai</b>	<b>Jun</b>	<b>Jul</b>	<b>Ago</b>	<b>Set</b>	<b>Out</b>	<b>Nov</b>	<b>Dez</b>
1	342.4	231.7	109.7	2.0	131.6	27.0	158.8	54.9	309.6	78.1	328.7	93.7
2	106.5	355.9	234.0	126.3	256.0	151.4	283.2	179.3	74.0	202.3	92.9	217.8
3	230.7	120.1	358.2	250.6	20.3	275.8	47.6	303.6	198.3	326.6	217.1	342.0
4	354.9	244.3	122.5	14.9	144.7	40.2	172.0	68.0	322.6	90.8	341.2	106.1
5	119.0	8.5	246.7	139.2	269.0	164.6	296.4	192.4	86.9	215.0	105.4	230.3
6	243.2	132.7	11.0	263.5	33.4	289.0	60.8	316.7	211.2	339.3	229.6	354.5
7	7.3	256.9	135.2	27.8	157.7	53.3	185.2	81.1	335.5	103.5	353.8	118.6
8	131.5	21.1	259.5	152.1	282.1	177.7	309.6	205.5	99.8	227.7	117.9	242.8
9	255.7	145.3	23.7	276.4	46.5	302.1	74.0	329.8	224.1	352.0	242.1	6.9
10	19.8	269.5	148.0	40.7	170.8	66.5	198.4	94.2	348.4	116.2	6.3	131.1
11	144.0	33.7	272.2	165.0	295.2	190.9	322.8	218.5	112.7	240.4	130.5	255.2
12	268.2	157.9	36.5	289.4	59.5	315.3	87.2	342.9	237.0	4.6	254.6	19.4
13	32.3	282.2	160.7	53.7	183.9	79.7	211.6	107.3	1.3	128.9	18.8	143.5
14	156.5	46.4	285.0	178.0	308.3	204.1	336.0	231.6	125.6	253.1	143.0	267.7
15	280.7	170.6	49.3	302.3	72.6	328.5	100.4	356.0	249.8	17.3	267.1	31.8
16	44.8	294.8	173.5	66.6	197.0	92.9	224.7	120.3	14.1	141.5	31.3	156.0
17	169.0	59.0	297.8	191.0	321.4	217.3	349.1	244.7	138.4	265.7	155.5	280.1
18	293.2	183.2	62.1	315.3	85.7	341.7	113.5	9.0	262.7	29.9	279.6	44.3
19	57.4	307.4	186.3	79.6	210.1	106.1	237.9	133.4	27.0	154.1	43.8	168.4
20	181.5	71.7	310.6	203.9	334.5	230.5	2.3	257.7	151.2	278.4	168.0	292.6
21	305.7	195.9	74.9	328.3	98.8	354.9	126.7	22.0	275.5	42.6	292.1	56.7
22	69.9	320.1	199.1	92.6	223.2	119.3	251.1	146.4	39.8	166.8	56.3	180.9
23	194.1	84.3	323.4	216.9	347.6	243.6	15.5	270.7	164.0	291.0	180.4	305.0
24	318.2	208.6	87.7	341.3	112.0	8.0	139.9	35.0	288.3	55.2	304.6	69.2
25	82.4	332.8	212.0	105.6	236.3	132.4	264.2	159.4	52.6	179.4	68.8	193.3
26	206.6	97.0	336.3	229.9	0.7	256.8	28.6	283.7	176.8	303.6	192.9	317.5
27	330.8	221.3	100.6	354.3	125.1	21.2	153.0	48.0	301.1	67.7	317.1	81.6
28	95.0	345.5	224.8	118.6	249.5	145.6	277.4	172.4	65.3	191.9	81.2	205.8
29	219.2		349.1	242.9	13.9	270.0	41.8	296.7	189.6	316.1	205.4	329.9
30	343.4		113.4	7.3	138.2	34.4	166.1	61.0	313.8	80.3	329.5	94.1
31	107.5		237.7		262.6		290.5	185.3		204.5		218.2

## Movimento do Meridiano Central, Sistema I

Minuto	0h o	1h o	2h o	3h o	4h o	5h o	6h o	7h o	8h o	9h o	10h o	11h o
0	0.0	35.2	70.4	105.5	140.7	175.9	211.1	246.3	281.4	316.6	351.8	35.2
10	5.9	41.0	76.2	111.4	146.6	181.8	216.9	252.1	287.3	322.5	357.7	32.8
20	11.7	46.9	82.1	117.3	152.4	187.6	222.8	258.0	293.2	328.3	3.5	38.7
30	17.6	52.8	87.9	123.1	158.3	193.5	228.7	263.8	299.0	334.2	9.4	44.6
40	23.5	58.6	93.8	129.0	164.2	199.3	234.5	269.7	304.9	340.1	15.2	50.4
50	29.3	64.5	99.7	134.9	170.0	205.2	240.4	275.6	310.7	345.9	21.1	56.3
60	35.2	70.4	105.5	140.7	175.9	211.1	246.3	281.4	316.6	351.8	27.0	62.2

## Urano

Data	$\alpha$	$\delta$	$\varnothing$	Elong. °	DT (ua)*	Ang. PH	Diâm. Equatorial	
							Período de Revolução	Inclinação Equatorial
							84 anos	0,8°
00:00 Hora – Tempo Universal								
01 Jan	02h 17m 19.49s	+13° 15' 40.6"	3.63	116.0	19.321200	2.6	1.000	5.7
08 Jan	02h 17m 05.19s	+13° 14' 41.3"	3.60	108.8	19.432133	2.7	0.999	5.7
15 Jan	02h 17m 00.78s	+13° 14' 32.4"	3.58	101.7	19.547938	2.8	0.999	5.7
22 Jan	02h 17m 06.31s	+13° 15' 14.2"	3.56	94.6	19.666727	2.8	0.999	5.8
29 Jan	02h 17m 21.88s	+13° 16' 46.9"	3.54	87.5	19.786624	2.9	0.999	5.8
05 Fev	02h 17m 47.16s	+13° 19' 08.6"	3.52	80.5	19.905898	2.8	0.999	5.8
12 Fev	02h 18m 22.02s	+13° 22' 18.1"	3.50	73.6	20.022857	2.7	0.999	5.8
19 Fev	02h 19m 05.94s	+13° 26' 12.5"	3.48	66.7	20.135743	2.6	0.999	5.8
26 Fev	02h 19m 58.46s	+13° 30' 49.0"	3.46	59.9	20.242942	2.5	1.000	5.8
05 Mar	02h 20m 58.81s	+13° 36' 03.0"	3.44	53.1	20.343079	2.3	1.000	5.8
12 Mar	02h 22m 06.44s	+13° 41' 51.5"	3.43	46.4	20.434879	2.1	1.000	5.8
19 Mar	02h 23m 20.50s	+13° 48' 09.5"	3.41	39.8	20.517083	1.8	1.000	5.8
26 Mar	02h 24m 40.23s	+13° 54' 53.0"	3.40	33.2	20.588642	1.6	1.000	5.9
02 Abr	02h 26m 04.66s	+14° 01' 56.4"	3.39	26.6	20.648779	1.3	1.000	5.9
09 Abr	02h 27m 33.06s	+14° 09' 16.0"	3.38	20.1	20.696837	1.0	1.000	5.9
16 Abr	02h 29m 04.43s	+14° 16' 46.4"	3.38	13.6	20.732192	0.7	1.000	5.9
23 Abr	02h 30m 37.93s	+14° 24' 23.4"	3.37	7.2	20.754460	0.4	1.000	5.9
30 Abr	02h 32m 12.55s	+14° 32' 01.5"	3.37	0.9	20.763522	0.0	1.000	5.9
07 Mai	02h 33m 47.40s	+14° 39' 37.4"	3.37	5.6	20.759352	0.3	1.000	5.9
14 Mai	02h 35m 21.64s	+14° 47' 06.1"	3.38	12.0	20.741967	0.6	1.000	5.9
21 Mai	02h 36m 54.33s	+14° 54' 23.8"	3.38	18.4	20.711615	0.9	1.000	5.9
28 Mai	02h 38m 24.53s	+15° 01' 25.7"	3.39	24.7	20.668789	1.2	1.000	5.9
04 Jun	02h 39m 51.45s	+15° 08' 09.1"	3.40	31.0	20.614040	1.5	1.000	5.9
11 Jun	02h 41m 14.22s	+15° 14' 29.9"	3.41	37.4	20.547953	1.8	1.000	5.9
18 Jun	02h 42m 32.01s	+15° 20' 24.9"	3.42	43.7	20.471336	2.0	1.000	5.8
25 Jun	02h 43m 44.02s	+15° 25' 50.6"	3.44	50.1	20.385212	2.3	1.000	5.8
02 Jul	02h 44m 49.56s	+15° 30' 44.8"	3.45	56.5	20.290623	2.5	1.000	5.8
09 Jul	02h 45m 47.96s	+15° 35' 04.4"	3.47	62.9	20.188632	2.6	0.999	5.8
16 Jul	02h 46m 38.51s	+15° 38' 47.4"	3.49	69.4	20.080516	2.8	0.999	5.8
23 Jul	02h 47m 20.69s	+15° 41' 51.3"	3.51	75.9	19.967717	2.9	0.999	5.8
30 Jul	02h 47m 54.03s	+15° 44' 15.1"	3.53	82.5	19.851653	2.9	0.999	5.8
06 Ago	02h 48m 18.19s	+15° 45' 57.1"	3.55	89.1	19.733741	2.9	0.999	5.8
13 Ago	02h 48m 32.79s	+15° 46' 56.5"	3.57	95.7	19.615573	2.9	0.999	5.7
20 Ago	02h 48m 37.74s	+15° 47' 12.6"	3.59	102.4	19.498844	2.9	0.999	5.7
27 Ago	02h 48m 33.01s	+15° 46' 46.0"	3.61	109.2	19.385149	2.8	0.999	5.7
03 Set	02h 48m 18.77s	+15° 45' 37.1"	3.63	116.0	19.276033	2.6	0.999	5.7
10 Set	02h 47m 55.17s	+15° 43' 47.0"	3.65	122.9	19.173141	2.5	1.000	5.7
17 Set	02h 47m 22.79s	+15° 41' 17.6"	3.67	129.9	19.078119	2.2	1.000	5.7
24 Set	02h 46m 42.16s	+15° 38' 11.8"	3.69	136.9	18.992402	2.0	1.000	5.7
01 Out	02h 45m 54.15s	+15° 34' 32.8"	3.70	143.9	18.917291	1.7	1.000	5.7
08 Out	02h 44m 59.55s	+15° 30' 24.3"	3.71	151.1	18.854080	1.4	1.000	5.7
15 Out	02h 43m 59.61s	+15° 25' 51.3"	3.72	158.2	18.803927	1.1	1.000	5.7
22 Out	02h 42m 55.47s	+15° 20' 59.2"	3.73	165.4	18.767656	0.7	1.000	5.7
29 Out	02h 41m 48.53s	+15° 15' 54.1"	3.74	172.7	18.745874	0.4	1.000	5.7
05 Nov	02h 40m 40.06s	+15° 10' 41.6"	3.74	-1.\$	18.739073	-1.\$	1.000	5.6
12 Nov	02h 39m 31.70s	+15° 05' 29.3"	3.74	172.7	18.747506	0.4	1.000	5.7
19 Nov	02h 38m 24.79s	+15° 00' 23.4"	3.73	165.3	18.771013	0.7	1.000	5.7
26 Nov	02h 37m 20.87s	+14° 55' 31.4"	3.72	158.0	18.809199	1.1	1.000	5.7
03 Dez	02h 36m 21.16s	+14° 50' 58.9"	3.71	150.7	18.861527	1.4	1.000	5.7
10 Dez	02h 35m 27.12s	+14° 46' 53.2"	3.70	143.3	18.927203	1.7	1.000	5.7
17 Dez	02h 34m 39.80s	+14° 43' 19.3"	3.69	136.0	19.005057	2.0	1.000	5.7
24 Dez	02h 34m 00.28s	+14° 40' 22.6"	3.67	128.7	19.093766	2.2	1.000	5.7
31 Dez	02h 33m 29.25s	+14° 38' 06.4"	3.65	121.5	19.191947	2.4	1.000	5.7

## Netuno

Data	$\alpha$	$\delta$	$\varnothing$	Elong. °	DT (ua)*	Ang. PH	Inclinação Equatorial		Diâm. Equatorial 49.244	
							Período de Revolução			
							30,06	165 anos		
00:00 Hora – Tempo Universal										
01 Jan	23h 18m 13.30s	-05° 40' 06.5"	2.21	67.7	30.286335	1.7	1.000	7.9		
08 Jan	23h 18m 44.45s	-05° 36' 37.5"	2.20	60.7	30.395725	1.6	1.000	7.9		
15 Jan	23h 19m 20.93s	-05° 32' 35.6"	2.20	53.7	30.498035	1.5	1.000	7.9		
22 Jan	23h 20m 02.16s	-05° 28' 04.6"	2.19	46.8	30.591714	1.4	1.000	7.9		
29 Jan	23h 20m 47.74s	-05° 23' 07.1"	2.18	39.9	30.675469	1.2	1.000	7.9		
05 Fev	23h 21m 37.00s	-05° 17' 47.4"	2.18	33.0	30.748241	1.0	1.000	7.9		
12 Fev	23h 22m 29.52s	-05° 12' 08.4"	2.17	26.2	30.809038	0.8	1.000	8.0		
19 Fev	23h 23m 24.54s	-05° 06' 14.9"	2.17	19.4	30.856978	0.6	1.000	8.0		
26 Fev	23h 24m 21.50s	-05° 00' 10.4"	2.17	12.6	30.891495	0.4	1.000	8.0		
05 Mar	23h 25m 19.66s	-04° 53' 59.8"	2.17	5.9	30.912271	0.2	1.000	8.0		
12 Mar	23h 26m 18.48s	-04° 47' 46.8"	2.17	1.4	30.919066	0.0	1.000	8.0		
19 Mar	23h 27m 17.22s	-04° 41' 35.3"	2.17	7.7	30.911782	0.3	1.000	8.0		
26 Mar	23h 28m 15.28s	-04° 35' 29.9"	2.17	14.4	30.890634	0.5	1.000	8.0		
02 Abr	23h 29m 11.97s	-04° 29' 35.0"	2.17	21.0	30.856060	0.7	1.000	8.0		
09 Abr	23h 30m 06.78s	-04° 23' 53.6"	2.17	27.7	30.808545	0.9	1.000	8.0		
16 Abr	23h 30m 59.02s	-04° 18' 30.1"	2.18	34.3	30.748708	1.1	1.000	7.9		
23 Abr	23h 31m 48.21s	-04° 13' 27.7"	2.18	40.9	30.677447	1.3	1.000	7.9		
30 Abr	23h 32m 33.76s	-04° 08' 49.9"	2.19	47.5	30.595829	1.4	1.000	7.9		
07 Mai	23h 33m 15.30s	-04° 04' 39.3"	2.20	54.1	30.504914	1.6	1.000	7.9		
14 Mai	23h 33m 52.29s	-04° 00' 58.9"	2.20	60.7	30.405869	1.7	1.000	7.9		
21 Mai	23h 34m 24.41s	-03° 57' 50.9"	2.21	67.3	30.300088	1.8	1.000	7.9		
28 Mai	23h 34m 51.29s	-03° 55' 17.5"	2.22	73.9	30.189064	1.9	1.000	7.9		
04 Jun	23h 35m 12.73s	-03° 53' 19.9"	2.23	80.5	30.074219	1.9	1.000	7.9		
11 Jun	23h 35m 28.45s	-03° 51' 59.5"	2.24	87.2	29.957045	1.9	1.000	7.9		
18 Jun	23h 35m 38.35s	-03° 51' 17.0"	2.25	93.8	29.839195	1.9	1.000	7.9		
25 Jun	23h 35m 42.35s	-03° 51' 12.5"	2.25	100.5	29.722336	1.9	1.000	7.9		
02 Jul	23h 35m 40.50s	-03° 51' 45.5"	2.26	107.2	29.607998	1.9	1.000	7.9		
09 Jul	23h 35m 32.86s	-03° 52' 55.3"	2.27	113.9	29.497724	1.8	1.000	7.9		
16 Jul	23h 35m 19.60s	-03° 54' 40.7"	2.28	120.6	29.393143	1.7	1.000	7.9		
23 Jul	23h 35m 01.01s	-03° 56' 59.5"	2.29	127.4	29.295800	1.5	1.000	7.8		
30 Jul	23h 34m 37.42s	-03° 59' 49.2"	2.29	134.2	29.207022	1.4	1.000	7.8		
06 Ago	23h 34m 09.27s	-04° 03' 06.8"	2.30	141.0	29.128090	1.2	1.000	7.8		
13 Ago	23h 33m 37.01s	-04° 06' 49.2"	2.31	147.9	29.060276	1.0	1.000	7.8		
20 Ago	23h 33m 01.31s	-04° 10' 51.8"	2.31	154.7	29.004666	0.8	1.000	7.8		
27 Ago	23h 32m 22.76s	-04° 15' 10.6"	2.31	161.6	28.962052	0.6	1.000	7.8		
03 Set	23h 31m 42.11s	-04° 19' 40.6"	2.32	168.6	28.933121	0.4	1.000	7.8		
10 Set	23h 31m 00.02s	-04° 24' 17.5"	2.32	175.5	28.918469	0.2	1.000	7.8		
17 Set	23h 30m 17.42s	-04° 28' 55.3"	2.32	177.1	28.918415	0.1	1.000	7.8		
24 Set	23h 29m 35.01s	-04° 33' 29.3"	2.32	170.3	28.932943	0.3	1.000	7.8		
01 Out	23h 28m 53.67s	-04° 37' 53.9"	2.31	163.3	28.961906	0.6	1.000	7.8		
08 Out	23h 28m 14.10s	-04° 42' 04.9"	2.31	156.2	29.005020	0.8	1.000	7.8		
15 Out	23h 27m 37.23s	-04° 45' 56.2"	2.31	149.1	29.061695	1.0	1.000	7.8		
22 Out	23h 27m 03.66s	-04° 49' 24.4"	2.30	142.0	29.131017	1.2	1.000	7.8		
29 Out	23h 26m 34.13s	-04° 52' 24.7"	2.29	134.9	29.211984	1.3	1.000	7.8		
05 Nov	23h 26m 09.17s	-04° 54' 54.2"	2.29	127.8	29.303473	1.5	1.000	7.8		
12 Nov	23h 25m 49.43s	-04° 56' 48.9"	2.28	120.7	29.404099	1.6	1.000	7.9		
19 Nov	23h 25m 35.20s	-04° 58' 07.1"	2.27	113.6	29.512240	1.7	1.000	7.9		
26 Nov	23h 25m 26.91s	-04° 58' 46.6"	2.26	106.5	29.626285	1.8	1.000	7.9		
03 Dez	23h 25m 24.68s	-04° 58' 46.9"	2.25	99.4	29.744585	1.9	1.000	7.9		
10 Dez	23h 25m 28.80s	-04° 58' 06.3"	2.24	92.3	29.865326	1.9	1.000	7.9		
17 Dez	23h 25m 39.13s	-04° 56' 45.9"	2.23	85.2	29.986595	1.9	1.000	7.9		
24 Dez	23h 25m 55.70s	-04° 54' 45.9"	2.23	78.2	30.106617	1.8	1.000	7.9		
31 Dez	23h 26m 18.24s	-04° 52' 08.3"	2.22	71.1	30.223689	1.8	1.000	7.9		

## (134340) Plutão

Data	$\alpha$	$\delta$	$\varnothing$	Elong. °	Inclinação Equatorial		Diâm. Equatorial 2.200-2.300	
					Período de Revolução			
					39,44	248 anos		
00:00 Hora – Tempo Universal								
01 Jan	19h 43m 59.52s	-22° 30' 06.0"	0.12	13.5	35.147251	0.4	1.000 14.4	
08 Jan	19h 44m 58.71s	-22° 28' 15.2"	0.12	6.6	35.173000	0.2	1.000 14.4	
15 Jan	19h 45m 58.65s	-22° 26' 23.2"	0.12	1.2	35.184416	0.0	1.000 14.4	
22 Jan	19h 46m 58.47s	-22° 24' 31.3"	0.12	7.4	35.181375	0.2	1.000 14.4	
29 Jan	19h 47m 57.59s	-22° 22' 41.9"	0.12	14.2	35.164088	0.4	1.000 14.4	
05 Fev	19h 48m 55.23s	-22° 20' 57.0"	0.12	21.1	35.132930	0.6	1.000 14.4	
12 Fev	19h 49m 50.87s	-22° 19' 17.7"	0.12	28.0	35.088349	0.8	1.000 14.4	
19 Fev	19h 50m 43.70s	-22° 17' 46.4"	0.12	34.8	35.031045	0.9	1.000 14.4	
26 Fev	19h 51m 33.25s	-22° 16' 24.4"	0.12	41.7	34.962010	1.1	1.000 14.4	
05 Mar	19h 52m 18.86s	-22° 15' 13.4"	0.12	48.5	34.882347	1.2	1.000 14.4	
12 Mar	19h 53m 00.18s	-22° 14' 14.8"	0.12	55.4	34.793181	1.4	1.000 14.4	
19 Mar	19h 53m 36.57s	-22° 13' 29.9"	0.12	62.2	34.695851	1.5	1.000 14.4	
26 Mar	19h 54m 07.79s	-22° 12' 59.7"	0.12	69.0	34.591905	1.6	1.000 14.4	
02 Abr	19h 54m 33.43s	-22° 12' 45.2"	0.12	75.8	34.482913	1.6	1.000 14.4	
09 Abr	19h 54m 53.36s	-22° 12' 46.9"	0.12	82.6	34.370394	1.7	1.000 14.4	
16 Abr	19h 55m 07.26s	-22° 13' 05.2"	0.12	89.5	34.256014	1.7	1.000 14.3	
23 Abr	19h 55m 15.15s	-22° 13' 40.3"	0.12	96.3	34.141546	1.7	1.000 14.3	
30 Abr	19h 55m 16.97s	-22° 14' 31.8"	0.12	103.1	34.028682	1.6	1.000 14.3	
07 Mai	19h 55m 12.87s	-22° 15' 39.6"	0.12	109.9	33.918985	1.6	1.000 14.3	
14 Mai	19h 55m 02.89s	-22° 17' 02.5"	0.12	116.7	33.814087	1.5	1.000 14.3	
21 Mai	19h 54m 47.38s	-22° 18' 40.0"	0.12	123.5	33.715623	1.4	1.000 14.3	
28 Mai	19h 54m 26.62s	-22° 20' 30.3"	0.12	130.3	33.625050	1.3	1.000 14.3	
04 Jun	19h 54m 01.08s	-22° 22' 32.4"	0.12	137.1	33.543619	1.2	1.000 14.3	
11 Jun	19h 53m 31.14s	-22° 24' 44.2"	0.12	143.9	33.472589	1.0	1.000 14.3	
18 Jun	19h 52m 57.42s	-22° 27' 04.3"	0.12	150.7	33.413122	0.8	1.000 14.3	
25 Jun	19h 52m 20.54s	-22° 29' 30.2"	0.12	157.5	33.366118	0.6	1.000 14.3	
02 Jul	19h 51m 41.17s	-22° 32' 00.3"	0.12	164.3	33.332230	0.5	1.000 14.3	
09 Jul	19h 50m 59.98s	-22° 34' 31.9"	0.12	171.1	33.312066	0.3	1.000 14.3	
16 Jul	19h 50m 17.73s	-22° 37' 03.6"	0.12	177.6	33.306072	0.1	1.000 14.3	
23 Jul	19h 49m 35.24s	-22° 39' 32.4"	0.12	174.8	33.314380	0.2	1.000 14.3	
30 Jul	19h 48m 53.23s	-22° 41' 57.2"	0.12	168.1	33.336868	0.3	1.000 14.3	
06 Ago	19h 48m 12.46s	-22° 44' 15.2"	0.12	161.3	33.373357	0.5	1.000 14.3	
13 Ago	19h 47m 33.67s	-22° 46' 25.4"	0.12	154.4	33.423477	0.7	1.000 14.3	
20 Ago	19h 46m 57.67s	-22° 48' 25.3"	0.12	147.6	33.486540	0.9	1.000 14.3	
27 Ago	19h 46m 25.03s	-22° 50' 14.3"	0.12	140.7	33.561647	1.1	1.000 14.3	
03 Set	19h 45m 56.41s	-22° 51' 50.5"	0.12	133.8	33.647868	1.2	1.000 14.3	
10 Set	19h 45m 32.33s	-22° 53' 13.4"	0.12	126.9	33.744104	1.3	1.000 14.3	
17 Set	19h 45m 13.38s	-22° 54' 21.4"	0.12	120.1	33.848979	1.5	1.000 14.3	
24 Set	19h 44m 59.82s	-22° 55' 14.8"	0.12	113.2	33.960997	1.5	1.000 14.3	
01 Out	19h 44m 52.06s	-22° 55' 52.4"	0.12	106.3	34.078691	1.6	1.000 14.3	
08 Out	19h 44m 50.25s	-22° 56' 14.7"	0.12	99.4	34.200487	1.6	1.000 14.4	
15 Out	19h 44m 54.67s	-22° 56' 20.8"	0.12	92.5	34.324617	1.7	1.000 14.4	
22 Out	19h 45m 05.19s	-22° 56' 11.7"	0.12	85.6	34.449308	1.7	1.000 14.4	
29 Out	19h 45m 21.86s	-22° 55' 47.3"	0.12	78.7	34.572905	1.6	1.000 14.4	
05 Nov	19h 45m 44.47s	-22° 55' 08.4"	0.12	71.7	34.693724	1.6	1.000 14.4	
12 Nov	19h 46m 12.96s	-22° 54' 15.4"	0.12	64.8	34.809997	1.5	1.000 14.4	
19 Nov	19h 46m 46.80s	-22° 53' 09.5"	0.12	57.9	34.920068	1.4	1.000 14.4	
26 Nov	19h 47m 25.78s	-22° 51' 51.4"	0.12	51.0	35.022494	1.3	1.000 14.4	
03 Dez	19h 48m 09.33s	-22° 50' 22.6"	0.12	44.1	35.115885	1.1	1.000 14.4	
10 Dez	19h 48m 57.12s	-22° 48' 44.1"	0.12	37.2	35.198864	1.0	1.000 14.4	
17 Dez	19h 49m 48.38s	-22° 46' 57.6"	0.12	30.3	35.270279	0.8	1.000 14.4	
24 Dez	19h 50m 42.63s	-22° 45' 04.5"	0.12	23.4	35.329253	0.6	1.000 14.4	
31 Dez	19h 51m 39.16s	-22° 43' 06.6"	0.12	16.5	35.375028	0.5	1.000 14.4	

# (1) Ceres

Data	$\alpha$	$\delta$	$\varnothing$	Elong. °	DT (ua)*	Ang. PH	Diâm. Equatorial	
							Período de Revolução	Inclinação Equatorial
							4.59 anos	10,5°
00:00 Hora – Tempo Universal								
01 Jan	23h 10m 27.7s	-15° 31' 37"	0.00	62.5	3.2806	17.1	0.978	9.2
08 Jan	23h 18m 16.0s	-14° 24' 53"	0.00	57.6	3.3630	16.3	0.980	9.2
15 Jan	23h 26m 26.0s	-13° 16' 36"	0.00	52.8	3.4410	15.4	0.982	9.3
22 Jan	23h 34m 54.6s	-12° 07' 01"	0.00	48.1	3.5139	14.4	0.984	9.3
29 Jan	23h 43m 39.3s	-10° 56' 25"	0.00	43.5	3.5814	13.3	0.987	9.3
05 Fev	23h 52m 37.8s	-09° 45' 01"	0.00	39.0	3.6432	12.2	0.989	9.3
12 Fev	00h 01m 48.8s	-08° 33' 02"	0.00	34.6	3.6990	11.0	0.991	9.2
19 Fev	00h 11m 10.4s	-07° 20' 42"	0.00	30.3	3.7484	9.8	0.993	9.2
26 Fev	00h 20m 41.1s	-06° 08' 17"	0.00	26.1	3.7912	8.5	0.994	9.2
05 Mar	00h 30m 19.7s	-04° 56' 01"	0.00	21.9	3.8273	7.3	0.996	9.1
12 Mar	00h 40m 05.5s	-03° 44' 04"	0.00	17.9	3.8566	6.0	0.997	9.1
19 Mar	00h 49m 57.4s	-02° 32' 41"	0.00	14.2	3.8790	4.8	0.998	9.0
26 Mar	00h 59m 54.4s	-01° 22' 07"	0.00	10.7	3.8943	3.6	0.999	9.0
02 Abr	01h 09m 55.8s	-00° 12' 34"	0.00	8.0	3.9027	2.7	0.999	8.9
09 Abr	01h 20m 01.1s	+00° 55' 46"	0.00	7.0	3.9041	2.4	1.000	8.9
16 Abr	01h 30m 09.5s	+02° 02' 42"	0.00	8.1	3.8985	2.8	0.999	8.9
23 Abr	01h 40m 20.3s	+03° 07' 59"	0.00	10.8	3.8860	3.7	0.999	9.0
30 Abr	01h 50m 32.5s	+04° 11' 26"	0.00	14.1	3.8668	4.9	0.998	9.0
07 Mai	02h 00m 45.9s	+05° 12' 55"	0.00	17.7	3.8410	6.1	0.997	9.1
14 Mai	02h 10m 59.6s	+06° 12' 15"	0.00	21.5	3.8086	7.3	0.996	9.1
21 Mai	02h 21m 12.4s	+07° 09' 13"	0.00	25.3	3.7698	8.6	0.994	9.1
28 Mai	02h 31m 23.2s	+08° 03' 42"	0.00	29.2	3.7249	9.9	0.993	9.2
04 Jun	02h 41m 31.4s	+08° 55' 34"	0.00	33.1	3.6741	11.1	0.991	9.2
11 Jun	02h 51m 35.6s	+09° 44' 43"	0.00	37.1	3.6174	12.3	0.989	9.2
18 Jun	03h 01m 34.1s	+10° 30' 59"	0.00	41.1	3.5552	13.5	0.986	9.2
25 Jun	03h 11m 25.1s	+11° 14' 17"	0.00	45.2	3.4878	14.6	0.984	9.2
02 Jul	03h 21m 07.2s	+11° 54' 36"	0.00	49.3	3.4155	15.7	0.981	9.2
09 Jul	03h 30m 38.2s	+12° 31' 51"	0.00	53.6	3.3384	16.7	0.979	9.2
16 Jul	03h 39m 55.4s	+13° 06' 00"	0.00	57.8	3.2570	17.6	0.977	9.1
23 Jul	03h 48m 55.9s	+13° 37' 03"	0.00	62.2	3.1717	18.4	0.974	9.1
30 Jul	03h 57m 37.1s	+14° 05' 03"	0.00	66.7	3.0829	19.2	0.972	9.1
06 Ago	04h 05m 55.4s	+14° 30' 05"	0.00	71.3	2.9910	19.8	0.970	9.0
13 Ago	04h 13m 46.7s	+14° 52' 12"	0.00	76.0	2.8965	20.3	0.969	9.0
20 Ago	04h 21m 06.3s	+15° 11' 33"	0.00	80.9	2.7999	20.7	0.968	8.9
27 Ago	04h 27m 50.0s	+15° 28' 20"	0.00	86.0	2.7021	21.0	0.967	8.8
03 Set	04h 33m 52.5s	+15° 42' 45"	0.00	91.2	2.6035	21.0	0.967	8.7
10 Set	04h 39m 07.3s	+15° 55' 01"	0.00	96.7	2.5049	20.9	0.967	8.6
17 Set	04h 43m 28.4s	+16° 05' 26"	0.00	102.4	2.4075	20.5	0.968	8.5
24 Set	04h 46m 49.7s	+16° 14' 19"	0.00	108.4	2.3121	19.9	0.970	8.4
01 Out	04h 49m 05.0s	+16° 21' 59"	0.00	114.7	2.2198	19.0	0.973	8.3
08 Out	04h 50m 07.5s	+16° 28' 44"	0.00	121.3	2.1318	17.9	0.976	8.2
15 Out	04h 49m 52.4s	+16° 34' 54"	0.00	128.2	2.0497	16.4	0.980	8.0
22 Out	04h 48m 17.2s	+16° 40' 48"	0.00	135.5	1.9749	14.6	0.984	7.9
29 Out	04h 45m 21.6s	+16° 46' 38"	0.00	143.1	1.9088	12.5	0.988	7.7
05 Nov	04h 41m 08.5s	+16° 52' 36"	0.00	151.0	1.8531	10.0	0.992	7.6
12 Nov	04h 35m 46.9s	+16° 58' 52"	0.00	159.1	1.8091	7.4	0.996	7.4
19 Nov	04h 29m 31.3s	+17° 05' 39"	0.00	167.3	1.7782	4.5	0.998	7.2
26 Nov	04h 22m 40.3s	+17° 13' 07"	0.00	174.7	1.7610	1.9	1.000	7.0
03 Dez	04h 15m 36.0s	+17° 21' 32"	0.00	173.2	1.7583	2.4	1.000	7.0
10 Dez	04h 08m 42.9s	+17° 31' 17"	0.00	165.3	1.7700	5.2	0.998	7.2
17 Dez	04h 02m 24.6s	+17° 42' 51"	0.00	157.0	1.7955	8.1	0.995	7.4
24 Dez	03h 57m 00.5s	+17° 56' 37"	0.00	148.7	1.8339	10.8	0.991	7.5
31 Dez	03h 52m 45.0s	+18° 12' 57"	0.00	140.7	1.8840	13.3	0.987	7.7

# VIII - Meteoros

00:00 Tempo Universal

Chuva	Período Atividade	Máximo			Radiante			V $\infty$ km/s	THZ	Lua
		Data	$\lambda\Theta$	$\alpha$	$\delta$					
Corrente Antélio	(ANT)	10 Dez - 10 Set	—	—	—	—	30	4	—	—
Quadrantídeos	(010 QUA)	28 Dez - 12 Jan	03 Jan	283°.15	230°	+49°	41	110	-0.844	
$\gamma$ - Ursae Minorídeos	(404 GUM)	10 Jan - 22 Jan	19 Jan	298°	228°	+67°	31	3	+0.327	
$\alpha$ -Centaurídeos	(102 ACE)	31 Jan - 20 Fev	08 Fev	319°.2	210°	-59°	58	6	-0.164	
$\gamma$ -Normideas	(118 GNO)	25 Fev - 28 Mar	14 Mar	354°	239°	-50°	56	6	+0.005	
Lirídeos	(006 LYR)	14 Abr - 30 Abr	22 Abr	32°.32	271°	+34°	49	18	+0.676	
$\pi$ -Pupídeos	(137 PPU)	15 Abr - 28 Abr	23 Abr	33°.5	110°	-45°	18	Var	+0.773	
$\eta$ -Aquarídeos	(031 ETA)	19 Abr - 28 Mai	05 Mai	45°.5	338°	-01°	66	50	-0.380	
$\eta$ -Lirídeos	(145 ELY)	03 Mai - 14 Mai	08 Mai	48°.0	287°	+44°	43	3	-0.127	
Arietídeos (Diurna)	(171 ARI)	14 Mai - 24 Jun	07 Jun	76°.6	44°	+24°	38	30	-0.104	
Bootídeos de Junho	(170 JBO)	22 Jun - 02 Jul	27 Jun	95°.7	224°	+48°	18	Var	-0.931	
Pisces Australídeos	(183 PAU)	15 Jul - 10 Ago	29 Jul	125°	341°	-30°	35	5	-0.740	
$\delta$ -Aquarídeos Sul	(005 SDA)	12 Jul - 23 Ago	30 Jul	127°	340°	-16°	41	25	-0.649	
$\alpha$ -Capricornídeos	(001 CAP)	12 Jul - 23 Ago	30 Jul	127°	307°	-10°	23	5	-0.649	
Perseídeos	(007 PER)	17 Jul - 24 Ago	12 Ago	140°.0	48°	+58°	59	100	+0.134	
$\kappa$ -Cignídeos	(012 KCG)	03 Ago - 25 Ago	17 Ago	145°	286°	+59°	25	3	+0.655	
Aurigídeos	(206 AUR)	28 Ago - 05 Set	01 Set	158°.6	91°	+39°	66	6	-0.343	
$\epsilon$ -Perseídeos de Setembro	(208 SPE)	05 Set - 21 Set	09 Set	166°.7	48°	+40°	64	5	0.051	
Sextántidas (Diurna)	(221 DSX)	09 Set - 09 Out	27 Set	184°.3	152°	+00°	32	5	-0.693	
Camelopardalídeos de Outubro	(281 OCT)	05 Out - 06 Out	05 Out	192°.58	164°	+79°	47	5	-0.030	
Draconídeos	(009 DRA)	06 Out - 10 Out	08 Out	195°.4	262°	+54°	20	10	+0.034	
Taurídeos austrais	(002 STA)	10 Set - 20 Nov	10 Out	197°	32°	+09°	27	5	+0.168	
$\delta$ -Aurigídeos	(224 DAU)	10 Out - 18 Out	11 Out	198°	84°	+44°	64	2	+0.265	
$\epsilon$ -Geminídeos	(023 EGE)	14 Out - 27 Out	18 Out	205°	102°	+27°	70	3	+0.931	
Orionídeos	(008 ORI)	02 Out - 07 Nov	21 Out	208°	95°	+16°	66	20	-0.998	
Leo Minorídeos	(022 LMI)	19 Out - 27 Out	24 Out	211°	162°	+37°	62	2	-0.899	
Taurídeos Boreais	(017 NTA)	20 Out - 10 Dez	12 Nov	230°	58°	+22°	29	5	+0.552	
Leonídeos	(013 LEO)	06 Nov - 30 Nov	17 Nov	235°.27	152°	+22°	71	10	+0.949	
$\alpha$ -Monocerotídeas	(246 AMO)	15 Nov - 25 Nov	21 Nov	239°.32	117°	+01°	65	Var	-0.977	
Orionídeos de Novembro	(250 NOO)	13 Nov - 06 Dez	28 Nov	246°	91°	+16°	44	3	-0.451	
Fenicídeos	(254 PHO)	28 Nov - 09 Dez	02 Dez	250°.0	18°	-53°	18	Var	-0.080	
Pupidas-Velidas	(301 PUP)	01 Dez - 15 Dez	(07 Dez)	(255°)	123°	-45°	40	10	+0.106	
Monocerotídeas	(019 MON)	05 Dez - 20 Dez	09 Dez	257°	100°	+08°	41	3	+0.286	
$\sigma$ -Hidrídeos	(016 HYD)	03 Dez - 20 Dez	09 Dez	257°	125°	+02°	58	7	+0.286	
Geminídeos	(004 GEM)	04 Dez - 20 Dez	14 Dez	262°.2	112°	+33°	35	150	+0.778	
Coma Berenicideos	(020 COM)	12 Dez - 23 Dez	16 Dez	264°	175°	+18°	65	3	+0.913	
Leo Minorídeos de Dezembro	(032 DLM)	05 Dez - 04 Fev	19 Dez	268°	161°	+30°	64	5	+0.999	
Ursídeos	(015 URS)	17 Dez - 26 Dez	22 Dez	270°.7	217°	+76°	33	10	-0.929	

**Notas:**

**1 - THZ = Taxa Horária Zenital.** Este valor indica o número de meteoros que um observador poderia observar durante uma hora (60 minutos), se o radiante estiver situado no zênite, onde a absorção atmosférica é mínima. Na contagem adota-se o limite padrão de magnitude de = 5,6.

**2 - V $\infty$  - km/s** – Velocidade Geocêntrica.

**3 -  $\lambda\Theta$  - Longitude solar.** Medida precisa da posição da Terra em sua órbita (J2000.0).

**4 – (301 PUP)** A data máxima entre parênteses para 301 PUP, indica apenas uma data de referência para o radiante, não necessariamente o máximo verdadeiro.

# IX - Asteroides

(54) Alexandra		$a$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ (km)	160.12	Mag.	Max.	Opp:	12.3
Data				Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
03 Dez 2020	07h 19m 55.14s	+31° 57' 22.2"	2.34588	3.18709	142.7	18.2	12.8		
02 Jan 2021	06h 51m 19.35s	+32° 04' 04.4"	2.23415	3.20874	170.8	17.8	12.3		
07 Feb 2021	06h 20m 05.16s	+30° 25' 34.7"	2.44744	3.22830	135.7	11.2	13.0		
(26) Proserpina		$a$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ (km)	94.8	Mag.	Max.	Opp:	11.1
Data				Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
14 Dez 2020	08h 41m 33.69s	+22° 59' 40.2"	1.99778	2.78427	135.2	13.8	12.0		
20 Jan 2021	08h 14m 38.80s	+25° 18' 38.4"	1.77362	2.75485	174.6	1.9	11.1		
26 Feb 2021	07h 44m 30.83s	+26° 20' 42.6"	1.92447	2.72310	135.8	14.7	11.9		
(15) Eunomia		$a$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ (km)	231.6	Mag.	Max.	Opp:	8.3
Data				Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
16 Dez 2020	08h 45m 27.71s	+18° 05' 49.4"	1.68337	2.48132	135.2	16.1	9.0		
21 Jan 2021	08h 13m 43.66s	+16° 56' 32.1	1.57006	2.55327	176.9	1.2	8.3		
28 Feb 2021	07h 43m 32.45s	+16° 08' 49.2"	1.83081	2.62920	135.3	15.4	9.3		
(14) Irene		$a$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ (km)	152	Mag.	Max.	Opp:	9.3
Data				Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
19 Dez 2020	09h 01m 27.56s	+23° 47' 41.5"	1.56826	2.37573	135.9	15.7	10.2		
24 Jan 2021	08h 39m 29.90s	+28° 36' 00.6"	1.34153	2.31739	170.0	4.2	9.3		
01 Mar 2021	08h 09m 53.08s	+31° 15' 04.7"	1.44205	2.26515	136.4	17.6	9.9		
(10) Hygiea		$a$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ (km)	407.2	Mag.	Max.	Opp:	9.8
Data				Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
22 Dez 2020	09h 06m 49.60s	+14° 49' 03.9"	2.46969	3.24576	135.5	12.2	10.7		
29 Jan 2021	08h 42m 03.44s	+15° 45' 55.3"	2.22244	3.20673	177.5	0.7	9.8		
08 Mar 2021	08h 16m 41.49s	+16° 57' 17.8"	2.38456	3.16638	135.1	12.8	10.6		
(21) Lutetia		$a$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ (km)	95.7	Mag.	Max.	Opp:	11.2
Data				Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
24 Dez 2020	09h 20m 54.94s	+18° 29' 23.2"	1.98047	2.76833	135.3	14.4	12.0		
30 Jan 2021	08h 51m 49.60s	+21° 18' 15.5"	1.81290	2.79666	176.4	1.4	11.2		
07 Mar 2021	08h 22m 28.69s	+23° 03' 08.2"	2.01709	2.81666	136.0	14.2	12.1		
(76) Freia		$a$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ (km)	145.4	Mag.	Max.	Opp:	11.9
Data				Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
25 Dez 2020	09h 15m 06.19s	+12° 55' 40.4"	2.10265	2.89256	136.0	13.6	12.7		
31 Jan 2021	08h 53m 01.56s	+14° 20' 51.4"	1.93825	2.92243	176.8	1.0	11.9		
11 Mar 2021	08h 30m 44.67s	+16° 14' 11.2"	2.16866	2.96090	135.5	13.6	12.8		
(60) Echo		$a$ (J2000.0)	$\delta$ (J2000.0)	$\varnothing$ (km)	43.2	Mag.	Max.	Opp:	10.3
Data				Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
27 Dez 2020	09h 19m 02.04s	+09° 23' 32.1"	1.13288	1.96204	135.8	20.4	11.1		
02 Fev 2021	08h 55m 20.00s	+11° 03' 35.8"	1.00989	1.99254	173.9	3.0	10.3		
12 Mar 2021	08h 34m 25.58s	+14° 18' 45.8"	1.20711	2.04072	135.8	19.9	11.5		

(18) Melpomene			$\varnothing$ (km)	139.6	Mag.	Max.	Opp:	9.5
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
29 Dez 2020	09h 26m 13.01s	+07° 49' 24.4"	1.51488	2.32178	135.5	17.2	10.2	
02 Fev 2021	08h 57m 39.78s	+11° 54' 43.2"	1.42178	2.40492	174.9	2.1	9.5	
11 Mar 2021	08h 30m 59.34s	+16° 41' 39.4"	1.67833	2.48667	135.5	16.3	10.6	
(94) Aurora			$\varnothing$ (km)	204.8	Mag.	Max.	Opp:	11.8
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
30 Dez 2020	09h 52m 12.78s	+22° 05' 12.7"	2.23794	3.01556	135.1	13.3	12.5	
05 Fev 2021	09h 27m 37.22s	+23° 55' 39.0"	2.06890	3.04744	171.4	2.7	11.8	
15 Mar 2021	09h 00m 13.24s	+24° 06' 14.0"	2.28918	3.08141	135.8	13.0	12.6	
(88) Thisbe			$\varnothing$ (km)	232	Mag.	Max.	Opp:	11.6
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
02 Jan 2021	09h 45m 19.19s	+09° 08' 39.9"	2.43858	3.21823	135.8	12.5	12.4	
08 Fev 2021	09h 18m 57.62s	+10° 18' 38.2"	2.23084	3.21456	174.9	2.9	11.6	
17 Mar 2021	08h 53m 10.83s	+12° 07' 56.1"	2.41588	3.20461	135.7	13.5	12.4	
(72) Feronia			$\varnothing$ (km)	75	Mag.	Max.	Opp:	12.3
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
08 Jan 2021	10h 04m 14.97s	+03° 49' 55.5"	1.74254	2.53836	135.3	15.7	13.1	
13 Fev 2021	09h 36m 04.91s	+05° 53' 34.7"	1.54890	2.53043	172.0	3.1	12.3	
22 Mar 2021	09h 08m 32.83s	+09° 35' 21.0"	1.70980	2.51499	135.0	16.3	13.1	
(77) Frigga			$\varnothing$ (km)	61.4	Mag.	Max.	Opp:	11.8
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
15 Jan 2021	10h 44m 36.86s	+10 18' 30.1"	1.76466	2.56500	135.9	15.4	12.7	
21 Fev 2021	10h 18m 30.20s	+12 33' 15.3"	1.62832	2.61690	178.0	0.7	11.8	
31 Mar 2021	09h 52m 38.42s	+14 10' 01.1"	1.86666	2.67032	135.2	15.3	12.9	
(29) Amphitrite			$\varnothing$ (km)	189.6	Mag.	Max.	Opp:	9.1
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
16 Jan 2021	10h 54m 37.26s	+12° 03' 07.7"	1.72876	2.52434	135.2	15.9	9.9	
22 Fev 2021	10h 27m 28.66s	+13° 49' 47.0"	1.56575	2.55350	176.1	1.5	9.1	
01 Abr 2021	09h 58m 42.28s	+14° 37' 08.9"	1.77405	2.58314	135.4	15.8	10.0	
(70) Panopaea			$\varnothing$ (km)	128	Mag.	Max.	Opp:	12.4
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
22 Jan 2021	11h 25m 38.93s	+20° 25' 52.9"	2.22897	3.01331	135.7	13.1	13.0	
26 Fev 2021	11h 01m 50.78s	+23° 54' 15.2"	2.01529	2.97855	163.7	5.4	12.4	
03 Abr 2021	10h 30m 56.23s	+24° 48' 55.3"	2.14245	2.93641	135.0	14.0	12.9	
(4) Vesta			$\varnothing$ (km)	525.4	Mag.	Max.	Opp:	5.8
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
27 Jan 2021	11h 39m 47.87s	+11° 16' 13.2"	2.38149	1.57719	135.4	16.8	6.5	
04 Mar 2021	11h 19m 09.50s	+16° 01' 54.1"	1.36451	2.34594	169.2	4.5	5.8	
10 Abr 2021	10h 50m 37.41s	+18° 44' 35.3"	2.30934	1.48332	135.7	17.7	6.4	

(93) Minerva		$a(J2000.0)$	$\delta(J2000.0)$	$\emptyset$ (km) Dist. Terra (ua)	154.2 Dist. Sol (ua)	Mag.	Max. Opp:	11.7
Data					Elong. °	Ang. PH	Mag.	
30 Jan 2021	11h 45m 14.68s	+06° 47' 58.0"	2.10867	2.89832	135.8	13.6	12.6	
08 Mar 2021	11h 19m 59.60s	+08° 24' 11.5"	1.85858	2.84973	176.2	1.3	11.7	
15 Abr 2021	10h 51m 07.16s	+09° 20' 38.1"	1.99118	2.79718	135.5	14.6	12.4	

(55) Pandora		$a(J2000.0)$	$\delta(J2000.0)$	$\emptyset$ (km) Dist. Terra (ua)	84.8 Dist. Sol (ua)	Mag.	Max. Opp:	11.9
Data					Elong. °	Ang. PH	Mag.	
03 Feb 2021	12h 00m 10.24s	+04° 25' 56.4"	2.30168	3.08448	135.6	12.9	12.7	
12 Mar 2021	11h 34m 58.78s	+06° 24' 59.2"	2.11761	3.11002	176.5	1.1	11.9	
20 Abr 2021	11h 07m 46.14s	+07° 49' 48.6"	2.33848	3.13102	135.0	13.1	12.7	

(35) Leukothea		$a(J2000.0)$	$\delta(J2000.0)$	$\emptyset$ (km) Dist. Terra (ua)	103 Dist. Sol (ua)	Mag.	Max. Opp:	11.2
Data					Elong. °	Ang. PH	Mag.	
19 Feb 2021	12h 51m 53.04s	-06° 26' 46.1"	1.56539	2.37642	135.8	14.1	12.3	
30 Mar 2021	12h 27m 33.07s	-07° 00' 29.4"	1.34304	2.34044	176.2	1.6	11.2	
08 Mai 2021	12h 03m 26.15s	-06° 35' 39.2"	1.48940	2.32198	135.7	19.3	12.2	

(9) Metis		$a(J2000.0)$	$\delta(J2000.0)$	$\emptyset$ (km) Dist. Terra (ua)	190 Dist. Sol (ua)	Mag.	Max. Opp:	9.4
Data					Elong. °	Ang. PH	Mag.	
27 Feb 2021	13h 31m 50.63s	-01° 35' 19.0"	1.64452	2.45505	135.9	16.2	10.1	
05 Abr 2021	13h 05m 05.52s	+01° 13' 12.1"	1.50631	2.50145	172.4	3.0	9.4	
13 Mai 2021	12h 36m 58.44s	+02° 21' 41.2"	1.72746	2.54501	135.0	16.3	10.4	

(69) Hesperia		$a(J2000.0)$	$\delta(J2000.0)$	$\emptyset$ (km) Dist. Terra (ua)	138.2 Dist. Sol (ua)	Mag.	Max. Opp:	11.2
Data					Elong. °	Ang. PH	Mag.	
17 Mar 2021	14h 39m 03.02s	-10° 49' 57.5"	2.12390	2.91707	135.3	13.8	11.9	
24 Abr 2021	14h 17m 17.13s	-07° 00' 10.8"	1.98047	2.98198	173.6	2.1	11.2	
03 Jun 2021	13h 54m 11.22s	-04° 14' 13.9"	2.24357	3.04870	135.2	12.2	12.1	

(37) Fides		$a(J2000.0)$	$\delta(J2000.0)$	$\emptyset$ (km) Dist. Terra (ua)	108.4 Dist. Sol (ua)	Mag.	Max. Opp:	11.4
Data					Elong. °	Ang. PH	Mag.	
03 Abr 2021	15h 36m 35.15s	-21° 55' 12.7"	3.03977	2.23962	136.0	13.1	12.1	
11 Mai 2021	15h 07m 54.32s	-20° 50' 06.3"	3.06759	2.05862	176.8	1.0	11.4	
19 Jun 2021	14h 40m 14.32s	-18° 55' 09.4"	3.08832	2.27783	135.7	13.3	12.2	

(46) Hestia		$a(J2000.0)$	$\delta(J2000.0)$	$\emptyset$ (km) Dist. Terra (ua)	131.4 Dist. Sol (ua)	Mag.	Max. Opp:	12.0
Data					Elong. °	Ang. PH	Mag.	
07 Abr 2021	15h 59m 47.79s	-18° 08' 42.3"	1.96184	2.76622	135.4	14.6	13.1	
11 Mai 2021	15h 32m 50.50s	-16° 01' 51.5"	1.69745	2.70763	176.9	1.1	12.0	
19 Jun 2021	15h 03m 51.52s	-14° 10' 35.9"	1.82451	2.64321	135.0	15.8	12.8	

(63) Ausonia		$a(J2000.0)$	$\delta(J2000.0)$	$\emptyset$ (km) Dist. Terra (ua)	116 Dist. Sol (ua)	Mag.	Max. Opp:	9.6
Data					Elong. °	Ang. PH	Mag.	
25 Abr 2021	17h 06m 17.05s	-32° 20' 21.0"	1.29627	2.13285	135.3	19.3	10.4	
03 Jun 2021	16h 38m 41.90s	-33° 17' 10.9"	1.10243	2.10690	168.9	5.3	9.6	
13 Jul 2021	16h 11m 40.75s	-30° 29' 57.9"	1.24437	2.09268	135.2	20.0	10.3	

(30) Urania			$\phi$ (km)	92.8	Mag.	Max. Opp:	10.5
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.
07 Mai 2021	18h 02m 05.20s	-25° 53' 26.5"	1.75740	2.57902	135.8	15.8	11.6
15 Jun 2021	17h 30m 58.94s	-25° 41' 48.3"	1.52449	2.53971	177.5	1.0	10.5
24 Jul 2021	16h 59m 03.76s	-24° 29' 26.4"	1.66983	2.49454	135.0	16.8	11.4

(5) Astraea			$\phi$ (km)	106.6	Mag.	Max. Opp:	10.6
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.
13 Mai 2021	18h 24m 37.03s	-16° 39' 40.4"	1.93227	2.74882	135.8	14.8	11.3
05 Jun 2021	17h 55m 24.77s	-16° 44' 47.5"	1.80213	2.81386	173.3	2.4	10.6
30 Jul 2021	17h 26m 42.73s	-17° 54' 29.9"	2.06621	2.87540	135.0	14.5	11.5

(27) Euterpe			$\phi$ (km)	96	Mag.	Max. Opp:	10.4
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.
27 Mai 2021	19h 20m 37.90s	-22° 07' 09.5"	1.92188	2.75134	137.0	14.5	11.4
03 Jul 2021	18h 50m 26.90s	-23° 13' 26.0"	1.72630	2.74297	179.3	0.2	10.4
11 Ago 2021	18h 17m 55.07s	-23° 56' 14.9"	1.90419	2.72426	135.8	15.1	11.4

(83) Beatrix			$\phi$ (km)	106.6	Mag.	Max. Opp:	11.7
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.
27 Mai 2021	19h 31m 04.73s	-28° 47' 56.6"	1.54046	2.36986	135.2	17.5	12.5
05 Jul 2021	19h 00m 59.18s	-31° 03' 05.4"	1.39392	2.40446	171.6	3.5	11.7
13 Ago 2021	18h 30m 19.13s	-30° 47' 15.3"	1.60804	2.43944	135.8	16.9	12.6

(48) Doris			$\phi$ (km)	216.4	Mag.	Max. Opp:	11.7
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.
30 Mai 2021	19h 30m 11.06s	-13° 07' 19.0"	2.51086	3.31259	135.6	12.3	12.4
08 Jul 2021	19h 06m 08.57s	-13° 17' 23.5"	2.29270	3.30029	170.7	2.8	11.7
17 Ago 2021	18h 41m 38.74s	-14° 52' 34.8"	2.48504	3.28501	135.5	12.5	12.4

(24) Themis			$\phi$ (km)	198	Mag.	Max. Opp:	11.9
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.
02 Jun 2021	19h 52m 28.58s	-21° 51' 09.1"	2.61957	3.41721	135.4	17.5	12.7
12 Jul 2021	19h 26m 47.97s	-22° 58' 38.9"	2.42943	3.44592	178.9	3.5	11.9
22 Ago 2021	19h 00m 58.54s	-23° 39' 58.8"	2.67042	3.47052	136.0	16.9	12.8

(84) Klio			$\phi$ (km)	79.2	Mag.	Max. Opp:	11.2
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.
03 Jun 2021	20h 02m 17.22s	-33° 22' 34.1"	2.04377	1.19568	135.1	20.5	12.3
13 Jul 2021	19h 36m 30.90s	-33° 28' 52.1"	0.94332	1.94964	168.2	6.1	11.2
21 Ago 2021	19h 04m 32.87s	-29° 01' 08.8"	1.01134	1.87509	135.9	22.1	11.8

(65) Cybele			$\phi$ (km)	237.2	Mag.	Max. Opp:	11.0
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.
04 Jun 2021	19h 54m 28.24s	-16° 58' 15.0"	2.26066	3.07105	135.8	13.3	11.9
14 Jul 2021	19h 31m 40.12s	-18° 02' 22.9"	2.07651	3.09163	176.3	1.2	11.0
24 Ago 2021	19h 09m 02.30s	-19° 38' 03.8"	2.31571	3.11758	135.4	13.2	12.0

(92) Undina			$\phi$ (km)	126.4	Mag.	Max.	Opp:	10.3
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
04 Jun 2021	20h 00m 52.47s	-21° 09' 53.0"	2.16945	2.97752	135.3	13.8	11.5	
14 Jul 2021	19h 38m 09.76s	-24° 19' 55.2"	1.92964	2.94534	177.1	1.0	10.3	
24 Ago 2021	19h 12m 20.46s	-26° 51' 56.9"	2.11073	2.91635	135.1	14.2	11.4	

(6) Hebe			$\phi$ (km)	185.2	Mag.	Max.	Opp:	8.4
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
10 Jun 2021	20h 03m 49.04s	-07° 03' 04.5"	1.52695	2.36386	135.8	17.4	9.4	
18 Jul 2021	19h 38m 34.11s	-10° 30' 10.8"	1.27071	2.27686	169.1	4.8	8.4	
25 Ago 2021	19h 11m 48.22s	-17° 05' 07.7"	1.35522	2.19169	135.2	19.0	9.0	

(12) Victoria			$\phi$ (km)	115.0	Mag.	Max.	Opp:	8.7
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
20 Jun 2021	20h 42m 21.56s	-04° 47' 24.4"	0.96295	1.83100	135.3	22.9	9.5	
30 Jul 2021	20h 21m 30.50s	-01° 12' 59.0"	0.82569	1.81910	162.2	9.8	8.7	
08 Set 2021	20h 06m 32.14s	-04° 02' 34.9"	0.97994	1.83843	135.3	22.7	9.5	

(80) Sappho			$\phi$ (km)	68.6	Mag.	Max.	Opp:	9.8
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
07 Jul 2021	21h 36m 24.46s	+02° 11' 28.1"	1.10168	1.96027	135.3	21.3	10.7	
15 Ago 2021	21h 14m 16.32s	+02° 44' 50.3"	0.90783	1.89743	162.1	9.4	9.8	
22 Set 2021	20h 58m 06.19s	-02° 25' 41.1"	1.00109	1.85552	135.4	22.3	10.4	

(43) Ariadne			$\phi$ (km)	71.4	Mag.	Max.	Opp:	9.4
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
11 Jul 2021	22h 11m 28.35s	-06° 13' 14.2"	0.99678	1.86597	135.8	22.2	10.3	
19 Ago 2021	21h 45m 29.00s	-06° 39' 24.2"	0.90354	1.91257	173.5	3.4	9.4	
28 Set 2021	21h 24m 58.67s	-08° 58' 08.8"	1.13064	1.97554	135.6	20.8	10.7	

(71) Niobe			$\phi$ (km)	83.4	Mag.	Max.	Opp:	10.8
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
14 Jul 2021	22h 26m 12.32s	-06° 37' 15.6"	1.92112	2.74103	135.5	15.0	11.3	
21 Ago 2021	21h 50m 43.93s	-04° 28' 38.3"	1.80382	2.80904	171.9	2.9	10.8	
28 Set 2021	21h 19m 54.32s	-03° 49' 17.0"	2.07510	2.87455	135.2	14.2	11.5	

(89) Julia			$\phi$ (km)	145.4	Mag.	Max.	Opp:	9.0
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
17 Jul 2021	22h 34m 22.15s	-05° 06' 28.5"	1.29732	2.14737	135.9	19.2	10.0	
25 Ago 2021	22h 01m 14.80s	-00° 20' 32.8"	1.10621	2.10722	168.9	5.3	9.0	
01 Out 2021	21h 31m 53.53s	+01° 23' 15.8"	1.24621	2.08489	135.8	19.6	9.8	

(53) Kalypso			$\phi$ (km)	97.2	Mag.	Max.	Opp:	12.5
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
24 Jul 2021	23h 07m 16.07s	-06° 40' 21.8"	2.04024	2.85723	135.7	14.3	13.5	
01 Set 2021	22h 44m 01.97s	-10° 19' 10.9"	1.77617	2.78501	177.8	0.8	12.5	
09 Out 2021	22h 18m 18.69s	-13° 37' 52.7"	1.90200	2.70926	135.8	14.9	13.2	

(2) Pallas			$\emptyset$ (km)	545	Mag.	Max.	Opp:	8.5
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
05 Ago 2021	23h 31m 39.24s	+06° 30' 32.4"	2.40250	3.20800	135.7	12.7	9.4	
11 Set 2021	23h 09m 25.41s	-00° 14' 25.0"	2.14455	3.14896	175.2	1.5	8.5	
18 Out 2021	22h 47m 18.63s	-08° 02' 02.7"	2.29099	3.08319	135.6	13.1	9.2	

(64) Angelina			$\emptyset$ (km)	58.2	Mag.	Max.	Opp:	11.5
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
06 Ago 2021	23h 51m 27.72s	+00° 12' 06.7"	2.13518	2.94434	135.3	14.0	12.5	
14 Set 2021	23h 26m 47.91s	-02° 07' 08.6"	1.90647	2.91226	178.5	0.5	11.5	
02 Out 2021	23h 01m 40.37s	-04° 44' 07.3"	2.08225	2.87527	135.2	14.1	12.4	

(40) Harmonia			$\emptyset$ (km)	111.2	Mag.	Max.	Opp:	9.3
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
25 Ago 2021	01h 07m 19.80s	-00° 20' 23.1"	1.31851	2.16214	135.9	18.9	10.2	
02 Out 2021	00h 43m 33.78s	-03° 53' 10.4"	1.16614	2.16204	172.1	3.6	9.3	
08 Nov 2021	00h 17m 30.28s	-05° 18' 35.0"	1.34095	2.16599	136.0	18.6	10.2	

(59) Elpis			$\emptyset$ (km)	165.2	Mag.	Max.	Opp:	10.9
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
02 Set 2021	01h 32m 12.80s	+05° 34' 15.0"	1.57210	2.40196	135.9	16.9	11.7	
10 Out 2021	01h 14m 04.47s	+00° 30' 50.7"	1.40034	2.39492	173.1	2.8	10.9	
16 Nov 2021	00h 53m 25.83s	-03° 00' 19.6"	1.57662	2.39641	136.9	16.4	11.7	

(100) Hekate			$\emptyset$ (km)	85.8	Mag.	Max.	Opp:	11.4
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
04 Set 2021	01h 41m 51.44s	+01° 49' 10.7"	1.93814	2.75858	136.4	14.5	12.0	
11 Out 2021	01h 21m 18.32s	-01° 34' 24.7"	1.82423	2.81394	170.5	3.3	11.4	
18 Nov 2021	00h 58m 56.21s	-03° 11' 02.1"	2.07945	2.87429	136.0	13.8	12.2	

(50) Virginia			$\emptyset$ (km)	84	Mag.	Max.	Opp:	10.6
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
05 Set 2021	01h 42m 41.10s	+09° 30' 36.3"	1.04555	1.89835	135.9	21.6	11.7	
16 Out 2021	01h 29m 25.87s	+06° 13' 18.9"	1.89984	0.90351	177.0	1.5	10.6	
26 Nov 2021	01h 15m 19.69s	+04° 05' 10.5"	1.93968	1.11056	135.1	21.1	11.9	

(25) Phocaea			$\emptyset$ (km)	61	Mag.	Max.	Opp:	10.0
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
15 Set 2021	01h 50m 52.76s	+24° 46' 23.0"	1.21349	2.05937	136.0	19.8	10.7	
25 Out 2021	01h 26m 19.90s	+15° 23' 22.6"	1.16546	2.15839	174.0	2.7	10.0	
25 Nov 2021	01h 10m 16.96s	+06° 03' 44.2"	1.44804	2.26348	135.8	17.7	11.3	

(73) Klytia			$\emptyset$ (km)	44.6	Mag.	Max.	Opp:	12.2
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
28 Out 2021	05h 12m 08.80s	+25° 52' 39.9"	1.75011	2.55286	135.1	15.9	13.1	
05 Dez 2021	04h 42m 47.86s	+25° 48' 23.1"	1.57016	2.55456	176.4	1.4	12.2	
11 Jan 2022	04h 15m 00.82s	+24° 37' 48.6"	1.76079	2.55878	135.7	15.6	13.1	

(42) Isis			$\emptyset$ (km)	111	Mag.	Max.	Opp:	10.6
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
03 Nov 2021	05h 37m 07.22s	+19° 52' 47.0"	1.67214	2.48147	135.7	16.2		11.4
09 Dez 2021	05h 03m 35.28s	+21° 01' 08.3"	1.58112	2.56582	178.2	0.7		10.6
15 Jan 2022	04h 32m 19.43s	+22° 04' 16.1"	1.85590	2.64672	135.2	15.2		11.8

(44) Nysa			$\emptyset$ (km)	70.6	Mag.	Max.	Opp:	8.9
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
04 Nov 2021	05h 37m 34.64s	+17° 52' 23.5"	1.33810	2.16128	135.5	18.7		9.8
11 Dez 2021	05h 11m 17.05s	+17° 25' 04.6"	1.13558	2.11784	174.4	2.6		8.9
17 Jan 2022	04h 43m 57.64s	+18° 18' 49.7"	1.26927	2.08634	135.2	19.4		9.6

(17) Thetis			$\emptyset$ (km)	84.8	Mag.	Max.	Opp:	11.4
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
14 Nov 2021	06h 25m 40.37s	+17° 53' 48.3"	2.00908	2.79885	135.1	14.4		12.2
21 Dez 2021	05h 55m 37.33s	+18° 17' 19.4"	1.81400	2.79519	174.8	1.8		11.4
26 Jan 2022	05h 25m 39.22s	+19° 20'	1.99109	2.78508	136.0	14.2		12.2

(32) Pomona			$\emptyset$ (km)	80.8	Mag.	Max.	Opp:	11.0
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
18 Nov 2021	06h 40m 23.36s	+17° 35' 00.9"	1.86143	2.65942	135.6	15.0		11.9
25 Dez 2021	06h 12m 11.94s	+16° 24' 00.4"	1.65007	2.62900	172.9	2.6		11.0
30 Jan 2022	05h 43m 57.80s	+16° 23' 52.7"	1.79849	2.59814	135.9	15.3		11.7

(22) Kalliope			$\emptyset$ (km)	167.6	Mag.	Max.	Opp:	10.1
Data	$a$ (J2000.0)	$\delta$ (J2000.0)	Dist. Terra (ua)	Dist. Sol (ua)	Elong. °	Ang. PH	Mag.	
23 Nov 2021	07h 07m 02.60s	+30° 32' 35.0"	1.85224	2.64877	135.5	15.1		10.7
29 Dez 2021	06h 39m 27.16s	+34° 44' 03.4"	1.69652	2.66711	168.3	4.3		10.1
04 Fev 2022	06h 08m 22.63s	+36° 12' 49.8"	1.89804	2.69047	135.4	14.9		10.8

# X - Cometas

C/2020 P4-C (SOHO) - 00:00 UTC (J2000)  
Sem medidas astrométricas recentes (Acesso em: 2020 Nov 21)

T 2020 Ago 6.8013 TT  
q 0.086553 Peri. 116.7357  
z -0.148591 Node 164.0398  
e 1.012861 Incl. 37.4582  
Ref: MPEC 2020-QN1

Data aaaa/mm./dd	$a$ (J2000.0) h m s	$\delta$ (J2000.0) o ' "	delta ua	Rsol ua	Elong	Fase	Mag	"/min	AP
2021 Jan 1	4 59 46.8	-27 32 21	2.470	3.120	123.3	15.3	7.8	0.82	305.0
2021 Jan 2	4 58 35.0	-27 20 57	2.490	3.135	123.0	15.3	7.8	0.81	306.1
2021 Jan 3	4 57 25.3	-27 9 25	2.511	3.151	122.6	15.3	7.9	0.80	307.3
2021 Jan 4	4 56 17.8	-26 57 45	2.531	3.166	122.1	15.3	7.9	0.79	308.4
2021 Jan 5	4 55 12.5	-26 45 57	2.552	3.181	121.7	15.3	8.0	0.78	309.6
2021 Jan 6	4 54 9.3	-26 34 3	2.573	3.196	121.2	15.3	8.0	0.76	310.7
2021 Jan 7	4 53 8.2	-26 22 2	2.594	3.211	120.8	15.3	8.1	0.75	311.9
2021 Jan 8	4 52 9.3	-26 9 55	2.616	3.225	120.3	15.3	8.1	0.74	313.1
2021 Jan 9	4 51 12.5	-25 57 44	2.638	3.240	119.8	15.3	8.2	0.73	314.3
2021 Jan 10	4 50 17.7	-25 45 27	2.659	3.255	119.3	15.3	8.2	0.72	315.5
2021 Jan 11	4 49 25.0	-25 33 7	2.681	3.270	118.7	15.3	8.3	0.71	316.7
2021 Jan 12	4 48 34.3	-25 20 42	2.704	3.285	118.2	15.3	8.3	0.70	317.9
2021 Jan 13	4 47 45.7	-25 8 15	2.726	3.300	117.7	15.3	8.4	0.69	319.2
2021 Jan 14	4 46 59.1	-24 55 45	2.749	3.314	117.1	15.3	8.4	0.68	320.4
2021 Jan 15	4 46 14.4	-24 43 12	2.772	3.329	116.5	15.3	8.4	0.67	321.7
2021 Jan 16	4 45 31.7	-24 30 38	2.795	3.344	115.9	15.3	8.5	0.66	323.0
2021 Jan 17	4 44 50.9	-24 18 3	2.818	3.359	115.4	15.3	8.5	0.65	324.2
2021 Jan 18	4 44 12.1	-24 5 26	2.841	3.373	114.8	15.4	8.6	0.64	325.5
2021 Jan 19	4 43 35.0	-23 52 49	2.864	3.388	114.1	15.4	8.6	0.63	326.8
2021 Jan 20	4 42 59.9	-23 40 12	2.888	3.403	113.5	15.4	8.7	0.62	328.1
2021 Jan 21	4 42 26.5	-23 27 35	2.912	3.417	112.9	15.4	8.7	0.61	329.5
2021 Jan 22	4 41 55.0	-23 14 59	2.936	3.432	112.3	15.4	8.8	0.60	330.8
2021 Jan 23	4 41 25.1	-23 2 24	2.960	3.446	111.6	15.4	8.8	0.59	332.1
2021 Jan 24	4 40 57.0	-22 49 49	2.984	3.461	111.0	15.4	8.9	0.58	333.4
2021 Jan 25	4 40 30.6	-22 37 17	3.008	3.475	110.4	15.4	8.9	0.58	334.8
2021 Jan 26	4 40 5.9	-22 24 46	3.033	3.490	109.7	15.4	9.0	0.57	336.2
2021 Jan 27	4 39 42.8	-22 12 17	3.057	3.504	109.0	15.4	9.0	0.56	337.5
2021 Jan 28	4 39 21.3	-21 59 51	3.082	3.519	108.4	15.4	9.0	0.55	338.9
2021 Jan 29	4 39 1.4	-21 47 27	3.107	3.533	107.7	15.4	9.1	0.55	340.3
2021 Jan 30	4 38 43.0	-21 35 6	3.132	3.547	107.0	15.4	9.1	0.54	341.6
2021 Jan 31	4 38 26.2	-21 22 48	3.157	3.562	106.4	15.4	9.2	0.53	343.0
2021 Fev 1	4 38 10.8	-21 10 33	3.182	3.576	105.7	15.4	9.2	0.53	344.4
2021 Fev 2	4 37 56.9	-20 58 22	3.207	3.591	105.0	15.4	9.3	0.52	345.8
2021 Fev 3	4 37 44.4	-20 46 14	3.232	3.605	104.3	15.4	9.3	0.52	347.2
2021 Fev 4	4 37 33.4	-20 34 10	3.258	3.619	103.6	15.4	9.3	0.51	348.6
2021 Fev 5	4 37 23.7	-20 22 9	3.283	3.633	102.9	15.3	9.4	0.51	350.0
2021 Fev 6	4 37 15.4	-20 10 13	3.309	3.648	102.2	15.3	9.4	0.50	351.4
2021 Fev 7	4 37 8.4	-19 58 21	3.335	3.662	101.5	15.3	9.5	0.50	352.8
2021 Fev 8	4 37 2.7	-19 46 33	3.361	3.676	100.8	15.3	9.5	0.49	354.3
2021 Fev 9	4 36 58.3	-19 34 50	3.386	3.690	100.1	15.3	9.6	0.49	355.7
2021 Fev 10	4 36 55.2	-19 23 11	3.412	3.704	99.4	15.2	9.6	0.48	357.1
2021 Fev 11	4 36 53.3	-19 11 37	3.438	3.718	98.7	15.2	9.6	0.48	358.5
2021 Fev 12	4 36 52.6	-19 0 8	3.464	3.733	98.0	15.2	9.7	0.48	359.9
2021 Fev 13	4 36 53.1	-18 48 44	3.491	3.747	97.3	15.2	9.7	0.47	1.3
2021 Fev 14	4 36 54.8	-18 37 25	3.517	3.761	96.6	15.1	9.8	0.47	2.7
2021 Fev 15	4 36 57.6	-18 26 11	3.543	3.775	95.9	15.1	9.8	0.47	4.1
2021 Fev 16	4 37 1.5	-18 15 3	3.569	3.789	95.2	15.1	9.8	0.46	5.5
2021 Fev 17	4 37 6.6	-18 4 0	3.596	3.803	94.5	15.0	9.9	0.46	6.9
2021 Fev 18	4 37 12.7	-17 53 2	3.622	3.817	93.8	15.0	9.9	0.46	8.2
2021 Fev 19	4 37 19.8	-17 42 11	3.648	3.831	93.1	14.9	10.0	0.46	9.6
2021 Fev 20	4 37 28.0	-17 31 24	3.675	3.845	92.4	14.9	10.0	0.46	10.9
2021 Fev 21	4 37 37.1	-17 20 44	3.701	3.859	91.7	14.8	10.0	0.45	12.2
2021 Fev 22	4 37 47.2	-17 10 9	3.728	3.873	90.9	14.8	10.1	0.45	13.5
2021 Fev 23	4 37 58.3	-16 59 40	3.754	3.886	90.2	14.7	10.1	0.45	14.8
2021 Fev 24	4 38 10.3	-16 49 17	3.781	3.900	89.5	14.7	10.2	0.45	16.1
2021 Fev 25	4 38 23.3	-16 39 0	3.807	3.914	88.8	14.6	10.2	0.45	17.4
2021 Fev 26	4 38 37.1	-16 28 49	3.834	3.928	88.1	14.6	10.2	0.45	18.6
2021 Fev 27	4 38 51.8	-16 18 44	3.861	3.942	87.4	14.5	10.3	0.44	19.9
2021 Fev 28	4 39 7.3	-16 8 45	3.887	3.956	86.7	14.5	10.3	0.44	21.1
2021 Mar 1	4 39 23.7	-15 58 52	3.914	3.969	86.0	14.4	10.3	0.44	22.3
2021 Mar 2	4 39 40.9	-15 49 5	3.940	3.983	85.3	14.4	10.4	0.44	23.5

2021	Mar	3	4	39	58.8	-15	39	24	3.967	3.997	84.6	14.3	10.4	0.44	24.7
2021	Mar	4	4	40	17.6	-15	29	49	3.993	4.011	83.9	14.2	10.5	0.44	25.8
2021	Mar	5	4	40	37.1	-15	20	20	4.020	4.024	83.2	14.2	10.5	0.44	27.0
2021	Mar	6	4	40	57.4	-15	10	58	4.047	4.038	82.5	14.1	10.5	0.44	28.1
2021	Mar	7	4	41	18.4	-15	1	41	4.073	4.052	81.8	14.0	10.6	0.44	29.2
2021	Mar	8	4	41	40.1	-14	52	31	4.100	4.065	81.1	14.0	10.6	0.44	30.3
2021	Mar	9	4	42	2.5	-14	43	27	4.126	4.079	80.4	13.9	10.6	0.44	31.4
2021	Mar	10	4	42	25.6	-14	34	29	4.153	4.093	79.7	13.8	10.7	0.44	32.5
2021	Mar	11	4	42	49.3	-14	25	37	4.179	4.106	79.0	13.7	10.7	0.44	33.5
2021	Mar	12	4	43	13.8	-14	16	52	4.205	4.120	78.3	13.7	10.7	0.44	34.5
2021	Mar	13	4	43	38.8	-14	8	12	4.232	4.133	77.6	13.6	10.8	0.44	35.6
2021	Mar	14	4	44	4.5	-13	59	39	4.258	4.147	76.9	13.5	10.8	0.44	36.6
2021	Mar	15	4	44	30.8	-13	51	12	4.284	4.161	76.2	13.4	10.8	0.44	37.6
2021	Mar	16	4	44	57.7	-13	42	52	4.311	4.174	75.5	13.3	10.9	0.44	38.5
2021	Mar	17	4	45	25.1	-13	34	38	4.337	4.188	74.8	13.3	10.9	0.44	39.5
2021	Mar	18	4	45	53.2	-13	26	30	4.363	4.201	74.1	13.2	10.9	0.44	40.4
2021	Mar	19	4	46	21.7	-13	18	28	4.389	4.215	73.4	13.1	11.0	0.44	41.3
2021	Mar	20	4	46	50.9	-13	10	32	4.415	4.228	72.8	13.0	11.0	0.44	42.3
2021	Mar	21	4	47	20.5	-13	2	43	4.441	4.241	72.1	12.9	11.1	0.44	43.1
2021	Mar	22	4	47	50.6	-12	55	0	4.467	4.255	71.4	12.8	11.1	0.44	44.0
2021	Mar	23	4	48	21.3	-12	47	24	4.492	4.268	70.7	12.7	11.1	0.44	44.9
2021	Mar	24	4	48	52.4	-12	39	53	4.518	4.282	70.0	12.6	11.1	0.44	45.7
2021	Mar	25	4	49	24.0	-12	32	29	4.544	4.295	69.4	12.5	11.2	0.45	46.6
2021	Mar	26	4	49	56.0	-12	25	11	4.569	4.308	68.7	12.5	11.2	0.45	47.4
2021	Mar	27	4	50	28.5	-12	17	59	4.595	4.322	68.0	12.4	11.2	0.45	48.2
2021	Mar	28	4	51	1.4	-12	10	54	4.620	4.335	67.4	12.3	11.3	0.45	49.0
2021	Mar	29	4	51	34.7	-12	3	54	4.646	4.348	66.7	12.2	11.3	0.45	49.8
2021	Mar	30	4	52	8.4	-11	57	1	4.671	4.362	66.0	12.1	11.3	0.45	50.5
2021	Mar	31	4	52	42.6	-11	50	14	4.696	4.375	65.4	12.0	11.4	0.45	51.3
2021	Abr	1	4	53	17.1	-11	43	33	4.721	4.388	64.7	11.9	11.4	0.45	52.0
2021	Abr	2	4	53	52.0	-11	36	58	4.746	4.402	64.1	11.8	11.4	0.45	52.7
2021	Abr	3	4	54	27.2	-11	30	29	4.771	4.415	63.4	11.7	11.5	0.45	53.5
2021	Abr	4	4	55	2.8	-11	24	6	4.796	4.428	62.8	11.6	11.5	0.45	54.2
2021	Abr	5	4	55	38.8	-11	17	49	4.820	4.441	62.1	11.5	11.5	0.45	54.9
2021	Abr	6	4	56	15.1	-11	11	38	4.845	4.455	61.5	11.4	11.6	0.45	55.6
2021	Abr	7	4	56	51.7	-11	5	33	4.869	4.468	60.8	11.3	11.6	0.45	56.2
2021	Abr	8	4	57	28.7	-10	59	34	4.894	4.481	60.2	11.2	11.6	0.45	56.9
2021	Abr	9	4	58	5.9	-10	53	41	4.918	4.494	59.5	11.1	11.6	0.45	57.6
2021	Abr	10	4	58	43.5	-10	47	54	4.942	4.507	58.9	11.0	11.7	0.45	58.2
2021	Abr	11	4	59	21.4	-10	42	13	4.966	4.520	58.3	10.9	11.7	0.45	58.9
2021	Abr	12	4	59	59.5	-10	36	38	4.990	4.533	57.7	10.8	11.7	0.45	59.5
2021	Abr	13	5	0	37.9	-10	31	9	5.014	4.547	57.0	10.7	11.8	0.46	60.2
2021	Abr	14	5	1	16.6	-10	25	45	5.037	4.560	56.4	10.6	11.8	0.46	60.8
2021	Abr	15	5	1	55.6	-10	20	28	5.061	4.573	55.8	10.5	11.8	0.46	61.4
2021	Abr	16	5	2	34.7	-10	15	16	5.084	4.586	55.2	10.3	11.9	0.46	62.0
2021	Abr	17	5	3	14.2	-10	10	11	5.107	4.599	54.6	10.2	11.9	0.46	62.6
2021	Abr	18	5	3	53.8	-10	5	11	5.131	4.612	54.0	10.1	11.9	0.46	63.2
2021	Abr	19	5	4	33.7	-10	0	17	5.154	4.625	53.4	10.0	11.9	0.46	63.8
2021	Abr	20	5	5	13.7	-9	55	29	5.176	4.638	52.8	9.9	12.0	0.46	64.3
2021	Abr	21	5	5	54.0	-9	50	46	5.199	4.651	52.2	9.8	12.0	0.46	64.9
2021	Abr	22	5	6	34.5	-9	46	10	5.222	4.664	51.6	9.7	12.0	0.46	65.5
2021	Abr	23	5	7	15.1	-9	41	39	5.244	4.677	51.0	9.6	12.0	0.46	66.0
2021	Abr	24	5	7	55.9	-9	37	14	5.266	4.690	50.4	9.5	12.1	0.46	66.6
2021	Abr	25	5	8	36.9	-9	32	54	5.289	4.703	49.8	9.4	12.1	0.46	67.1
2021	Abr	26	5	9	18.0	-9	28	41	5.310	4.716	49.3	9.3	12.1	0.46	67.6
2021	Abr	27	5	9	59.3	-9	24	32	5.332	4.729	48.7	9.2	12.2	0.46	68.2
2021	Abr	28	5	10	40.8	-9	20	30	5.354	4.742	48.1	9.1	12.2	0.46	68.7
2021	Abr	29	5	11	22.3	-9	16	33	5.376	4.754	47.6	9.0	12.2	0.46	69.2
2021	Abr	30	5	12	4.1	-9	12	41	5.397	4.767	47.0	8.9	12.2	0.46	69.7
2021	Mai	1	5	12	45.9	-9	8	56	5.418	4.780	46.5	8.8	12.3	0.46	70.2
2021	Mai	2	5	13	27.8	-9	5	15	5.439	4.793	45.9	8.7	12.3	0.46	70.7
2021	Mai	3	5	14	9.9	-9	1	40	5.460	4.806	45.4	8.6	12.3	0.46	71.2
2021	Mai	4	5	14	52.1	-8	58	11	5.481	4.819	44.8	8.5	12.3	0.46	71.7
2021	Mai	5	5	15	34.4	-8	54	47	5.501	4.832	44.3	8.4	12.4	0.46	72.2
2021	Mai	6	5	16	16.8	-8	51	28	5.522	4.844	43.8	8.3	12.4	0.46	72.7
2021	Mai	7	5	16	59.2	-8	48	15	5.542	4.857	43.3	8.2	12.4	0.46	73.2
2021	Mai	8	5	17	41.8	-8	45	7	5.562	4.870	42.8	8.1	12.4	0.46	73.7
2021	Mai	9	5	18	24.4	-8	42	5	5.582	4.883	42.3	8.0	12.5	0.46	74.1
2021	Mai	10	5	19	7.1	-8	39	8	5.602	4.895	41.8	7.9	12.5	0.46	74.6
2021	Mai	11	5	19	49.9	-8	36	17	5.621	4.908	41.3	7.8	12.5	0.46	75.1
2021	Mai	12	5	20	32.7	-8	33	30	5.641	4.921	40.8	7.7	12.5	0.46	75.6

11P/Tempel-Swift-LINEAR - 00:00 UTC (J2000)  
 Última medida astrométrica realizada em: 2020 out 26 (Acesso em: 2020 Nov 21)

T 2020 Nov 26.2255 TT  
 q 1.388789 Peri. 167.9468  
 a 3.282894 Node 238.9164  
 e 0.576962 Incl. 14.4208  
 Ref: MPEC 2017-L52

Data aaaa/mm./dd	$a$ (J2000.0) h m s	$\delta$ (J2000.0) ° ' "	delta ua	Rsol ua	Elong	Fase	Mag	"/min	AP
2021 Jan 1	2 16 40.7	6 21 8	0.736	1.444	113.4	38.7	9.9	1.71	94.2
2021 Jan 2	2 19 25.3	6 18 20	0.744	1.447	113.0	38.7	10.0	1.71	93.7
2021 Jan 3	2 22 9.6	6 15 52	0.753	1.450	112.6	38.8	10.0	1.70	93.2
2021 Jan 4	2 24 53.6	6 13 43	0.761	1.453	112.2	38.8	10.0	1.70	92.8
2021 Jan 5	2 27 37.3	6 11 54	0.769	1.456	111.8	38.8	10.1	1.69	92.3
2021 Jan 6	2 30 20.7	6 10 24	0.778	1.459	111.4	38.8	10.1	1.69	91.9
2021 Jan 7	2 33 3.7	6 9 12	0.786	1.463	111.0	38.9	10.1	1.69	91.5
2021 Jan 8	2 35 46.4	6 8 17	0.795	1.466	110.7	38.9	10.2	1.68	91.1
2021 Jan 9	2 38 28.8	6 7 40	0.804	1.470	110.3	38.9	10.2	1.68	90.7
2021 Jan 10	2 41 10.8	6 7 18	0.812	1.473	109.9	38.9	10.2	1.68	90.3
2021 Jan 11	2 43 52.5	6 7 13	0.821	1.477	109.5	38.9	10.3	1.67	89.9
2021 Jan 12	2 46 33.8	6 7 23	0.831	1.481	109.1	38.9	10.3	1.67	89.6
2021 Jan 13	2 49 14.8	6 7 48	0.840	1.484	108.8	38.9	10.3	1.67	89.2
2021 Jan 14	2 51 55.4	6 8 28	0.849	1.488	108.4	38.8	10.4	1.66	88.9
2021 Jan 15	2 54 35.7	6 9 21	0.859	1.492	108.0	38.8	10.4	1.66	88.6
2021 Jan 16	2 57 15.5	6 10 27	0.868	1.496	107.6	38.8	10.4	1.65	88.3
2021 Jan 17	2 59 55.1	6 11 46	0.878	1.500	107.3	38.8	10.5	1.65	88.0
2021 Jan 18	3 2 34.2	6 13 16	0.887	1.504	106.9	38.7	10.5	1.65	87.7
2021 Jan 19	3 5 12.9	6 14 58	0.897	1.508	106.5	38.7	10.5	1.64	87.4
2021 Jan 20	3 7 51.3	6 16 52	0.907	1.513	106.1	38.7	10.6	1.64	87.1
2021 Jan 21	3 10 29.3	6 18 55	0.917	1.517	105.8	38.6	10.6	1.64	86.9
2021 Jan 22	3 13 6.8	6 21 8	0.927	1.521	105.4	38.6	10.7	1.63	86.6
2021 Jan 23	3 15 44.0	6 23 31	0.938	1.526	105.0	38.5	10.7	1.63	86.4
2021 Jan 24	3 18 20.7	6 26 2	0.948	1.530	104.7	38.5	10.7	1.62	86.2
2021 Jan 25	3 20 57.1	6 28 42	0.959	1.534	104.3	38.4	10.8	1.62	86.0
2021 Jan 26	3 23 33.0	6 31 30	0.969	1.539	103.9	38.4	10.8	1.62	85.8
2021 Jan 27	3 26 8.5	6 34 25	0.980	1.544	103.6	38.3	10.8	1.61	85.6
2021 Jan 28	3 28 43.6	6 37 27	0.991	1.548	103.2	38.3	10.9	1.61	85.4
2021 Jan 29	3 31 18.3	6 40 35	1.001	1.553	102.9	38.2	10.9	1.60	85.2
2021 Jan 30	3 33 52.5	6 43 49	1.012	1.558	102.5	38.1	11.0	1.60	85.1
2021 Jan 31	3 36 26.3	6 47 9	1.023	1.562	102.1	38.1	11.0	1.60	84.9
2021 Fev 1	3 38 59.7	6 50 35	1.034	1.567	101.8	38.0	11.0	1.59	84.8
2021 Fev 2	3 41 32.7	6 54 5	1.046	1.572	101.4	37.9	11.1	1.59	84.7
2021 Fev 3	3 44 5.3	6 57 40	1.057	1.577	101.0	37.8	11.1	1.58	84.5
2021 Fev 4	3 46 37.5	7 1 19	1.068	1.582	100.7	37.8	11.1	1.58	84.4
2021 Fev 5	3 49 9.3	7 5 1	1.080	1.587	100.3	37.7	11.2	1.57	84.3
2021 Fev 6	3 51 40.7	7 8 47	1.092	1.592	99.9	37.6	11.2	1.57	84.2
2021 Fev 7	3 54 11.7	7 12 37	1.103	1.597	99.6	37.5	11.2	1.57	84.1
2021 Fev 8	3 56 42.4	7 16 29	1.115	1.602	99.2	37.4	11.3	1.56	84.0
2021 Fev 9	3 59 12.7	7 20 24	1.127	1.608	98.8	37.3	11.3	1.56	84.0
2021 Fev 10	4 1 42.6	7 24 20	1.139	1.613	98.5	37.2	11.4	1.56	83.9
2021 Fev 11	4 4 12.2	7 28 19	1.151	1.618	98.1	37.1	11.4	1.55	83.9
2021 Fev 12	4 6 41.4	7 32 19	1.163	1.623	97.7	37.1	11.4	1.55	83.8
2021 Fev 13	4 9 10.2	7 36 20	1.175	1.629	97.3	37.0	11.5	1.54	83.8
2021 Fev 14	4 11 38.7	7 40 22	1.188	1.634	97.0	36.9	11.5	1.54	83.7
2021 Fev 15	4 14 6.9	7 44 25	1.200	1.640	96.6	36.8	11.5	1.54	83.7
2021 Fev 16	4 16 34.7	7 48 28	1.213	1.645	96.2	36.7	11.6	1.53	83.7
2021 Fev 17	4 19 2.2	7 52 31	1.225	1.651	95.9	36.5	11.6	1.53	83.7
2021 Fev 18	4 21 29.3	7 56 33	1.238	1.656	95.5	36.4	11.7	1.53	83.7
2021 Fev 19	4 23 56.1	8 0 35	1.251	1.662	95.1	36.3	11.7	1.52	83.7
2021 Fev 20	4 26 22.5	8 4 36	1.263	1.667	94.7	36.2	11.7	1.52	83.7
2021 Fev 21	4 28 48.6	8 8 36	1.276	1.673	94.4	36.1	11.8	1.51	83.7
2021 Fev 22	4 31 14.3	8 12 35	1.289	1.679	94.0	36.0	11.8	1.51	83.7
2021 Fev 23	4 33 39.7	8 16 32	1.302	1.684	93.6	35.9	11.8	1.51	83.7
2021 Fev 24	4 36 4.8	8 20 28	1.316	1.690	93.2	35.8	11.9	1.50	83.8
2021 Fev 25	4 38 29.5	8 24 21	1.329	1.696	92.9	35.7	11.9	1.50	83.8
2021 Fev 26	4 40 53.8	8 28 12	1.342	1.702	92.5	35.5	11.9	1.49	83.9
2021 Fev 27	4 43 17.8	8 32 1	1.355	1.708	92.1	35.4	12.0	1.49	83.9
2021 Fev 28	4 45 41.4	8 35 47	1.369	1.713	91.7	35.3	12.0	1.49	84.0
2021 Mar 1	4 48 4.7	8 39 30	1.382	1.719	91.3	35.2	12.1	1.48	84.0
2021 Mar 2	4 50 27.7	8 43 10	1.396	1.725	90.9	35.1	12.1	1.48	84.1
2021 Mar 3	4 52 50.3	8 46 48	1.410	1.731	90.6	34.9	12.1	1.47	84.2
2021 Mar 4	4 55 12.5	8 50 22	1.423	1.737	90.2	34.8	12.2	1.47	84.2
2021 Mar 5	4 57 34.5	8 53 53	1.437	1.743	89.8	34.7	12.2	1.47	84.3

2021	Mar	6	4	59	56.1	8	57	20	1.451	1.749	89.4	34.5	12.2	1.46	84.4
2021	Mar	7	5	2	17.3	9	0	44	1.465	1.755	89.0	34.4	12.3	1.46	84.5
2021	Mar	8	5	4	38.3	9	4	4	1.479	1.761	88.6	34.3	12.3	1.45	84.6
2021	Mar	9	5	6	59.0	9	7	20	1.493	1.767	88.2	34.2	12.3	1.45	84.7
2021	Mar	10	5	9	19.3	9	10	32	1.507	1.773	87.8	34.0	12.4	1.45	84.8
2021	Mar	11	5	11	39.3	9	13	40	1.521	1.780	87.4	33.9	12.4	1.44	84.9
2021	Mar	12	5	13	59.1	9	16	43	1.536	1.786	87.1	33.8	12.4	1.44	85.0
2021	Mar	13	5	16	18.5	9	19	43	1.550	1.792	86.7	33.6	12.5	1.44	85.1
2021	Mar	14	5	18	37.6	9	22	37	1.564	1.798	86.3	33.5	12.5	1.43	85.2

C/2019 N1 (ATLAS) - 00:00 UTC (J2000)

Última medida astrométrica realizada em: 2020 Set 8 (Acesso em: 2020 Nov 21)

T 2020 Dez 1.8052 TT  
q 1.704611 Peri. 193.4459  
z 0.000046 Node 13.5732  
e 0.999921 Inc1. 82.4273  
Ref: MPEC 2020-W26

Data aaaa/mm./dd	$\alpha$ (J2000.0) h m s	$\delta$ (J2000.0) o ' "	delta	Rsol	Elong	Fase	Mag	"/min	AP
			ua	ua					
2021 Jan 1	14 30 16.4	-42 14 11	2.104	1.750	55.7	27.7	11.5	1.95	164.3
2021 Jan 2	14 31 25.1	-42 59 17	2.095	1.753	56.4	27.8	11.5	1.96	164.5
2021 Jan 3	14 32 34.1	-43 44 43	2.086	1.756	57.0	28.0	11.5	1.97	164.7
2021 Jan 4	14 33 43.6	-44 30 29	2.078	1.759	57.6	28.2	11.5	1.98	164.9
2021 Jan 5	14 34 53.5	-45 16 34	2.069	1.763	58.2	28.3	11.5	1.99	165.1
2021 Jan 6	14 36 3.9	-46 2 59	2.061	1.766	58.9	28.5	11.5	2.01	165.3
2021 Jan 7	14 37 14.7	-46 49 43	2.053	1.770	59.5	28.6	11.5	2.02	165.5
2021 Jan 8	14 38 26.1	-47 36 46	2.045	1.773	60.1	28.7	11.5	2.03	165.7
2021 Jan 9	14 39 37.9	-48 24 7	2.037	1.777	60.7	28.9	11.5	2.04	165.9
2021 Jan 10	14 40 50.3	-49 11 47	2.030	1.781	61.3	29.0	11.5	2.05	166.1
2021 Jan 11	14 42 3.2	-49 59 45	2.022	1.784	61.9	29.1	11.5	2.06	166.3
2021 Jan 12	14 43 16.7	-50 48 1	2.015	1.788	62.5	29.2	11.5	2.07	166.5
2021 Jan 13	14 44 30.8	-51 36 34	2.008	1.792	63.1	29.3	11.5	2.08	166.6
2021 Jan 14	14 45 45.6	-52 25 23	2.001	1.796	63.7	29.4	11.6	2.10	166.8
2021 Jan 15	14 47 1.0	-53 14 29	1.995	1.800	64.3	29.5	11.6	2.10	167.0
2021 Jan 16	14 48 17.2	-54 3 50	1.988	1.805	64.8	29.6	11.6	2.11	167.2
2021 Jan 17	14 49 34.2	-54 53 26	1.982	1.809	65.4	29.6	11.6	2.12	167.4
2021 Jan 18	14 50 52.0	-55 43 16	1.976	1.813	65.9	29.7	11.6	2.13	167.6
2021 Jan 19	14 52 10.6	-56 33 20	1.970	1.818	66.5	29.8	11.6	2.14	167.7
2021 Jan 20	14 53 30.3	-57 23 38	1.965	1.822	67.0	29.8	11.6	2.15	167.9
2021 Jan 21	14 54 50.9	-58 14 7	1.960	1.827	67.6	29.9	11.6	2.15	168.1
2021 Jan 22	14 56 12.7	-59 4 48	1.955	1.832	68.1	29.9	11.6	2.16	168.2
2021 Jan 23	14 57 35.6	-59 55 40	1.950	1.836	68.6	29.9	11.6	2.17	168.4
2021 Jan 24	14 58 59.8	-60 46 42	1.946	1.841	69.1	30.0	11.6	2.17	168.5
2021 Jan 25	15 0 25.4	-61 37 52	1.941	1.846	69.6	30.0	11.6	2.18	168.7
2021 Jan 26	15 1 52.6	-62 29 11	1.938	1.851	70.1	30.0	11.6	2.18	168.8
2021 Jan 27	15 3 21.4	-63 20 37	1.934	1.856	70.6	30.0	11.6	2.19	168.9
2021 Jan 28	15 4 52.0	-64 12 10	1.931	1.861	71.1	30.0	11.6	2.19	169.1
2021 Jan 29	15 6 24.7	-65 3 47	1.927	1.867	71.6	30.0	11.6	2.19	169.2
2021 Jan 30	15 7 59.5	-65 55 30	1.925	1.872	72.0	30.0	11.6	2.19	169.3
2021 Jan 31	15 9 36.8	-66 47 15	1.922	1.877	72.5	30.0	11.7	2.20	169.4
2021 Fev 1	15 11 16.7	-67 39 3	1.920	1.883	72.9	30.0	11.7	2.20	169.5
2021 Fev 2	15 12 59.7	-68 30 52	1.918	1.888	73.3	30.0	11.7	2.20	169.5
2021 Fev 3	15 14 46.0	-69 22 41	1.916	1.894	73.7	30.0	11.7	2.19	169.6
2021 Fev 4	15 16 36.0	-70 14 29	1.915	1.899	74.1	30.0	11.7	2.19	169.6
2021 Fev 5	15 18 30.3	-71 6 14	1.914	1.905	74.5	29.9	11.7	2.19	169.7
2021 Fev 6	15 20 29.3	-71 57 57	1.913	1.911	74.9	29.9	11.7	2.19	169.7
2021 Fev 7	15 22 33.8	-72 49 34	1.913	1.917	75.3	29.9	11.7	2.18	169.7
2021 Fev 8	15 24 44.5	-73 41 6	1.912	1.922	75.7	29.8	11.7	2.18	169.6
2021 Fev 9	15 27 2.5	-74 32 30	1.913	1.928	76.0	29.8	11.8	2.17	169.6
2021 Fev 10	15 29 28.8	-75 23 45	1.913	1.934	76.3	29.7	11.8	2.17	169.5
2021 Fev 11	15 32 5.1	-76 14 50	1.914	1.940	76.7	29.7	11.8	2.16	169.3
2021 Fev 12	15 34 53.0	-77 5 44	1.915	1.946	77.0	29.6	11.8	2.15	169.1
2021 Fev 13	15 37 55.1	-77 56 24	1.916	1.953	77.3	29.6	11.8	2.15	168.9
2021 Fev 14	15 41 14.1	-78 46 49	1.918	1.959	77.6	29.5	11.8	2.14	168.6
2021 Fev 15	15 44 54.2	-79 36 57	1.920	1.965	77.8	29.4	11.9	2.13	168.2
2021 Fev 16	15 49 0.5	-80 26 46	1.922	1.972	78.1	29.4	11.9	2.12	167.7
2021 Fev 17	15 53 40.0	-81 16 13	1.924	1.978	78.4	29.3	11.9	2.11	167.0
2021 Fev 18	15 59 2.6	-82 5 15	1.927	1.984	78.6	29.2	11.9	2.09	166.2
2021 Fev 19	16 5 22.4	-82 53 49	1.930	1.991	78.8	29.2	11.9	2.08	165.1
2021 Fev 20	16 13 0.2	-83 41 48	1.933	1.997	79.1	29.1	11.9	2.07	163.8
2021 Fev 21	16 22 27.8	-84 29 6	1.937	2.004	79.3	29.0	12.0	2.06	161.9
2021 Fev 22	16 34 36.5	-85 15 30	1.941	2.011	79.5	28.9	12.0	2.04	159.4
2021 Fev 23	16 50 52.7	-86 0 39	1.945	2.017	79.6	28.8	12.0	2.03	155.9
2021 Fev 24	17 13 51.4	-86 43 58	1.950	2.024	79.8	28.8	12.0	2.01	150.6

2021	Fev	25	17	48	22.8	-87	24	12	1.954	2.031	80.0	28.7	12.0	1.99	142.5
2021	Fev	26	18	43	22.5	-87	58	42	1.959	2.038	80.1	28.6	12.1	1.98	129.3
2021	Fev	27	20	10	31.2	-88	21	50	1.965	2.045	80.3	28.5	12.1	1.96	108.1
2021	Fev	28	22	2	48.5	-88	25	27	1.970	2.052	80.4	28.4	12.1	1.94	80.5
2021	Mar	1	23	39	40.4	-88	8	12	1.976	2.059	80.5	28.3	12.1	1.93	56.9
2021	Mar	2	0	42	48.8	-87	37	53	1.982	2.066	80.6	28.2	12.1	1.91	41.6
2021	Mar	3	1	22	3.9	-87	1	20	1.988	2.073	80.7	28.2	12.2	1.89	32.4
2021	Mar	4	1	47	43.0	-86	21	58	1.995	2.080	80.8	28.1	12.2	1.87	26.5
2021	Mar	5	2	5	34.8	-85	41	18	2.001	2.087	80.8	28.0	12.2	1.85	22.6
2021	Mar	6	2	18	43.8	-85	0	5	2.008	2.095	80.9	27.9	12.2	1.83	19.9
2021	Mar	7	2	28	51.8	-84	18	41	2.015	2.102	81.0	27.8	12.2	1.81	17.9
2021	Mar	8	2	36	57.8	-83	37	21	2.023	2.109	81.0	27.7	12.3	1.79	16.4
2021	Mar	9	2	43	38.2	-82	56	13	2.030	2.116	81.0	27.6	12.3	1.77	15.3
2021	Mar	10	2	49	16.4	-82	15	21	2.038	2.124	81.1	27.5	12.3	1.75	14.5
2021	Mar	11	2	54	8.0	-81	34	51	2.046	2.131	81.1	27.4	12.3	1.73	13.9
2021	Mar	12	2	58	23.9	-80	54	44	2.054	2.139	81.1	27.3	12.4	1.71	13.4
2021	Mar	13	3	2	11.8	-80	15	2	2.063	2.146	81.1	27.2	12.4	1.69	13.0
2021	Mar	14	3	5	37.5	-79	35	47	2.071	2.154	81.1	27.1	12.4	1.67	12.8
2021	Mar	15	3	8	45.1	-78	57	0	2.080	2.161	81.1	27.0	12.4	1.65	12.6
2021	Mar	16	3	11	37.9	-78	18	43	2.089	2.169	81.0	26.9	12.5	1.62	12.5
2021	Mar	17	3	14	18.4	-77	40	54	2.098	2.177	81.0	26.8	12.5	1.60	12.4
2021	Mar	18	3	16	48.6	-77	3	36	2.107	2.184	81.0	26.7	12.5	1.58	12.4
2021	Mar	19	3	19	10.0	-76	26	49	2.116	2.192	80.9	26.6	12.5	1.56	12.4

### 323P/SOHO - 00:00 UTC (J2000)

Última medida astrométrica realizada em: 2016 Nov 23 (Acesso em: 2020 Nov 21)

T 2021 Jan 17.7618 TT

q 0.039138 Peri. 353.0521

z 0.387296 Node 324.3751

e 0.984842 Incl. 5.3386

Ref: MPEC 2016-Y36

Data aaaa/mm./dd	$\alpha$ (J2000.0) h m s	$\delta$ (J2000.0) ° ' "	delta ua	Rsol ua	Elong	Fase	Mag	"/min	AP
2021 Jan 15	19 1 20.6	-23 26 30	0.958	0.184	10.7	92.5	12.5	9.76	82.2
2021 Jan 16	19 19 0.2	-22 48 27	0.986	0.131	7.7	85.4	11.2	10.96	80.0
2021 Jan 17	19 39 53.9	-21 50 26	1.016	0.073	3.7	61.9	8.7	14.39	77.2
2021 Jan 18	20 8 20.6	-20 2 35	1.008	0.044	2.1	56.0	6.4	15.58	72.2
2021 Jan 19	20 24 58.7	-18 40 56	0.934	0.101	5.3	116.7	9.9	7.47	69.8
2021 Jan 20	20 35 17.0	-17 45 34	0.874	0.157	6.9	131.3	11.7	5.94	69.0

### 10P/TempeI - 00:00 UTC (J2000)

Última medida astrométrica realizada em: 2020 Jun 13 (Acesso em: 2020 Nov 21)

T 2021 Mar 24.2931 TT

q 1.412438 Peri. 195.5167

a 3.060862 Node 117.8094

e 0.538549 Incl. 12.0398

Ref: MPC114607

Nota: Efemérides com intervalo de 3 dias.

Data aaaa/mm./dd	$\alpha$ (J2000.0) h m s	$\delta$ (J2000.0) ° ' "	delta ua	Rsol ua	Elong	Fase	Mag	"/min	AP
2021 Jan 1	17 50 29.4	-18 41 37	2.589	1.649	13.6	8.1	12.5	1.82	95.5
2021 Jan 4	17 59 42.6	-18 53 22	2.568	1.634	14.3	8.6	12.4	1.84	94.7
2021 Jan 7	18 9 2.9	-19 3 20	2.548	1.619	15.1	9.1	12.3	1.85	93.9
2021 Jan 10	18 18 30.0	-19 11 28	2.528	1.605	15.8	9.6	12.1	1.87	93.1
2021 Jan 13	18 28 3.8	-19 17 42	2.509	1.591	16.6	10.2	12.0	1.89	92.2
2021 Jan 16	18 37 43.7	-19 21 58	2.489	1.577	17.3	10.7	11.9	1.91	91.4
2021 Jan 19	18 47 29.4	-19 24 14	2.470	1.564	18.0	11.2	11.8	1.93	90.5
2021 Jan 22	18 57 20.5	-19 24 26	2.451	1.551	18.7	11.7	11.7	1.94	89.7
2021 Jan 25	19 7 16.5	-19 22 33	2.433	1.539	19.3	12.2	11.6	1.96	88.8
2021 Jan 28	19 17 17.0	-19 18 33	2.415	1.527	20.0	12.7	11.5	1.98	88.0
2021 Jan 31	19 27 21.7	-19 12 25	2.397	1.515	20.6	13.2	11.4	1.99	87.1
2021 Feb 3	19 37 30.1	-19 4 7	2.380	1.505	21.2	13.7	11.3	2.01	86.3
2021 Feb 6	19 47 41.7	-18 53 39	2.364	1.494	21.8	14.2	11.2	2.02	85.4
2021 Feb 9	19 57 55.9	-18 41 2	2.348	1.484	22.4	14.7	11.1	2.03	84.6
2021 Feb 12	20 8 12.2	-18 26 15	2.332	1.475	23.0	15.2	11.1	2.04	83.8
2021 Feb 15	20 18 30.1	-18 9 20	2.317	1.466	23.6	15.6	11.0	2.06	83.0
2021 Feb 18	20 28 48.8	-17 50 20	2.303	1.458	24.1	16.1	10.9	2.07	82.3
2021 Feb 21	20 39 8.0	-17 29 18	2.289	1.451	24.7	16.5	10.8	2.07	81.5
2021 Feb 24	20 49 27.1	-17 6 15	2.276	1.444	25.2	17.0	10.8	2.08	80.8

2021	Fev	27	20	59	45.7	-16	41	17	2.264	1.438	25.7	17.4	10.7	2.09	80.1
2021	Mar	2	21	10	3.2	-16	14	27	2.252	1.432	26.3	17.8	10.7	2.09	79.4
2021	Mar	5	21	20	19.3	-15	45	50	2.241	1.427	26.8	18.2	10.6	2.10	78.7
2021	Mar	8	21	30	33.5	-15	15	31	2.230	1.423	27.3	18.6	10.6	2.10	78.1
2021	Mar	11	21	40	45.3	-14	43	35	2.221	1.419	27.8	19.0	10.5	2.10	77.5
2021	Mar	14	21	50	54.4	-14	10	10	2.212	1.417	28.3	19.4	10.5	2.10	77.0
2021	Mar	17	22	1	0.2	-13	35	22	2.203	1.415	28.8	19.8	10.5	2.10	76.4
2021	Mar	20	22	11	2.4	-12	59	18	2.195	1.413	29.3	20.2	10.5	2.09	75.9
2021	Mar	23	22	21	0.7	-12	22	5	2.188	1.413	29.8	20.5	10.4	2.09	75.5
2021	Mar	26	22	30	54.8	-11	43	52	2.181	1.413	30.3	20.9	10.4	2.08	75.0
2021	Mar	29	22	40	44.4	-11	4	44	2.175	1.413	30.8	21.2	10.4	2.08	74.7
2021	Abr	1	22	50	29.4	-10	24	50	2.170	1.415	31.3	21.5	10.4	2.07	74.3
2021	Abr	4	23	0	9.7	-9	44	17	2.165	1.417	31.8	21.8	10.5	2.06	74.0
2021	Abr	7	23	9	44.9	-9	3	12	2.161	1.420	32.3	22.2	10.5	2.05	73.7
2021	Abr	10	23	19	14.8	-8	21	44	2.157	1.423	32.9	22.5	10.5	2.03	73.5
2021	Abr	13	23	28	39.4	-7	40	0	2.153	1.428	33.4	22.8	10.5	2.02	73.3
2021	Abr	16	23	37	58.4	-6	58	8	2.150	1.433	34.0	23.1	10.6	2.00	73.1
2021	Abr	19	23	47	11.6	-6	16	15	2.148	1.438	34.6	23.3	10.6	1.99	73.0
2021	Abr	22	23	56	19.1	-5	34	29	2.146	1.445	35.2	23.6	10.7	1.97	72.9
2021	Abr	25	0	5	20.6	-4	52	56	2.144	1.452	35.8	23.9	10.7	1.95	72.8
2021	Abr	28	0	14	16.3	-4	11	42	2.142	1.459	36.4	24.2	10.8	1.93	72.8
2021	Mai	1	0	23	6.0	-3	30	53	2.141	1.467	37.0	24.4	10.8	1.91	72.8
2021	Mai	4	0	31	49.7	-2	50	35	2.140	1.476	37.7	24.7	10.9	1.89	72.9
2021	Mai	7	0	40	27.4	-2	10	53	2.139	1.486	38.3	24.9	10.9	1.87	73.0
2021	Mai	10	0	48	58.9	-1	31	53	2.138	1.495	39.0	25.2	11.0	1.84	73.1
2021	Mai	13	0	57	24.2	-0	53	40	2.137	1.506	39.8	25.4	11.1	1.82	73.2
2021	Mai	16	1	5	43.2	-0	16	19	2.136	1.517	40.5	25.7	11.2	1.80	73.4
2021	Mai	19	1	13	55.8	0	20	6	2.135	1.528	41.3	25.9	11.3	1.77	73.6
2021	Mai	22	1	22	1.9	0	55	31	2.135	1.540	42.1	26.1	11.3	1.75	73.9
2021	Mai	25	1	30	1.7	1	29	53	2.134	1.553	42.9	26.3	11.4	1.72	74.1
2021	Mai	28	1	37	54.9	2	3	10	2.133	1.566	43.7	26.6	11.5	1.69	74.4
2021	Mai	31	1	45	41.7	2	35	18	2.132	1.579	44.6	26.8	11.6	1.67	74.8
2021	Jun	3	1	53	21.9	3	6	16	2.130	1.593	45.5	27.0	11.7	1.64	75.1
2021	Jun	6	2	0	55.5	3	36	1	2.129	1.607	46.4	27.2	11.8	1.61	75.5
2021	Jun	9	2	8	22.3	4	4	31	2.127	1.621	47.3	27.4	11.9	1.58	75.9
2021	Jun	12	2	15	42.3	4	31	44	2.125	1.636	48.3	27.6	12.0	1.55	76.3
2021	Jun	15	2	22	55.1	4	57	38	2.122	1.651	49.3	27.8	12.1	1.53	76.7
2021	Jun	18	2	30	0.9	5	22	13	2.119	1.666	50.4	28.0	12.2	1.50	77.2
2021	Jun	21	2	36	59.3	5	45	28	2.116	1.682	51.4	28.2	12.3	1.47	77.7
2021	Jun	24	2	43	50.4	6	7	23	2.112	1.698	52.6	28.4	12.4	1.44	78.2
2021	Jun	27	2	50	34.1	6	27	58	2.108	1.714	53.7	28.5	12.5	1.41	78.7

7P/Pons-Winnecke - 00:00 UTC (J2000)  
Última medida astrométrica realizada em: 2020 Fev 22 (Acesso em: 2020 Nov 21)

T 2021 Mai 27.1019 TT  
q 1.234328 Peri. 172.5842  
a 3.414471 Node 93.3771  
e 0.638501 Incl. 22.3635  
Ref: MPEC 2015-E14

Nota: Efemérides com intervalo de 2 dias.

Data aaaa/mm./dd	$\alpha$ (J2000.0) h m s	$\delta$ (J2000.0) o ' "	delta ua	Rsol ua	Elong	Fase	Mag	"'/min	AP
2021 Fev 2	15 14 0.7	10 3 24	1.515	1.809	90.1	33.0	12.5	1.48	92.3
2021 Fev 4	15 18 49.6	10 0 39	1.486	1.794	90.8	33.3	12.4	1.49	92.1
2021 Fev 6	15 23 40.8	9 58 12	1.456	1.779	91.4	33.7	12.3	1.50	91.8
2021 Fev 8	15 28 34.2	9 56 3	1.428	1.764	92.0	34.0	12.2	1.51	91.6
2021 Fev 10	15 33 29.9	9 54 11	1.399	1.749	92.6	34.3	12.2	1.52	91.4
2021 Fev 12	15 38 27.9	9 52 35	1.371	1.734	93.2	34.6	12.1	1.54	91.1
2021 Fev 14	15 43 28.2	9 51 13	1.343	1.719	93.8	35.0	12.0	1.55	91.0
2021 Fev 16	15 48 30.9	9 50 5	1.316	1.704	94.3	35.3	11.9	1.56	90.8
2021 Fev 18	15 53 35.9	9 49 9	1.289	1.689	94.9	35.7	11.8	1.57	90.6
2021 Fev 20	15 58 43.3	9 48 23	1.262	1.675	95.4	36.0	11.7	1.58	90.5
2021 Fev 22	16 3 53.2	9 47 45	1.236	1.660	95.9	36.3	11.7	1.60	90.4
2021 Fev 24	16 9 5.7	9 47 13	1.210	1.646	96.3	36.7	11.6	1.61	90.4
2021 Fev 26	16 14 20.7	9 46 46	1.185	1.631	96.8	37.1	11.5	1.62	90.3
2021 Fev 28	16 19 38.5	9 46 21	1.160	1.617	97.2	37.4	11.4	1.64	90.3
2021 Mar 2	16 24 58.9	9 45 56	1.135	1.603	97.6	37.8	11.3	1.65	90.3
2021 Mar 4	16 30 22.2	9 45 29	1.111	1.589	98.0	38.2	11.2	1.67	90.3

2021	Mar	6	16	35	48.1	9	44	58	1.087	1.575	98.4	38.5	11.2	1.68	90.4	
2021	Mar	8	16	41	16.9	9	44	19	1.064	1.561	98.7	38.9	11.1	1.69	90.5	
2021	Mar	10	16	46	48.5	9	43	31	1.041	1.548	99.1	39.3	11.0	1.71	90.6	
2021	Mar	12	16	52	22.9	9	42	28	1.018	1.534	99.4	39.7	10.9	1.72	90.8	
2021	Mar	14	16	58	0.3	9	41	9	0.996	1.521	99.7	40.1	10.8	1.74	91.0	
2021	Mar	16	17	3	40.5	9	39	27	0.974	1.508	100.0	40.5	10.7	1.76	91.3	
2021	Mar	18	17	9	23.9	9	37	20	0.952	1.495	100.2	40.9	10.6	1.77	91.6	
2021	Mar	20	17	15	10.3	9	34	43	0.931	1.482	100.5	41.4	10.6	1.79	91.9	
2021	Mar	22	17	21	0.0	9	31	31	0.911	1.469	100.7	41.8	10.5	1.81	92.3	
2021	Mar	24	17	26	53.0	9	27	39	0.890	1.457	100.9	42.2	10.4	1.82	92.8	
2021	Mar	26	17	32	49.5	9	23	2	0.871	1.445	101.1	42.6	10.3	1.84	93.2	
2021	Mar	28	17	38	49.6	9	17	36	0.851	1.433	101.3	43.1	10.2	1.86	93.8	
2021	Mar	30	17	44	53.4	9	11	15	0.832	1.421	101.5	43.5	10.1	1.89	94.3	
2021	Abr	1	17	51	1.1	9	3	54	0.813	1.410	101.6	44.0	10.0	1.91	94.9	
2021	Abr	3	17	57	12.6	8	55	27	0.795	1.399	101.8	44.4	10.0	1.93	95.6	
2021	Abr	5	18	3	28.1	8	45	50	0.777	1.388	101.9	44.9	9.9	1.95	96.3	
2021	Abr	7	18	9	47.6	8	34	55	0.759	1.377	102.1	45.3	9.8	1.98	97.0	
2021	Abr	9	18	16	11.2	8	22	36	0.742	1.367	102.2	45.8	9.7	2.01	97.8	
2021	Abr	11	18	22	39.0	8	8	46	0.726	1.357	102.3	46.2	9.6	2.03	98.6	
2021	Abr	13	18	29	11.1	7	53	18	0.709	1.347	102.4	46.6	9.5	2.06	99.5	
2021	Abr	15	18	35	47.5	7	36	3	0.693	1.338	102.5	47.1	9.5	2.09	100.4	
2021	Abr	17	18	42	28.5	7	16	56	0.678	1.328	102.7	47.5	9.4	2.13	101.4	
2021	Abr	19	18	49	14.2	6	55	48	0.662	1.320	102.8	47.9	9.3	2.16	102.4	
2021	Abr	21	18	56	4.6	6	32	32	0.648	1.311	102.9	48.3	9.2	2.20	103.4	
2021	Abr	23	19	2	59.9	6	7	1	0.633	1.303	103.0	48.7	9.2	2.23	104.4	
2021	Abr	25	19	10	0.3	5	39	8	0.619	1.296	103.2	49.1	9.1	2.27	105.5	
2021	Abr	27	19	17	5.7	5	8	46	0.606	1.289	103.3	49.5	9.0	2.32	106.5	
2021	Abr	29	19	24	16.3	4	35	50	0.593	1.282	103.5	49.8	8.9	2.36	107.6	
2021	Mai	1	19	31	32.0	4	0	13	0.580	1.276	103.6	50.1	8.9	2.40	108.7	
2021	Mai	3	19	38	52.8	3	21	51	0.568	1.270	103.8	50.4	8.8	2.45	109.8	
2021	Mai	5	19	46	18.4	2	40	37	0.556	1.264	104.0	50.7	8.7	2.49	110.9	
2021	Mai	7	19	53	48.7	1	56	26	0.545	1.259	104.2	51.0	8.7	2.54	112.0	
2021	Mai	9	20	1	23.5	1	9	15	0.534	1.254	104.4	51.2	8.6	2.59	113.1	
2021	Mai	11	20	9	2.6	0	19	0	0.524	1.250	104.7	51.4	8.6	2.63	114.2	
2021	Mai	13	20	16	45.8	-	0	34	21	0.515	1.247	105.0	51.5	8.5	2.68	115.3
2021	Mai	15	20	24	32.8	-	1	30	48	0.505	1.243	105.2	51.7	8.5	2.72	116.3
2021	Mai	17	20	32	23.1	-	2	30	21	0.497	1.241	105.6	51.7	8.4	2.77	117.4
2021	Mai	19	20	40	16.5	-	3	32	55	0.489	1.238	105.9	51.8	8.4	2.81	118.4
2021	Mai	21	20	48	12.5	-	4	38	27	0.481	1.237	106.3	51.8	8.3	2.84	119.4
2021	Mai	23	20	56	10.7	-	5	46	50	0.475	1.235	106.7	51.7	8.3	2.88	120.3
2021	Mai	25	21	4	10.4	-	6	57	53	0.469	1.235	107.1	51.6	8.3	2.90	121.3
2021	Mai	27	21	12	10.9	-	8	11	28	0.463	1.234	107.5	51.5	8.2	2.93	122.1
2021	Mai	29	21	20	11.6	-	9	27	20	0.458	1.235	108.0	51.3	8.2	2.94	123.0
2021	Mai	31	21	28	11.6	-10	45	17	0.454	1.235	108.5	51.1	8.2	2.95	123.8	
2021	Jun	2	21	36	9.9	-12	5	4	0.450	1.236	109.0	50.8	8.2	2.95	124.7	
2021	Jun	4	21	44	5.5	-13	26	25	0.447	1.238	109.6	50.5	8.2	2.95	125.5	
2021	Jun	6	21	51	57.4	-14	49	4	0.445	1.240	110.1	50.2	8.2	2.93	126.2	
2021	Jun	8	21	59	44.6	-16	12	42	0.443	1.243	110.7	49.8	8.2	2.91	127.0	
2021	Jun	10	22	7	26.1	-17	37	2	0.442	1.246	111.3	49.4	8.2	2.88	127.8	
2021	Jun	12	22	15	0.9	-19	1	45	0.442	1.250	112.0	48.9	8.2	2.84	128.5	
2021	Jun	14	22	22	27.8	-20	26	34	0.442	1.254	112.6	48.4	8.2	2.79	129.3	
2021	Jun	16	22	29	46.0	-21	51	9	0.443	1.259	113.3	47.9	8.2	2.74	130.0	
2021	Jun	18	22	36	54.5	-23	15	16	0.444	1.264	113.9	47.3	8.3	2.67	130.7	
2021	Jun	20	22	43	52.3	-24	38	36	0.447	1.269	114.6	46.7	8.3	2.61	131.5	
2021	Jun	22	22	50	38.5	-26	0	57	0.449	1.275	115.3	46.1	8.3	2.53	132.3	
2021	Jun	24	22	57	12.3	-27	22	5	0.452	1.281	116.1	45.5	8.4	2.45	133.1	
2021	Jun	26	23	3	32.7	-28	41	49	0.456	1.288	116.8	44.8	8.4	2.37	134.0	
2021	Jun	28	23	9	38.8	-30	0	2	0.460	1.295	117.5	44.1	8.4	2.28	134.9	
2021	Jun	30	23	15	29.7	-31	16	35	0.465	1.303	118.2	43.4	8.5	2.19	135.9	
2021	Jul	2	23	21	4.6	-32	31	22	0.470	1.311	119.0	42.7	8.5	2.10	137.0	
2021	Jul	4	23	26	22.7	-33	44	18	0.476	1.319	119.7	42.0	8.6	2.01	138.2	
2021	Jul	6	23	31	23.2	-34	55	18	0.482	1.328	120.5	41.3	8.6	1.92	139.5	
2021	Jul	8	23	36	5.5	-36	4	19	0.488	1.337	121.2	40.6	8.7	1.82	141.0	
2021	Jul	10	23	40	29.0	-37	11	17	0.495	1.346	122.0	39.9	8.8	1.73	142.5	
2021	Jul	12	23	44	33.4	-38	16	9	0.502	1.356	122.7	39.1	8.8	1.64	144.2	
2021	Jul	14	23	48	18.1	-39	18	51	0.510	1.366	123.5	38.4	8.9	1.55	146.0	
2021	Jul	16	23	51	42.9	-40	19	22	0.518	1.376	124.2	37.7	9.0	1.46	148.0	
2021	Jul	18	23	54	47.6	-41	17	37	0.526	1.387	124.9	36.9	9.0	1.37	150.1	
2021	Jul	20	23	57	32.0	-42	13	36	0.535	1.397	125.7	36.2	9.1	1.29	152.5	
2021	Jul	22	23	59	56.1	-43	7	17	0.544	1.409	126.4	35.5	9.2	1.21	155.1	
2021	Jul	24	0	1	59.9	-43	58	38	0.554	1.420	127.1	34.8	9.2	1.13	157.9	
2021	Jul	26	0	3	43.2	-44	47	39	0.563	1.432	127.8	34.1	9.3	1.05	160.9	
2021	Jul	28	0	5	6.2	-45	34	17	0.574	1.444	128.4	33.4	9.4	0.98	164.3	
2021	Jul	30	0	6	8.9	-46	18	30	0.584	1.456	129.1	32.8	9.5	0.92	168.1	

2021	Ago	1	0	6	51.6	-47	0	16	0.595	1.468	129.7	32.1	9.5	0.85	172.1
2021	Ago	3	0	7	14.7	-47	39	32	0.606	1.481	130.3	31.5	9.6	0.79	176.6
2021	Ago	5	0	7	18.6	-48	16	14	0.618	1.493	130.8	30.9	9.7	0.74	181.5
2021	Ago	7	0	7	4.0	-48	50	19	0.629	1.506	131.4	30.3	9.8	0.69	186.8
2021	Ago	9	0	6	31.7	-49	21	43	0.642	1.519	131.9	29.8	9.9	0.64	192.5
2021	Ago	11	0	5	42.6	-49	50	22	0.654	1.533	132.4	29.3	9.9	0.60	198.7
2021	Ago	13	0	4	37.9	-50	16	15	0.667	1.546	132.8	28.8	10.0	0.56	205.2
2021	Ago	15	0	3	18.7	-50	39	17	0.681	1.560	133.2	28.3	10.1	0.53	212.2
2021	Ago	17	0	1	46.5	-50	59	28	0.695	1.574	133.5	27.8	10.2	0.51	219.5
2021	Ago	19	0	0	2.6	-51	16	48	0.709	1.587	133.8	27.4	10.3	0.49	227.1
2021	Ago	21	23	58	8.5	-51	31	15	0.724	1.601	134.0	27.0	10.3	0.47	234.8
2021	Ago	23	23	56	5.5	-51	42	52	0.739	1.616	134.2	26.7	10.4	0.46	242.6
2021	Ago	25	23	53	55.2	-51	51	39	0.754	1.630	134.3	26.3	10.5	0.46	250.3
2021	Ago	27	23	51	39.0	-51	57	38	0.770	1.644	134.4	26.0	10.6	0.46	257.8
2021	Ago	29	23	49	18.4	-52	0	52	0.786	1.659	134.4	25.8	10.7	0.46	265.1
2021	Ago	31	23	46	54.8	-52	1	24	0.803	1.673	134.4	25.5	10.8	0.46	272.1
2021	Set	2	23	44	29.9	-51	59	15	0.821	1.688	134.3	25.3	10.8	0.47	278.8
2021	Set	4	23	42	5.0	-51	54	32	0.838	1.703	134.2	25.1	10.9	0.48	285.1
2021	Set	6	23	39	41.5	-51	47	17	0.857	1.717	134.0	25.0	11.0	0.49	291.1
2021	Set	8	23	37	20.6	-51	37	37	0.875	1.732	133.7	24.9	11.1	0.50	296.7
2021	Set	10	23	35	3.7	-51	25	37	0.895	1.747	133.4	24.8	11.2	0.52	302.0
2021	Set	12	23	32	51.8	-51	11	24	0.914	1.762	133.0	24.7	11.3	0.53	307.1
2021	Set	14	23	30	45.8	-50	55	5	0.935	1.777	132.6	24.6	11.4	0.54	311.9
2021	Set	16	23	28	46.6	-50	36	48	0.955	1.792	132.1	24.6	11.4	0.55	316.3
2021	Set	18	23	26	54.6	-50	16	39	0.977	1.807	131.6	24.6	11.5	0.57	320.6
2021	Set	20	23	25	10.4	-49	54	49	0.998	1.823	131.0	24.6	11.6	0.58	324.6
2021	Set	22	23	23	34.4	-49	31	22	1.021	1.838	130.4	24.6	11.7	0.59	328.4
2021	Set	24	23	22	6.8	-49	6	27	1.043	1.853	129.8	24.6	11.8	0.60	332.0
2021	Set	26	23	20	47.8	-48	40	11	1.067	1.868	129.1	24.6	11.9	0.62	335.4
2021	Set	28	23	19	37.4	-48	12	40	1.091	1.884	128.3	24.7	11.9	0.63	338.6
2021	Set	30	23	18	35.8	-47	44	1	1.115	1.899	127.5	24.7	12.0	0.64	341.8
2021	Out	2	23	17	43.0	-47	14	19	1.140	1.915	126.7	24.8	12.1	0.65	344.8
2021	Out	4	23	16	58.8	-46	43	40	1.165	1.930	125.9	24.8	12.2	0.66	347.6
2021	Out	6	23	16	23.3	-46	12	10	1.191	1.945	125.0	24.9	12.3	0.67	350.4
2021	Out	8	23	15	56.4	-45	39	55	1.217	1.961	124.1	25.0	12.4	0.68	353.1
2021	Out	10	23	15	37.8	-45	6	58	1.244	1.976	123.2	25.0	12.4	0.69	355.6
2021	Out	12	23	15	27.3	-44	33	26	1.271	1.992	122.2	25.1	12.5	0.70	358.1

### 15P/Finlay - 00:00 UTC (J2000)

Última medida astrométrica realizada em: 2016 Fev 6 (Acesso em: 2020 Nov 21)

T 2021 Jul 13.5552 TT  
q 0.991817 Peri. 347.8330  
a 3.504716 Node 13.7212  
e 0.717005 Incl. 6.7975  
Ref: MPC 92276

Data aaaa/mm./dd	$\alpha$ (J2000.0) h m s	$\delta$ (J2000.0) o ' "	delta	Rsol	Elong	Fase	Mag	"/min	AP
2021 Jun 13	1 21 57.6	3 3 44	1.090	1.086	62.0	55.6	12.5	3.20	63.3
2021 Jun 14	1 26 32.7	3 38 13	1.089	1.080	61.6	55.8	12.5	3.20	63.4
2021 Jun 15	1 31 8.0	4 12 36	1.088	1.075	61.3	56.0	12.5	3.20	63.4
2021 Jun 16	1 35 43.6	4 46 53	1.088	1.069	61.0	56.2	12.5	3.20	63.5
2021 Jun 17	1 40 19.4	5 21 1	1.087	1.064	60.7	56.3	12.5	3.19	63.6
2021 Jun 18	1 44 55.4	5 54 59	1.087	1.059	60.3	56.5	12.4	3.19	63.7
2021 Jun 19	1 49 31.5	6 28 46	1.088	1.054	60.0	56.6	12.4	3.18	63.9
2021 Jun 20	1 54 7.7	7 2 19	1.088	1.049	59.7	56.7	12.4	3.18	64.0
2021 Jun 21	1 58 44.0	7 35 39	1.089	1.045	59.4	56.8	12.4	3.17	64.1
2021 Jun 22	2 3 20.3	8 8 43	1.090	1.040	59.1	56.9	12.4	3.16	64.3
2021 Jun 23	2 7 56.6	8 41 30	1.091	1.036	58.8	57.0	12.3	3.15	64.5
2021 Jun 24	2 12 32.9	9 13 59	1.093	1.032	58.4	57.1	12.3	3.14	64.6
2021 Jun 25	2 17 9.0	9 46 8	1.095	1.028	58.1	57.1	12.3	3.13	64.8
2021 Jun 26	2 21 45.1	10 17 57	1.096	1.024	57.8	57.2	12.3	3.12	65.0
2021 Jun 27	2 26 21.0	10 49 23	1.099	1.021	57.6	57.2	12.3	3.11	65.2
2021 Jun 28	2 30 56.7	11 20 27	1.101	1.017	57.3	57.2	12.3	3.09	65.4
2021 Jun 29	2 35 32.2	11 51 6	1.104	1.014	57.0	57.2	12.3	3.08	65.7
2021 Jun 30	2 40 7.4	12 21 20	1.106	1.011	56.7	57.2	12.3	3.07	65.9
2021 Jul 1	2 44 42.3	12 51 8	1.109	1.009	56.4	57.1	12.3	3.05	66.2
2021 Jul 2	2 49 16.9	13 20 29	1.112	1.006	56.2	57.1	12.3	3.03	66.4
2021 Jul 3	2 53 51.0	13 49 21	1.116	1.004	55.9	57.0	12.3	3.02	66.7
2021 Jul 4	2 58 24.8	14 17 45	1.119	1.002	55.7	57.0	12.3	3.00	67.0
2021 Jul 5	3 2 58.0	14 45 39	1.123	1.000	55.4	56.9	12.3	2.98	67.3
2021 Jul 6	3 7 30.8	15 13 3	1.127	0.998	55.2	56.8	12.3	2.96	67.6

2021	Jul	7	3	12	3.0	15	39	55	1.131	0.996	55.0	56.7	12.3	2.94	67.9
2021	Jul	8	3	16	34.6	16	6	16	1.135	0.995	54.8	56.6	12.3	2.92	68.2
2021	Jul	9	3	21	5.5	16	32	5	1.139	0.994	54.6	56.4	12.3	2.90	68.5
2021	Jul	10	3	25	35.8	16	57	21	1.143	0.993	54.4	56.3	12.3	2.88	68.8
2021	Jul	11	3	30	5.3	17	22	4	1.148	0.993	54.2	56.1	12.3	2.86	69.2
2021	Jul	12	3	34	34.1	17	46	13	1.153	0.992	54.0	56.0	12.3	2.84	69.5
2021	Jul	13	3	39	2.1	18	9	49	1.157	0.992	53.8	55.8	12.3	2.82	69.9
2021	Jul	14	3	43	29.2	18	32	50	1.162	0.992	53.7	55.6	12.3	2.80	70.2
2021	Jul	15	3	47	55.5	18	55	17	1.167	0.992	53.5	55.4	12.3	2.78	70.6
2021	Jul	16	3	52	20.8	19	17	10	1.172	0.992	53.4	55.3	12.3	2.75	70.9
2021	Jul	17	3	56	45.2	19	38	28	1.178	0.993	53.2	55.0	12.3	2.73	71.3
2021	Jul	18	4	1	8.5	19	59	11	1.183	0.994	53.1	54.8	12.3	2.71	71.7
2021	Jul	19	4	5	30.8	20	19	19	1.188	0.995	53.0	54.6	12.4	2.69	72.1
2021	Jul	20	4	9	52.1	20	38	53	1.194	0.996	52.9	54.4	12.4	2.66	72.5
2021	Jul	21	4	14	12.2	20	57	53	1.199	0.998	52.8	54.2	12.4	2.64	72.8
2021	Jul	22	4	18	31.2	21	16	18	1.205	0.999	52.7	53.9	12.4	2.62	73.2
2021	Jul	23	4	22	49.0	21	34	8	1.210	1.001	52.6	53.7	12.4	2.60	73.6
2021	Jul	24	4	27	5.5	21	51	25	1.216	1.003	52.5	53.4	12.4	2.57	74.0
2021	Jul	25	4	31	20.8	22	8	8	1.222	1.006	52.5	53.2	12.5	2.55	74.4
2021	Jul	26	4	35	34.9	22	24	16	1.227	1.008	52.4	52.9	12.5	2.53	74.8
2021	Jul	27	4	39	47.5	22	39	52	1.233	1.011	52.4	52.7	12.5	2.50	75.2
2021	Jul	28	4	43	58.9	22	54	54	1.239	1.014	52.3	52.4	12.5	2.48	75.6
2021	Jul	29	4	48	8.8	23	9	24	1.245	1.017	52.3	52.2	12.5	2.46	76.1

8P/Tuttle - 00:00 UTC (J2000)

Última medida astrométrica realizada em: 2020 Out 6 (Acesso em: 2020 Nov 21)

T 2021 Ago 27.7535 TT

q 1.026067 Peri. 207.4911

a 5.704682 Node 270.2046

e 0.820136 Incl. 54.9116

Ref: MPEC 2020-SI8

Data aaaa/mm./dd	$\alpha$ (J2000.0) h m s	$\delta$ (J2000.0) ° ' "	delta ua	RSol ua	Elong	Fase	Mag	"/min	AP
2021 Jun 27	5 9 34.4	40 21 48	2.253	1.376	23.0	16.8	12.5	1.97	111.5
2021 Jun 28	5 13 25.2	40 4 12	2.245	1.367	22.9	16.8	12.5	1.98	112.1
2021 Jun 29	5 17 15.3	39 46 3	2.237	1.357	22.8	16.8	12.4	1.99	112.6
2021 Jun 30	5 21 4.7	39 27 22	2.228	1.348	22.7	16.9	12.3	2.00	113.2
2021 Jul 1	5 24 53.3	39 8 9	2.220	1.339	22.5	16.9	12.3	2.01	113.8
2021 Jul 2	5 28 41.1	38 48 22	2.212	1.330	22.4	17.0	12.2	2.03	114.3
2021 Jul 3	5 32 28.1	38 28 3	2.204	1.321	22.3	17.0	12.1	2.04	114.9
2021 Jul 4	5 36 14.2	38 7 11	2.196	1.312	22.2	17.0	12.1	2.05	115.5
2021 Jul 5	5 39 59.4	37 45 46	2.188	1.303	22.1	17.1	12.0	2.06	116.0
2021 Jul 6	5 43 43.8	37 23 48	2.180	1.295	22.0	17.1	11.9	2.07	116.6
2021 Jul 7	5 47 27.3	37 1 17	2.172	1.286	22.0	17.2	11.9	2.08	117.1
2021 Jul 8	5 51 9.8	36 38 12	2.164	1.278	21.9	17.3	11.8	2.10	117.7
2021 Jul 9	5 54 51.5	36 14 35	2.155	1.269	21.8	17.3	11.7	2.11	118.2
2021 Jul 10	5 58 32.1	35 50 24	2.148	1.261	21.7	17.4	11.7	2.12	118.7
2021 Jul 11	6 2 11.8	35 25 39	2.140	1.252	21.7	17.4	11.6	2.13	119.3
2021 Jul 12	6 5 50.5	35 0 22	2.132	1.244	21.6	17.5	11.5	2.15	119.8
2021 Jul 13	6 9 28.3	34 34 31	2.124	1.236	21.6	17.6	11.5	2.16	120.3
2021 Jul 14	6 13 5.0	34 8 6	2.116	1.228	21.5	17.7	11.4	2.17	120.8
2021 Jul 15	6 16 40.8	33 41 9	2.108	1.220	21.5	17.7	11.3	2.18	121.3
2021 Jul 16	6 20 15.5	33 13 38	2.100	1.212	21.4	17.8	11.3	2.20	121.8
2021 Jul 17	6 23 49.3	32 45 33	2.092	1.204	21.4	17.9	11.2	2.21	122.3
2021 Jul 18	6 27 22.1	32 16 56	2.085	1.197	21.4	18.0	11.2	2.22	122.8
2021 Jul 19	6 30 53.9	31 47 45	2.077	1.189	21.3	18.1	11.1	2.24	123.3
2021 Jul 20	6 34 24.8	31 18 0	2.069	1.182	21.3	18.2	11.0	2.25	123.7
2021 Jul 21	6 37 54.7	30 47 43	2.062	1.175	21.3	18.3	11.0	2.27	124.2
2021 Jul 22	6 41 23.6	30 16 53	2.054	1.168	21.3	18.4	10.9	2.28	124.7
2021 Jul 23	6 44 51.6	29 45 29	2.047	1.161	21.3	18.6	10.8	2.29	125.1
2021 Jul 24	6 48 18.8	29 13 33	2.039	1.154	21.3	18.7	10.8	2.31	125.5
2021 Jul 25	6 51 45.0	28 41 4	2.032	1.147	21.4	18.8	10.7	2.32	126.0
2021 Jul 26	6 55 10.3	28 8 3	2.024	1.141	21.4	19.0	10.7	2.34	126.4
2021 Jul 27	6 58 34.8	27 34 29	2.017	1.134	21.4	19.1	10.6	2.35	126.8
2021 Jul 28	7 1 58.4	27 0 22	2.010	1.128	21.5	19.2	10.6	2.37	127.2
2021 Jul 29	7 5 21.3	26 25 44	2.003	1.122	21.5	19.4	10.5	2.38	127.6
2021 Jul 30	7 8 43.3	25 50 33	1.996	1.116	21.6	19.5	10.5	2.40	128.0
2021 Jul 31	7 12 4.6	25 14 51	1.989	1.110	21.6	19.7	10.4	2.41	128.4
2021 Ago 1	7 15 25.1	24 38 37	1.982	1.104	21.7	19.9	10.3	2.43	128.7
2021 Ago 2	7 18 45.0	24 1 52	1.975	1.099	21.8	20.0	10.3	2.45	129.1
2021 Ago 3	7 22 4.1	23 24 36	1.968	1.094	21.9	20.2	10.2	2.46	129.4
2021 Ago 4	7 25 22.6	22 46 49	1.961	1.088	22.0	20.4	10.2	2.48	129.8
2021 Ago 5	7 28 40.4	22 8 31	1.955	1.084	22.1	20.6	10.2	2.49	130.1

2021 Ago	6	7	31	57.6	21	29	44	1.948	1.079	22.2	20.8	10.1	2.51	130.4	
2021 Ago	7	7	35	14.3	20	50	26	1.942	1.074	22.3	21.0	10.1	2.52	130.8	
2021 Ago	8	7	38	30.4	20	10	39	1.935	1.070	22.4	21.2	10.0	2.54	131.1	
2021 Ago	9	7	41	45.9	19	30	23	1.929	1.066	22.5	21.4	10.0	2.55	131.3	
2021 Ago	10	7	45	1.0	18	49	39	1.923	1.062	22.7	21.6	9.9	2.57	131.6	
2021 Ago	11	7	48	15.6	18	8	26	1.917	1.058	22.8	21.8	9.9	2.59	131.9	
2021 Ago	12	7	51	29.8	17	26	46	1.911	1.054	22.9	22.0	9.9	2.60	132.2	
2021 Ago	13	7	54	43.6	16	44	38	1.905	1.051	23.1	22.2	9.8	2.62	132.4	
2021 Ago	14	7	57	57.0	16	2	4	1.899	1.048	23.2	22.4	9.8	2.63	132.7	
2021 Ago	15	8	1	10.2	15	19	4	1.894	1.045	23.4	22.7	9.8	2.65	132.9	
2021 Ago	16	8	4	23.0	14	35	38	1.888	1.042	23.6	22.9	9.7	2.66	133.1	
2021 Ago	17	8	7	35.5	13	51	48	1.883	1.039	23.7	23.1	9.7	2.67	133.3	
2021 Ago	18	8	10	47.8	13	7	33	1.878	1.037	23.9	23.3	9.7	2.69	133.5	
2021 Ago	19	8	14	0.0	12	22	55	1.873	1.035	24.1	23.5	9.7	2.70	133.7	
2021 Ago	20	8	17	12.0	11	37	54	1.868	1.033	24.3	23.8	9.6	2.72	133.9	
2021 Ago	21	8	20	23.9	10	52	32	1.863	1.031	24.5	24.0	9.6	2.73	134.0	
2021 Ago	22	8	23	35.7	10	6	48	1.858	1.030	24.7	24.2	9.6	2.74	134.2	
2021 Ago	23	8	26	47.5	9	20	45	1.854	1.029	24.9	24.4	9.6	2.76	134.3	
2021 Ago	24	8	29	59.3	8	34	21	1.850	1.028	25.1	24.6	9.6	2.77	134.5	
2021 Ago	25	8	33	11.1	7	47	40	1.846	1.027	25.3	24.9	9.6	2.78	134.6	
2021 Ago	26	8	36	23.0	7	0	41	1.842	1.026	25.5	25.1	9.6	2.79	134.7	
2021 Ago	27	8	39	35.1	6	13	25	1.838	1.026	25.7	25.3	9.5	2.80	134.8	
2021 Ago	28	8	42	47.2	5	25	53	1.835	1.026	25.9	25.5	9.5	2.81	134.9	
2021 Ago	29	8	45	59.6	4	38	8	1.831	1.026	26.1	25.7	9.5	2.82	135.0	
2021 Ago	30	8	49	12.1	3	50	8	1.828	1.027	26.4	25.9	9.5	2.83	135.0	
2021 Ago	31	8	52	24.9	3	1	56	1.825	1.027	26.6	26.1	9.5	2.84	135.1	
2021 Set	1	8	55	37.9	2	13	33	1.823	1.028	26.8	26.3	9.5	2.85	135.1	
2021 Set	2	8	58	51.2	1	25	0	1.820	1.029	27.0	26.5	9.6	2.86	135.2	
2021 Set	3	9	2	4.9	0	36	18	1.818	1.031	27.3	26.6	9.6	2.86	135.2	
2021 Set	4	9	5	18.9	-	0	12	1.816	1.032	27.5	26.8	9.6	2.87	135.2	
2021 Set	5	9	8	33.2	-	1	1	28	1.814	1.034	27.7	27.0	9.6	2.88	135.2
2021 Set	6	9	11	48.0	-	1	50	29	1.813	1.036	27.9	27.1	9.6	2.88	135.2
2021 Set	7	9	15	3.2	-	2	39	1.811	1.038	28.2	27.3	9.6	2.88	135.2	
2021 Set	8	9	18	18.8	-	3	28	1.810	1.040	28.4	27.4	9.6	2.89	135.2	
2021 Set	9	9	21	34.9	-	4	17	1.809	1.043	28.6	27.6	9.7	2.89	135.1	
2021 Set	10	9	24	51.4	-	5	7	1	1.808	1.046	28.8	27.7	9.7	2.89	135.1
2021 Set	11	9	28	8.5	-	5	56	1.808	1.049	29.1	27.8	9.7	2.89	135.0	
2021 Set	12	9	31	26.1	-	6	45	1.808	1.052	29.3	27.9	9.7	2.89	135.0	
2021 Set	13	9	34	44.2	-	7	34	1.808	1.056	29.5	28.0	9.8	2.89	134.9	
2021 Set	14	9	38	2.9	-	8	23	1.808	1.060	29.7	28.1	9.8	2.89	134.8	
2021 Set	15	9	41	22.2	-	9	11	1.809	1.063	30.0	28.2	9.8	2.89	134.7	
2021 Set	16	9	44	42.1	-	10	0	1.810	1.068	30.2	28.3	9.9	2.88	134.6	
2021 Set	17	9	48	2.5	-	10	49	1.811	1.072	30.4	28.3	9.9	2.88	134.5	
2021 Set	18	9	51	23.7	-	11	37	1.812	1.076	30.6	28.4	9.9	2.87	134.4	
2021 Set	19	9	54	45.4	-	12	25	1.814	1.081	30.8	28.4	10.0	2.87	134.2	
2021 Set	20	9	58	7.8	-	13	13	1.815	1.086	31.0	28.5	10.0	2.86	134.1	
2021 Set	21	10	1	30.9	-	14	1	14	1.817	1.091	31.2	28.5	10.1	2.85	133.9
2021 Set	22	10	4	54.7	-	14	48	1.820	1.096	31.4	28.5	10.1	2.85	133.8	
2021 Set	23	10	8	19.1	-	15	35	1.822	1.101	31.6	28.5	10.1	2.84	133.6	
2021 Set	24	10	11	44.3	-	16	22	1.825	1.107	31.8	28.5	10.2	2.83	133.4	
2021 Set	25	10	15	10.1	-	17	9	1.828	1.113	32.0	28.5	10.2	2.82	133.2	
2021 Set	26	10	18	36.7	-	17	55	1.832	1.119	32.2	28.5	10.3	2.81	133.0	
2021 Set	27	10	22	4.0	-	18	40	1.835	1.125	32.4	28.5	10.3	2.79	132.8	
2021 Set	28	10	25	32.0	-	19	26	1.839	1.131	32.5	28.5	10.4	2.78	132.6	
2021 Set	29	10	29	0.7	-	20	11	1.843	1.137	32.7	28.4	10.4	2.77	132.4	
2021 Set	30	10	32	30.1	-	20	55	1.847	1.144	32.9	28.4	10.5	2.75	132.2	
2021 Out	1	10	36	0.3	-	21	40	7	1.852	1.150	33.0	28.3	10.6	2.74	131.9
2021 Out	2	10	39	31.1	-	22	23	50	1.857	1.157	33.2	28.3	10.6	2.72	131.7
2021 Out	3	10	43	2.7	-	23	7	5	1.862	1.164	33.3	28.2	10.7	2.71	131.4
2021 Out	4	10	46	34.9	-	23	49	52	1.867	1.171	33.5	28.1	10.7	2.69	131.2
2021 Out	5	10	50	7.8	-	24	32	10	1.872	1.178	33.6	28.1	10.8	2.67	130.9
2021 Out	6	10	53	41.4	-	25	13	58	1.878	1.186	33.8	28.0	10.8	2.66	130.7
2021 Out	7	10	57	15.7	-	25	55	16	1.884	1.193	33.9	27.9	10.9	2.64	130.4
2021 Out	8	11	0	50.6	-	26	36	2	1.890	1.200	34.0	27.8	11.0	2.62	130.1
2021 Out	9	11	4	26.2	-	27	16	16	1.896	1.208	34.2	27.7	11.0	2.60	129.8
2021 Out	10	11	8	2.4	-	27	55	57	1.903	1.216	34.3	27.6	11.1	2.58	129.5
2021 Out	11	11	11	39.1	-	28	35	6	1.910	1.224	34.4	27.5	11.2	2.56	129.2
2021 Out	12	11	15	16.5	-	29	13	40	1.916	1.232	34.5	27.3	11.2	2.54	128.9
2021 Out	13	11	18	54.5	-	29	51	41	1.923	1.240	34.6	27.2	11.3	2.52	128.6
2021 Out	14	11	22	33.0	-	30	29	7	1.931	1.248	34.7	27.1	11.4	2.50	128.2
2021 Out	15	11	26	12.1	-	31	5	58	1.938	1.256	34.8	27.0	11.4	2.48	127.9
2021 Out	16	11	29	51.7	-	31	42	14	1.946	1.265	34.9	26.8	11.5	2.46	127.6
2021 Out	17	11	33	31.8	-	32	17	54	1.953	1.273	35.0	26.7	11.6	2.44	127.2
2021 Out	18	11	37	12.4	-	32	52	59	1.961	1.282	35.1	26.6	11.6	2.41	126.9
2021 Out	19	11	40	53.4	-	33	27	28	1.969	1.290	35.2	26.4	11.7	2.39	126.5
2021 Out	20	11	44	35.0	-	34	1	21	1.978	1.299	35.3	26.3	11.8	2.37	126.2

2021	Out	21	11	48	16.9	-34	34	38	1.986	1.308	35.3	26.1	11.8	2.35	125.8
2021	Out	22	11	51	59.2	-35	7	18	1.995	1.316	35.4	26.0	11.9	2.33	125.4
2021	Out	23	11	55	42.0	-35	39	23	2.003	1.325	35.5	25.8	12.0	2.30	125.1
2021	Out	24	11	59	25.0	-36	10	52	2.012	1.334	35.5	25.7	12.0	2.28	124.7
2021	Out	25	12	3	8.4	-36	41	44	2.021	1.343	35.6	25.5	12.1	2.26	124.3
2021	Out	26	12	6	52.1	-37	12	0	2.030	1.352	35.7	25.4	12.2	2.24	123.9
2021	Out	27	12	10	36.1	-37	41	41	2.039	1.362	35.7	25.2	12.2	2.22	123.5
2021	Out	28	12	14	20.3	-38	10	46	2.048	1.371	35.8	25.1	12.3	2.19	123.1
2021	Out	29	12	18	4.6	-38	39	15	2.057	1.380	35.8	24.9	12.4	2.17	122.8
2021	Out	30	12	21	49.2	-39	7	9	2.067	1.390	35.9	24.8	12.4	2.15	122.4
2021	Out	31	12	25	33.9	-39	34	28	2.076	1.399	35.9	24.6	12.5	2.13	122.0

4P/Faye - 00:00 UTC (J2000)

Última medida astrométrica realizada em: 2015 Jun 10 (Acesso em: 2020 Nov 21)

T 2021 Set 9.3335 TT  
 q 1.618269 Peri. 206.9127  
 a 3.828356 Node 193.0231  
 e 0.577294 Incl. 8.0086  
 Ref: MPEC 2015-A10

Nota: Efemérides com intervalo de 2 dias.

Data	$a(\text{J2000.0})$			$\delta(\text{J2000.0})$			delta	Rsol	Elong	Fase	Mag	"/min	AP
aaaa/mm./dd	h	m	s	o	'	"	ua	ua					
2021 Jul 24	3	0	3.6	17	9	23	1.668	1.689	73.5	35.2	12.5	1.69	80.3
2021 Jul 26	3	5	38.8	17	22	43	1.649	1.683	74.1	35.5	12.5	1.69	80.8
2021 Jul 28	3	11	15.0	17	35	17	1.631	1.678	74.7	35.7	12.4	1.69	81.4
2021 Jul 30	3	16	52.2	17	47	2	1.613	1.673	75.2	35.9	12.4	1.69	82.0
2021 Ago 1	3	22	30.1	17	57	58	1.595	1.668	75.8	36.2	12.3	1.69	82.6
2021 Ago 3	3	28	8.6	18	8	2	1.578	1.663	76.4	36.4	12.3	1.69	83.2
2021 Ago 5	3	33	47.5	18	17	14	1.560	1.658	77.0	36.6	12.3	1.69	83.8
2021 Ago 7	3	39	26.6	18	25	33	1.544	1.654	77.5	36.8	12.2	1.68	84.4
2021 Ago 9	3	45	5.6	18	32	57	1.527	1.650	78.1	37.0	12.2	1.68	85.1
2021 Ago 11	3	50	44.4	18	39	26	1.510	1.646	78.7	37.1	12.1	1.68	85.7
2021 Ago 13	3	56	22.8	18	44	59	1.494	1.642	79.3	37.3	12.1	1.67	86.4
2021 Ago 15	4	2	0.4	18	49	35	1.478	1.639	79.9	37.5	12.1	1.66	87.0
2021 Ago 17	4	7	37.2	18	53	14	1.463	1.636	80.5	37.6	12.0	1.66	87.7
2021 Ago 19	4	13	12.8	18	55	56	1.447	1.633	81.1	37.8	12.0	1.65	88.4
2021 Ago 21	4	18	47.2	18	57	41	1.432	1.630	81.7	37.9	12.0	1.64	89.1
2021 Ago 23	4	24	20.0	18	58	27	1.417	1.628	82.4	38.0	11.9	1.63	89.8
2021 Ago 25	4	29	51.0	18	58	17	1.402	1.626	83.0	38.1	11.9	1.63	90.5
2021 Ago 27	4	35	20.0	18	57	8	1.388	1.624	83.7	38.2	11.9	1.62	91.2
2021 Ago 29	4	40	46.6	18	55	2	1.374	1.622	84.3	38.3	11.8	1.60	91.9
2021 Ago 31	4	46	10.6	18	52	0	1.359	1.621	85.0	38.3	11.8	1.59	92.6
2021 Set 2	4	51	31.7	18	48	0	1.346	1.620	85.7	38.4	11.8	1.58	93.4
2021 Set 4	4	56	49.6	18	43	5	1.332	1.619	86.4	38.4	11.8	1.56	94.1
2021 Set 6	5	2	4.0	18	37	14	1.319	1.619	87.1	38.5	11.7	1.55	94.9
2021 Set 8	5	7	14.6	18	30	29	1.305	1.618	87.8	38.5	11.7	1.53	95.6
2021 Set 10	5	12	21.1	18	22	51	1.292	1.618	88.6	38.5	11.7	1.51	96.4
2021 Set 12	5	17	23.3	18	14	21	1.280	1.618	89.3	38.5	11.7	1.50	97.1
2021 Set 14	5	22	20.9	18	5	0	1.267	1.619	90.1	38.4	11.7	1.48	97.9
2021 Set 16	5	27	13.6	17	54	50	1.254	1.620	90.9	38.4	11.6	1.46	98.7
2021 Set 18	5	32	1.3	17	43	53	1.242	1.621	91.7	38.3	11.6	1.43	99.5
2021 Set 20	5	36	43.7	17	32	11	1.230	1.622	92.5	38.2	11.6	1.41	100.3
2021 Set 22	5	41	20.4	17	19	44	1.218	1.623	93.4	38.1	11.6	1.39	101.1
2021 Set 24	5	45	51.4	17	6	36	1.207	1.625	94.2	38.0	11.6	1.36	101.9
2021 Set 26	5	50	16.2	16	52	47	1.195	1.627	95.1	37.9	11.6	1.34	102.7
2021 Set 28	5	54	34.7	16	38	21	1.184	1.630	96.1	37.7	11.5	1.31	103.6
2021 Set 30	5	58	46.4	16	23	18	1.172	1.632	97.0	37.5	11.5	1.28	104.4
2021 Out 2	6	2	51.2	16	7	41	1.161	1.635	98.0	37.3	11.5	1.25	105.3
2021 Out 4	6	6	48.7	15	51	33	1.150	1.638	99.0	37.1	11.5	1.22	106.2
2021 Out 6	6	10	38.8	15	34	56	1.140	1.641	100.0	36.9	11.5	1.19	107.2
2021 Out 8	6	14	21.1	15	17	53	1.129	1.645	101.0	36.6	11.5	1.15	108.2
2021 Out 10	6	17	55.3	15	0	26	1.119	1.648	102.1	36.3	11.5	1.12	109.2
2021 Out 12	6	21	21.4	14	42	38	1.108	1.652	103.2	36.0	11.5	1.08	110.2
2021 Out 14	6	24	39.0	14	24	31	1.098	1.657	104.4	35.7	11.5	1.05	111.3
2021 Out 16	6	27	48.1	14	6	10	1.089	1.661	105.5	35.3	11.5	1.01	112.4
2021 Out 18	6	30	48.4	13	47	36	1.079	1.666	106.7	34.9	11.5	0.97	113.6
2021 Out 20	6	33	39.7	13	28	52	1.069	1.671	107.9	34.5	11.5	0.93	114.9
2021 Out 22	6	36	21.8	13	10	1	1.060	1.676	109.2	34.1	11.5	0.89	116.2
2021 Out 24	6	38	54.5	12	51	7	1.051	1.681	110.5	33.6	11.5	0.85	117.7
2021 Out 26	6	41	17.6	12	32	11	1.042	1.687	111.8	33.2	11.5	0.81	119.3
2021 Out 28	6	43	30.9	12	13	17	1.034	1.693	113.2	32.6	11.5	0.76	121.0
2021 Out 30	6	45	34.1	11	54	28	1.025	1.699	114.6	32.1	11.5	0.72	123.0

2021	Nov	1	6	47	27.1	11	35	47	1.017	1.705	116.1	31.5	11.5	0.67	125.1
2021	Nov	3	6	49	9.8	11	17	18	1.009	1.711	117.6	30.9	11.5	0.63	127.6
2021	Nov	5	6	50	41.9	10	59	4	1.002	1.718	119.1	30.3	11.5	0.58	130.3
2021	Nov	7	6	52	3.4	10	41	8	0.994	1.725	120.6	29.6	11.5	0.54	133.5
2021	Nov	9	6	53	14.3	10	23	34	0.987	1.732	122.2	28.9	11.6	0.49	137.1
2021	Nov	11	6	54	14.6	10	6	26	0.981	1.739	123.9	28.2	11.6	0.45	141.4
2021	Nov	13	6	55	4.2	9	49	46	0.975	1.746	125.5	27.5	11.6	0.41	146.4
2021	Nov	15	6	55	43.2	9	33	38	0.969	1.754	127.2	26.7	11.6	0.37	152.3
2021	Nov	17	6	56	11.8	9	18	5	0.963	1.762	129.0	25.9	11.6	0.34	159.3
2021	Nov	19	6	56	29.9	9	3	10	0.958	1.770	130.7	25.0	11.6	0.31	167.7
2021	Nov	21	6	56	37.7	8	48	55	0.954	1.778	132.6	24.2	11.6	0.29	177.3
2021	Nov	23	6	56	35.4	8	35	25	0.950	1.786	134.4	23.3	11.7	0.28	187.9
2021	Nov	25	6	56	23.1	8	22	42	0.946	1.794	136.3	22.4	11.7	0.27	199.1
2021	Nov	27	6	56	1.1	8	10	49	0.943	1.803	138.2	21.4	11.7	0.28	210.0
2021	Nov	29	6	55	29.6	7	59	48	0.941	1.812	140.1	20.5	11.7	0.29	220.2
2021	Dez	1	6	54	49.2	7	49	42	0.939	1.820	142.0	19.5	11.8	0.31	229.1
2021	Dez	3	6	54	0.1	7	40	34	0.938	1.829	143.9	18.5	11.8	0.33	236.8
2021	Dez	5	6	53	2.9	7	32	27	0.937	1.839	145.9	17.5	11.8	0.35	243.3
2021	Dez	7	6	51	58.3	7	25	21	0.938	1.848	147.8	16.5	11.9	0.38	248.7
2021	Dez	9	6	50	46.9	7	19	18	0.939	1.857	149.8	15.5	11.9	0.40	253.4
2021	Dez	11	6	49	29.3	7	14	20	0.940	1.867	151.7	14.5	11.9	0.43	257.5
2021	Dez	13	6	48	6.4	7	10	26	0.943	1.876	153.6	13.5	12.0	0.45	261.0
2021	Dez	15	6	46	38.8	7	7	37	0.946	1.886	155.4	12.6	12.0	0.47	264.2
2021	Dez	17	6	45	7.3	7	5	53	0.950	1.896	157.1	11.6	12.1	0.48	267.0
2021	Dez	19	6	43	32.8	7	5	14	0.955	1.906	158.8	10.8	12.1	0.50	269.7
2021	Dez	21	6	41	55.9	7	5	37	0.961	1.916	160.3	10.0	12.2	0.51	272.1
2021	Dez	23	6	40	17.4	7	7	2	0.968	1.926	161.6	9.3	12.2	0.51	274.5
2021	Dez	25	6	38	38.2	7	9	27	0.976	1.937	162.7	8.7	12.3	0.52	276.8
2021	Dez	27	6	36	59.0	7	12	52	0.984	1.947	163.5	8.2	12.3	0.52	279.0
2021	Dez	29	6	35	20.7	7	17	12	0.993	1.958	164.0	8.0	12.4	0.51	281.2
2021	Dez	31	6	33	43.8	7	22	27	1.004	1.968	164.2	7.8	12.4	0.51	283.5

### 6P/d'Arrest - 00:00 UTC (J2000)

Última medida astrométrica realizada em: 2016 Jan 14 (Acesso em: 2020 Nov 21)

T 2021 Set 17.7811 TT  
q 1.354824 Peri. 178.1009  
a 3.497466 Node 138.9347  
e 0.612627 Incl. 19.5122  
Ref: MPEC 2015-S97

Nota: Efemérides com intervalo de 2 dias.

Data aaaa/mm./dd	$\alpha$ (J2000.0) h m s	$\delta$ (J2000.0) ° ' "	delta ua	Rsol ua	Elong	Fase	Mag	"/min	AP
2021 Abr 29	16 52 26.8	12 11 21	1.199	2.038	134.8	20.5	12.5	0.55	359.6
2021 Mai 1	16 52 22.5	12 37 38	1.176	2.024	135.7	20.3	12.4	0.55	355.8
2021 Mai 3	16 52 11.1	13 3 39	1.154	2.010	136.6	20.2	12.3	0.54	351.9
2021 Mai 5	16 51 52.4	13 29 18	1.133	1.996	137.4	20.0	12.3	0.54	348.0
2021 Mai 7	16 51 26.6	13 54 28	1.112	1.981	138.1	19.9	12.2	0.54	344.0
2021 Mai 9	16 50 53.5	14 19 3	1.092	1.967	138.8	19.8	12.1	0.54	339.9
2021 Mai 11	16 50 13.2	14 42 54	1.073	1.953	139.3	19.7	12.1	0.54	335.7
2021 Mai 13	16 49 26.0	15 5 56	1.054	1.939	139.9	19.6	12.0	0.53	331.5
2021 Mai 15	16 48 31.9	15 27 59	1.036	1.926	140.3	19.6	11.9	0.53	327.3
2021 Mai 17	16 47 31.1	15 48 58	1.019	1.912	140.6	19.6	11.9	0.53	322.9
2021 Mai 19	16 46 24.0	16 8 43	1.002	1.898	140.9	19.6	11.8	0.53	318.6
2021 Mai 21	16 45 10.8	16 27 7	0.986	1.884	141.1	19.7	11.7	0.53	314.1
2021 Mai 23	16 43 51.9	16 44 4	0.971	1.870	141.1	19.9	11.7	0.53	309.6
2021 Mai 25	16 42 27.7	16 59 25	0.956	1.857	141.1	20.0	11.6	0.53	305.0
2021 Mai 27	16 40 58.6	17 13 3	0.942	1.843	141.0	20.2	11.5	0.53	300.3
2021 Mai 29	16 39 25.1	17 24 52	0.928	1.829	140.8	20.5	11.5	0.53	295.5
2021 Mai 31	16 37 47.6	17 34 44	0.915	1.816	140.5	20.8	11.4	0.53	290.5
2021 Jun 2	16 36 6.7	17 42 33	0.903	1.802	140.1	21.1	11.3	0.53	285.4
2021 Jun 4	16 34 23.0	17 48 10	0.891	1.789	139.7	21.5	11.3	0.53	280.2
2021 Jun 6	16 32 37.3	17 51 31	0.880	1.776	139.1	22.0	11.2	0.53	274.9
2021 Jun 8	16 30 50.2	17 52 29	0.869	1.763	138.5	22.4	11.2	0.53	269.4
2021 Jun 10	16 29 2.7	17 50 59	0.859	1.750	137.8	22.9	11.1	0.54	263.8
2021 Jun 12	16 27 15.4	17 46 57	0.850	1.737	137.1	23.5	11.0	0.54	258.2
2021 Jun 14	16 25 29.3	17 40 19	0.841	1.724	136.2	24.1	11.0	0.55	252.4
2021 Jun 16	16 23 45.2	17 31 2	0.832	1.711	135.4	24.7	10.9	0.56	246.6
2021 Jun 18	16 22 3.9	17 19 6	0.824	1.698	134.5	25.3	10.9	0.57	240.8
2021 Jun 20	16 20 26.3	17 4 28	0.817	1.686	133.5	25.9	10.8	0.58	235.0
2021 Jun 22	16 18 53.0	16 47 9	0.810	1.673	132.5	26.6	10.8	0.60	229.4
2021 Jun 24	16 17 24.9	16 27 10	0.803	1.661	131.5	27.3	10.7	0.62	223.8

2021	Jun	26	16	16	2.5	16	4	31	0.797	1.649	130.4	28.0	10.7	0.64	218.5	
2021	Jun	28	16	14	46.6	15	39	14	0.791	1.637	129.4	28.7	10.6	0.66	213.3	
2021	Jun	30	16	13	37.7	15	11	21	0.786	1.625	128.3	29.4	10.6	0.69	208.3	
2021	Jul	2	16	12	36.5	14	40	52	0.781	1.613	127.2	30.1	10.5	0.72	203.5	
2021	Jul	4	16	11	43.7	14	7	52	0.776	1.602	126.1	30.9	10.5	0.75	198.9	
2021	Jul	6	16	10	59.7	13	32	23	0.772	1.590	124.9	31.6	10.5	0.79	194.6	
2021	Jul	8	16	10	25.1	12	54	30	0.768	1.579	123.8	32.3	10.4	0.83	190.5	
2021	Jul	10	16	10	0.4	12	14	15	0.765	1.568	122.7	33.1	10.4	0.87	186.6	
2021	Jul	12	16	9	46.1	11	31	45	0.762	1.557	121.6	33.8	10.3	0.91	182.9	
2021	Jul	14	16	9	42.4	10	47	4	0.759	1.547	120.5	34.5	10.3	0.95	179.4	
2021	Jul	16	16	9	49.7	10	0	18	0.756	1.536	119.4	35.2	10.3	1.00	176.2	
2021	Jul	18	16	10	8.3	9	11	32	0.754	1.526	118.3	35.9	10.2	1.04	173.1	
2021	Jul	20	16	10	38.3	8	20	53	0.752	1.516	117.2	36.6	10.2	1.09	170.3	
2021	Jul	22	16	11	19.9	7	28	27	0.751	1.506	116.2	37.2	10.2	1.14	167.6	
2021	Jul	24	16	12	13.2	6	34	19	0.749	1.497	115.2	37.9	10.1	1.18	165.0	
2021	Jul	26	16	13	18.2	5	38	36	0.748	1.487	114.1	38.5	10.1	1.23	162.6	
2021	Jul	28	16	14	35.1	4	41	22	0.747	1.478	113.1	39.2	10.1	1.28	160.4	
2021	Jul	30	16	16	4.0	3	42	45	0.747	1.470	112.1	39.8	10.0	1.33	158.2	
2021	Ago	1	16	17	44.8	2	42	50	0.746	1.461	111.2	40.4	10.0	1.38	156.2	
2021	Ago	3	16	19	37.8	1	41	43	0.746	1.453	110.2	41.0	10.0	1.43	154.2	
2021	Ago	5	16	21	43.0	0	39	30	0.747	1.445	109.3	41.5	10.0	1.47	152.4	
2021	Ago	7	16	24	0.4	-	0	23	41	0.747	1.437	108.4	42.0	9.9	1.52	150.6
2021	Ago	9	16	26	30.2	-	1	27	44	0.748	1.430	107.5	42.5	9.9	1.57	148.8
2021	Ago	11	16	29	12.3	-	2	32	31	0.749	1.423	106.7	43.0	9.9	1.61	147.2
2021	Ago	13	16	32	6.7	-	3	37	55	0.750	1.416	105.8	43.5	9.9	1.66	145.5
2021	Ago	15	16	35	13.4	-	4	43	50	0.752	1.409	105.0	43.9	9.9	1.70	144.0
2021	Ago	17	16	38	32.4	-	5	50	6	0.754	1.403	104.3	44.4	9.9	1.74	142.5
2021	Ago	19	16	42	3.5	-	6	56	36	0.756	1.398	103.5	44.8	9.8	1.78	141.0
2021	Ago	21	16	45	46.8	-	8	3	12	0.759	1.392	102.8	45.1	9.8	1.82	139.6
2021	Ago	23	16	49	42.0	-	9	9	46	0.762	1.387	102.0	45.5	9.8	1.86	138.2
2021	Ago	25	16	53	49.3	-	10	16	11	0.765	1.382	101.3	45.8	9.8	1.90	136.8
2021	Ago	27	16	58	8.4	-	11	22	18	0.768	1.378	100.7	46.1	9.8	1.93	135.4
2021	Ago	29	17	2	39.5	-	12	28	0	0.772	1.374	100.0	46.4	9.8	1.96	134.1
2021	Ago	31	17	7	22.3	-	13	33	7	0.776	1.370	99.4	46.6	9.8	1.99	132.7
2021	Set	2	17	12	17.0	-14	37	31	0.781	1.367	98.8	46.8	9.8	2.02	131.4	
2021	Set	4	17	17	23.4	-15	41	4	0.786	1.364	98.2	47.0	9.8	2.04	130.0	
2021	Set	6	17	22	41.4	-16	43	37	0.791	1.362	97.6	47.2	9.8	2.07	128.6	
2021	Set	8	17	28	11.0	-17	45	1	0.797	1.360	97.1	47.3	9.8	2.09	127.3	
2021	Set	10	17	33	51.9	-18	45	8	0.803	1.358	96.6	47.5	9.9	2.11	125.9	
2021	Set	12	17	39	43.9	-19	43	48	0.810	1.356	96.0	47.6	9.9	2.13	124.5	
2021	Set	14	17	45	46.8	-20	40	55	0.816	1.356	95.6	47.6	9.9	2.14	123.2	
2021	Set	16	17	52	0.2	-21	36	19	0.824	1.355	95.1	47.7	9.9	2.16	121.8	
2021	Set	18	17	58	23.9	-22	29	53	0.831	1.355	94.6	47.7	9.9	2.17	120.4	
2021	Set	20	18	4	57.4	-23	21	29	0.840	1.355	94.2	47.7	9.9	2.18	119.0	
2021	Set	22	18	11	40.3	-24	11	0	0.848	1.356	93.7	47.6	10.0	2.18	117.5	
2021	Set	24	18	18	32.2	-24	58	20	0.857	1.357	93.3	47.6	10.0	2.19	116.1	
2021	Set	26	18	25	32.7	-25	43	22	0.866	1.358	92.9	47.5	10.0	2.19	114.6	
2021	Set	28	18	32	41.3	-26	26	2	0.876	1.360	92.5	47.4	10.0	2.19	113.2	
2021	Set	30	18	39	57.4	-27	6	13	0.887	1.362	92.1	47.3	10.1	2.19	111.7	
2021	Out	2	18	47	20.6	-27	43	51	0.897	1.365	91.8	47.1	10.1	2.19	110.2	
2021	Out	4	18	54	50.2	-28	18	53	0.909	1.368	91.4	47.0	10.2	2.19	108.7	
2021	Out	6	19	2	25.6	-28	51	14	0.920	1.371	91.0	46.8	10.2	2.19	107.2	
2021	Out	8	19	10	6.1	-29	20	53	0.932	1.375	90.7	46.6	10.2	2.18	105.7	
2021	Out	10	19	17	51.1	-29	47	48	0.945	1.379	90.3	46.4	10.3	2.18	104.1	
2021	Out	12	19	25	39.7	-30	11	57	0.958	1.383	90.0	46.2	10.3	2.17	102.6	
2021	Out	14	19	33	31.2	-30	33	20	0.971	1.388	89.7	45.9	10.4	2.16	101.1	
2021	Out	16	19	41	24.7	-30	51	58	0.985	1.393	89.3	45.7	10.4	2.15	99.6	
2021	Out	18	19	49	19.6	-31	7	51	0.999	1.399	89.0	45.4	10.5	2.14	98.1	
2021	Out	20	19	57	15.0	-31	21	2	1.014	1.405	88.7	45.1	10.5	2.13	96.6	
2021	Out	22	20	5	10.3	-31	31	32	1.029	1.411	88.3	44.8	10.6	2.12	95.2	
2021	Out	24	20	13	4.6	-31	39	24	1.045	1.417	88.0	44.5	10.6	2.10	93.7	
2021	Out	26	20	20	57.4	-31	44	42	1.061	1.424	87.7	44.2	10.7	2.09	92.3	
2021	Out	28	20	28	48.1	-31	47	28	1.078	1.431	87.3	43.9	10.7	2.08	90.9	
2021	Out	30	20	36	36.0	-31	47	49	1.095	1.439	87.0	43.6	10.8	2.06	89.5	
2021	Nov	1	20	44	20.7	-31	45	47	1.112	1.446	86.6	43.2	10.8	2.05	88.1	
2021	Nov	3	20	52	1.7	-31	41	28	1.130	1.454	86.3	42.9	10.9	2.04	86.8	
2021	Nov	5	20	59	38.4	-31	34	56	1.148	1.463	85.9	42.5	11.0	2.02	85.5	
2021	Nov	7	21	7	10.6	-31	26	19	1.167	1.471	85.6	42.2	11.0	2.01	84.3	
2021	Nov	9	21	14	37.8	-31	15	40	1.186	1.480	85.2	41.8	11.1	1.99	83.0	
2021	Nov	11	21	21	59.7	-31	3	6	1.206	1.489	84.8	41.5	11.1	1.98	81.8	
2021	Nov	13	21	29	15.9	-30	48	43	1.226	1.499	84.4	41.1	11.2	1.96	80.7	
2021	Nov	15	21	36	26.3	-30	32	37	1.246	1.508	84.0	40.7	11.3	1.95	79.6	
2021	Nov	17	21	43	30.6	-30	14	54	1.267	1.518	83.6	40.3	11.3	1.93	78.5	

2021	Nov	19	21	50	28.6	-29	55	39	1.288	1.528	83.2	40.0	11.4	1.92	77.5
2021	Nov	21	21	57	20.3	-29	34	59	1.309	1.538	82.8	39.6	11.5	1.90	76.5
2021	Nov	23	22	4	5.7	-29	12	58	1.331	1.549	82.4	39.2	11.5	1.89	75.5
2021	Nov	25	22	10	44.6	-28	49	42	1.353	1.560	82.0	38.8	11.6	1.87	74.6
2021	Nov	27	22	17	17.2	-28	25	17	1.376	1.570	81.5	38.4	11.7	1.86	73.7
2021	Nov	29	22	23	43.4	-27	59	46	1.399	1.582	81.0	38.0	11.7	1.84	72.9
2021	Dez	1	22	30	3.4	-27	33	17	1.423	1.593	80.6	37.6	11.8	1.83	72.1
2021	Dez	3	22	36	17.3	-27	5	52	1.446	1.604	80.1	37.3	11.9	1.81	71.4
2021	Dez	5	22	42	25.1	-26	37	36	1.471	1.616	79.6	36.9	11.9	1.80	70.6
2021	Dez	7	22	48	27.0	-26	8	35	1.495	1.628	79.1	36.5	12.0	1.79	70.0
2021	Dez	9	22	54	23.1	-25	38	52	1.520	1.639	78.6	36.1	12.1	1.77	69.3
2021	Dez	11	23	0	13.4	-25	8	33	1.545	1.651	78.1	35.7	12.1	1.76	68.7
2021	Dez	13	23	5	58.2	-24	37	40	1.571	1.664	77.5	35.3	12.2	1.74	68.2
2021	Dez	15	23	11	37.4	-24	6	17	1.596	1.676	77.0	34.9	12.3	1.73	67.6
2021	Dez	17	23	17	11.4	-23	34	29	1.622	1.688	76.4	34.5	12.3	1.72	67.1
2021	Dez	19	23	22	40.2	-23	2	18	1.649	1.701	75.8	34.1	12.4	1.70	66.7
2021	Dez	21	23	28	3.9	-22	29	48	1.675	1.714	75.3	33.7	12.5	1.69	66.3
2021	Dez	23	23	33	22.9	-21	57	1	1.702	1.726	74.7	33.3	12.5	1.68	65.9

### 342P/SOHO - 00:00 UTC (J2000)

Última medida astrométrica realizada em: 2016 Jul 2 (Acesso em: 2020 Nov 21)

T 2021 Out 19.2060 TT  
q 0.051860 Peri. 72.4676  
z 0.328538 Node 28.5696  
e 0.982962 Incl. 11.6914  
Ref: MPC101101

Data aaaa/mm./dd	$\alpha$ (J2000.0) h m s	$\delta$ (J2000.0) ° ' "	delta	Rsol	Elong	Fase	Mag	"/min	AP
	ua	ua	ua	ua	ua	ua	ua	ua	ua
2021 Jul 13	20 35 24.0	-41 27 32	1.135	2.104	155.9	11.4	12.5	1.69	239.7
2021 Jul 14	20 32 12.9	-41 48 0	1.120	2.091	156.4	11.2	12.4	1.74	240.6
2021 Jul 15	20 28 53.5	-42 8 26	1.105	2.078	156.7	11.1	12.4	1.79	241.6
2021 Jul 16	20 25 25.6	-42 28 47	1.090	2.064	157.0	11.1	12.3	1.84	242.6
2021 Jul 17	20 21 49.0	-42 48 58	1.076	2.051	157.1	11.1	12.3	1.88	243.6
2021 Jul 18	20 18 3.7	-43 8 57	1.062	2.037	157.1	11.2	12.2	1.93	244.6
2021 Jul 19	20 14 9.4	-43 28 40	1.049	2.023	157.0	11.3	12.2	1.98	245.7
2021 Jul 20	20 10 6.3	-43 48 2	1.035	2.010	156.8	11.5	12.1	2.03	246.8
2021 Jul 21	20 5 54.1	-44 7 0	1.023	1.996	156.4	11.8	12.0	2.07	247.9
2021 Jul 22	20 1 32.8	-44 25 30	1.011	1.982	155.9	12.1	12.0	2.12	249.0
2021 Jul 23	19 57 2.6	-44 43 26	0.999	1.968	155.3	12.5	11.9	2.16	250.1
2021 Jul 24	19 52 23.4	-45 0 45	0.987	1.954	154.5	12.9	11.9	2.21	251.3
2021 Jul 25	19 47 35.3	-45 17 22	0.976	1.940	153.7	13.4	11.8	2.25	252.5
2021 Jul 26	19 42 38.6	-45 33 12	0.966	1.926	152.8	14.0	11.8	2.29	253.7
2021 Jul 27	19 37 33.4	-45 48 9	0.955	1.911	151.7	14.6	11.7	2.33	254.9
2021 Jul 28	19 32 20.0	-46 2 11	0.946	1.897	150.6	15.2	11.7	2.36	256.2
2021 Jul 29	19 26 58.8	-46 15 10	0.936	1.883	149.4	15.9	11.6	2.40	257.5
2021 Jul 30	19 21 30.1	-46 27 4	0.927	1.868	148.1	16.7	11.6	2.43	258.8
2021 Jul 31	19 15 54.5	-46 37 47	0.919	1.854	146.8	17.5	11.5	2.46	260.1
2021 Ago 1	19 10 12.4	-46 47 16	0.911	1.839	145.4	18.3	11.4	2.49	261.5
2021 Ago 2	19 4 24.5	-46 55 26	0.903	1.824	143.9	19.1	11.4	2.51	262.9
2021 Ago 3	18 58 31.4	-47 2 14	0.896	1.809	142.4	20.0	11.3	2.54	264.3
2021 Ago 4	18 52 33.8	-47 7 36	0.889	1.795	140.9	20.9	11.3	2.56	265.7
2021 Ago 5	18 46 32.5	-47 11 31	0.883	1.780	139.3	21.8	11.2	2.57	267.1
2021 Ago 6	18 40 28.2	-47 13 55	0.877	1.764	137.7	22.8	11.2	2.59	268.5
2021 Ago 7	18 34 21.9	-47 14 48	0.872	1.749	136.0	23.8	11.1	2.60	269.9
2021 Ago 8	18 28 14.2	-47 14 7	0.867	1.734	134.3	24.7	11.1	2.60	271.3
2021 Ago 9	18 22 6.1	-47 11 53	0.862	1.719	132.6	25.7	11.0	2.61	272.8
2021 Ago 10	18 15 58.4	-47 8 5	0.857	1.703	130.9	26.7	11.0	2.61	274.2
2021 Ago 11	18 9 52.0	-47 2 44	0.854	1.688	129.2	27.8	10.9	2.61	275.6
2021 Ago 12	18 3 47.7	-46 55 52	0.850	1.672	127.4	28.8	10.9	2.60	277.0
2021 Ago 13	17 57 46.2	-46 47 30	0.847	1.656	125.6	29.8	10.8	2.59	278.4
2021 Ago 14	17 51 48.2	-46 37 40	0.844	1.641	123.9	30.8	10.8	2.58	279.8
2021 Ago 15	17 45 54.6	-46 26 25	0.841	1.625	122.1	31.9	10.7	2.57	281.2
2021 Ago 16	17 40 5.8	-46 13 48	0.839	1.609	120.3	32.9	10.7	2.55	282.5
2021 Ago 17	17 34 22.5	-45 59 53	0.837	1.592	118.5	34.0	10.6	2.54	283.8
2021 Ago 18	17 28 45.2	-45 44 43	0.836	1.576	116.7	35.0	10.6	2.52	285.1
2021 Ago 19	17 23 14.4	-45 28 21	0.835	1.560	114.9	36.0	10.5	2.49	286.4
2021 Ago 20	17 17 50.3	-45 10 53	0.834	1.543	113.1	37.1	10.5	2.47	287.7
2021 Ago 21	17 12 33.4	-44 52 22	0.833	1.527	111.4	38.1	10.4	2.44	288.9
2021 Ago 22	17 7 23.9	-44 32 53	0.832	1.510	109.6	39.1	10.4	2.42	290.1
2021 Ago 23	17 2 21.9	-44 12 30	0.832	1.493	107.8	40.2	10.3	2.39	291.3
2021 Ago 24	16 57 27.8	-43 51 17	0.832	1.476	106.0	41.2	10.3	2.36	292.4
2021 Ago 25	16 52 41.4	-43 29 18	0.832	1.459	104.3	42.2	10.2	2.33	293.6
2021 Ago 26	16 48 3.0	-43 6 38	0.833	1.442	102.5	43.2	10.2	2.30	294.7

2021	Ago	27	16	43	32.4	-42	43	20	0.833	1.425	100.8	44.2	10.1	2.26	295.7
2021	Ago	28	16	39	9.7	-42	19	29	0.834	1.407	99.0	45.2	10.1	2.23	296.8
2021	Ago	29	16	34	54.7	-41	55	8	0.835	1.389	97.3	46.1	10.0	2.20	297.8
2021	Ago	30	16	30	47.4	-41	30	20	0.836	1.372	95.6	47.1	10.0	2.17	298.7
2021	Ago	31	16	26	47.7	-41	5	9	0.837	1.354	93.9	48.1	9.9	2.13	299.7
2021	Set	1	16	22	55.2	-40	39	38	0.838	1.336	92.2	49.0	9.9	2.10	300.6
2021	Set	2	16	19	9.9	-40	13	50	0.839	1.318	90.5	50.0	9.8	2.07	301.5
2021	Set	3	16	15	31.5	-39	47	47	0.840	1.299	88.8	50.9	9.8	2.04	302.4
2021	Set	4	16	11	59.8	-39	21	31	0.842	1.281	87.1	51.9	9.7	2.01	303.2
2021	Set	5	16	8	34.4	-38	55	5	0.843	1.262	85.4	52.8	9.6	1.98	304.0
2021	Set	6	16	5	15.3	-38	28	30	0.845	1.243	83.8	53.7	9.6	1.95	304.8
2021	Set	7	16	2	2.0	-38	1	48	0.846	1.224	82.1	54.6	9.5	1.92	305.5
2021	Set	8	15	58	54.2	-37	35	0	0.848	1.205	80.5	55.6	9.5	1.89	306.2
2021	Set	9	15	55	51.7	-37	8	8	0.849	1.185	78.9	56.5	9.4	1.87	306.9
2021	Set	10	15	52	54.1	-36	41	11	0.850	1.166	77.2	57.4	9.3	1.85	307.5
2021	Set	11	15	50	1.1	-36	14	10	0.852	1.146	75.6	58.3	9.2	1.82	308.1
2021	Set	12	15	47	12.4	-35	47	6	0.853	1.126	74.0	59.2	9.2	1.81	308.7
2021	Set	13	15	44	27.6	-35	19	58	0.854	1.106	72.4	60.2	9.1	1.79	309.3
2021	Set	14	15	41	46.4	-34	52	47	0.856	1.085	70.8	61.1	9.0	1.77	309.8
2021	Set	15	15	39	8.4	-34	25	31	0.857	1.065	69.2	62.0	8.9	1.76	310.2
2021	Set	16	15	36	33.2	-33	58	10	0.858	1.044	67.6	63.0	8.9	1.75	310.7
2021	Set	17	15	34	0.5	-33	30	43	0.859	1.023	66.0	63.9	8.8	1.75	311.0
2021	Set	18	15	31	29.9	-33	3	9	0.859	1.001	64.4	64.9	8.7	1.74	311.4
2021	Set	19	15	29	1.1	-32	35	25	0.860	0.980	62.8	65.8	8.6	1.74	311.7
2021	Set	20	15	26	33.5	-32	7	32	0.860	0.958	61.2	66.8	8.5	1.74	312.0
2021	Set	21	15	24	7.0	-31	39	25	0.861	0.935	59.6	67.8	8.4	1.75	312.2
2021	Set	22	15	21	40.9	-31	11	4	0.861	0.913	58.0	68.9	8.3	1.76	312.4
2021	Set	23	15	19	14.9	-30	42	25	0.861	0.890	56.4	69.9	8.2	1.78	312.5
2021	Set	24	15	16	48.5	-30	13	26	0.861	0.867	54.8	71.0	8.1	1.80	312.6
2021	Set	25	15	14	21.3	-29	44	2	0.861	0.843	53.1	72.1	7.9	1.82	312.7
2021	Set	26	15	11	52.7	-29	14	12	0.860	0.819	51.5	73.3	7.8	1.85	312.7
2021	Set	27	15	9	22.2	-28	43	49	0.860	0.795	49.8	74.4	7.7	1.88	312.7
2021	Set	28	15	6	49.3	-28	12	50	0.859	0.771	48.2	75.7	7.5	1.93	312.6
2021	Set	29	15	4	13.2	-27	41	10	0.858	0.745	46.5	77.0	7.4	1.98	312.5
2021	Set	30	15	1	33.4	-27	8	42	0.857	0.720	44.7	78.3	7.2	2.03	312.4
2021	Out	1	14	58	49.0	-26	35	19	0.856	0.694	43.0	79.8	7.1	2.10	312.2
2021	Out	2	14	55	59.4	-26	0	54	0.854	0.667	41.2	81.3	6.9	2.18	312.0
2021	Out	3	14	53	3.5	-25	25	19	0.853	0.640	39.4	82.9	6.7	2.26	311.8
2021	Out	4	14	50	0.4	-24	48	23	0.851	0.612	37.5	84.6	6.5	2.37	311.6
2021	Out	5	14	46	48.9	-24	9	56	0.850	0.584	35.6	86.4	6.3	2.48	311.3
2021	Out	6	14	43	27.9	-23	29	43	0.848	0.555	33.7	88.4	6.1	2.61	311.0
2021	Out	7	14	39	55.8	-22	47	30	0.846	0.525	31.7	90.5	5.8	2.77	310.7
2021	Out	8	14	36	11.0	-22	2	59	0.845	0.494	29.6	92.8	5.6	2.94	310.4
2021	Out	9	14	32	11.5	-21	15	49	0.843	0.462	27.4	95.4	5.3	3.14	310.1
2021	Out	10	14	27	55.2	-20	25	34	0.842	0.429	25.2	98.3	5.0	3.38	309.8
2021	Out	11	14	23	19.1	-19	31	45	0.841	0.395	22.8	101.5	4.6	3.65	309.5
2021	Out	12	14	18	20.1	-18	33	44	0.841	0.360	20.4	105.2	4.2	3.98	309.2
2021	Out	13	14	12	53.9	-17	30	44	0.842	0.323	17.7	109.6	3.7	4.36	308.9
2021	Out	14	14	6	55.4	-16	21	47	0.844	0.284	15.0	114.9	3.2	4.83	308.7
2021	Out	15	14	0	17.6	-15	5	35	0.849	0.243	12.0	121.5	2.5	5.39	308.4
2021	Out	16	13	52	51.2	-13	40	24	0.857	0.198	8.7	130.3	1.6	6.11	308.1
2021	Out	17	13	44	24.3	-12	3	57	0.872	0.150	5.1	143.5	0.5	6.99	307.9
2021	Out	18	13	34	48.7	-10	14	23	0.900	0.099	1.2	167.7	-1.3	7.82	307.8
2021	Out	19	13	26	3.8	-8	30	29	0.963	0.054	2.5	126.2	-3.7	3.85	313.5
2021	Out	20	13	30	12.7	-8	53	9	1.059	0.077	2.4	33.3	-2.0	6.76	118.6
2021	Out	21	13	40	24.2	-10	16	42	1.124	0.129	0.5	4.1	0.4	7.14	119.0
2021	Out	22	13	50	9.9	-11	35	49	1.172	0.178	1.2	6.8	1.9	6.52	118.6
2021	Out	23	13	59	8.6	-12	46	41	1.213	0.224	2.7	12.2	2.9	5.95	118.0
2021	Out	24	14	7	27.1	-13	50	22	1.250	0.267	4.0	15.2	3.7	5.48	117.4
2021	Out	25	14	15	12.3	-14	48	4	1.284	0.307	5.2	17.0	4.4	5.08	116.8
2021	Out	26	14	22	29.5	-15	40	43	1.316	0.344	6.2	18.0	5.0	4.75	116.2
2021	Out	27	14	29	23.0	-16	29	3	1.347	0.381	7.0	18.6	5.5	4.46	115.7
2021	Out	28	14	35	55.8	-17	13	37	1.377	0.415	7.8	18.9	5.9	4.21	115.1
2021	Out	29	14	42	10.3	-17	54	53	1.407	0.448	8.4	18.9	6.3	3.99	114.5
2021	Out	30	14	48	8.6	-18	33	15	1.436	0.481	9.0	18.9	6.6	3.79	114.0
2021	Out	31	14	53	52.3	-19	8	59	1.464	0.512	9.5	18.7	6.9	3.61	113.5
2021	Nov	1	14	59	22.7	-19	42	22	1.492	0.542	9.9	18.4	7.2	3.45	112.9
2021	Nov	2	15	4	41.1	-20	13	38	1.520	0.572	10.3	18.1	7.5	3.31	112.4
2021	Nov	3	15	9	48.3	-20	42	57	1.547	0.600	10.6	17.7	7.7	3.17	111.9
2021	Nov	4	15	14	45.3	-21	10	31	1.574	0.628	10.9	17.3	8.0	3.05	111.4
2021	Nov	5	15	19	32.8	-21	36	27	1.600	0.656	11.1	16.9	8.2	2.93	110.9
2021	Nov	6	15	24	11.4	-22	0	54	1.627	0.682	11.3	16.5	8.4	2.83	110.5
2021	Nov	7	15	28	41.8	-22	23	58	1.653	0.709	11.4	16.1	8.6	2.73	110.0
2021	Nov	8	15	33	4.4	-22	45	47	1.678	0.735	11.5	15.6	8.8	2.64	109.6
2021	Nov	9	15	37	19.9	-23	6	24	1.704	0.760	11.6	15.1	9.0	2.55	109.1

2021	Nov	10	15	41	28.5	-23	25	56	1.729	0.785	11.6	14.7	9.1	2.47	108.7
2021	Nov	11	15	45	30.6	-23	44	28	1.754	0.809	11.6	14.2	9.3	2.40	108.2
2021	Nov	12	15	49	26.7	-24	2	2	1.779	0.833	11.6	13.8	9.5	2.33	107.8
2021	Nov	13	15	53	17.1	-24	18	43	1.804	0.857	11.5	13.3	9.6	2.26	107.4
2021	Nov	14	15	57	2.0	-24	34	34	1.828	0.880	11.4	12.9	9.8	2.20	107.0
2021	Nov	15	16	0	41.8	-24	49	39	1.852	0.903	11.3	12.4	9.9	2.14	106.6
2021	Nov	16	16	4	16.7	-25	4	0	1.876	0.926	11.2	12.0	10.0	2.09	106.2
2021	Nov	17	16	7	46.9	-25	17	40	1.899	0.948	11.1	11.5	10.2	2.04	105.8
2021	Nov	18	16	11	12.6	-25	30	42	1.923	0.970	10.9	11.1	10.3	1.99	105.5
2021	Nov	19	16	14	34.2	-25	43	8	1.946	0.992	10.7	10.7	10.4	1.94	105.1
2021	Nov	20	16	17	51.7	-25	54	59	1.969	1.014	10.5	10.3	10.5	1.89	104.8
2021	Nov	21	16	21	5.3	-26	6	18	1.991	1.035	10.3	9.9	10.6	1.85	104.4
2021	Nov	22	16	24	15.3	-26	17	6	2.014	1.056	10.1	9.4	10.8	1.81	104.1
2021	Nov	23	16	27	21.7	-26	27	26	2.036	1.077	9.9	9.0	10.9	1.77	103.7
2021	Nov	24	16	30	24.7	-26	37	19	2.058	1.097	9.6	8.7	11.0	1.74	103.4
2021	Nov	25	16	33	24.5	-26	46	45	2.080	1.117	9.4	8.3	11.1	1.70	103.1
2021	Nov	26	16	36	21.2	-26	55	47	2.101	1.137	9.1	7.9	11.2	1.67	102.8
2021	Nov	27	16	39	14.8	-27	4	26	2.122	1.157	8.8	7.5	11.3	1.64	102.5
2021	Nov	28	16	42	5.6	-27	12	43	2.143	1.177	8.6	7.2	11.4	1.60	102.1
2021	Nov	29	16	44	53.6	-27	20	39	2.164	1.197	8.3	6.8	11.5	1.58	101.8
2021	Nov	30	16	47	38.9	-27	28	15	2.185	1.216	8.0	6.5	11.5	1.55	101.6
2021	Dez	1	16	50	21.7	-27	35	33	2.205	1.235	7.8	6.2	11.6	1.52	101.3
2021	Dez	2	16	53	1.9	-27	42	32	2.225	1.254	7.5	5.9	11.7	1.49	101.0
2021	Dez	3	16	55	39.7	-27	49	13	2.245	1.273	7.2	5.6	11.8	1.47	100.7
2021	Dez	4	16	58	15.2	-27	55	39	2.264	1.291	7.0	5.3	11.9	1.44	100.5
2021	Dez	5	17	0	48.5	-28	1	48	2.283	1.310	6.7	5.0	12.0	1.42	100.2
2021	Dez	6	17	3	19.5	-28	7	43	2.302	1.328	6.5	4.8	12.0	1.40	99.9
2021	Dez	7	17	5	48.5	-28	13	24	2.321	1.346	6.3	4.6	12.1	1.38	99.7
2021	Dez	8	17	8	15.3	-28	18	50	2.340	1.364	6.1	4.4	12.2	1.36	99.4
2021	Dez	9	17	10	40.2	-28	24	4	2.358	1.382	5.9	4.2	12.3	1.34	99.2
2021	Dez	10	17	13	3.1	-28	29	5	2.376	1.400	5.8	4.1	12.3	1.32	99.0
2021	Dez	11	17	15	24.1	-28	33	54	2.394	1.417	5.7	3.9	12.4	1.30	98.7
2021	Dez	12	17	17	43.3	-28	38	32	2.411	1.434	5.6	3.8	12.5	1.28	98.5
2021	Dez	13	17	20	0.7	-28	42	58	2.428	1.452	5.6	3.8	12.5	1.26	98.3

67P/Churyumov-Gerasimenko - 00:00 UTC (J2000)  
Última medida astrométrica realizada em: 2017 Abr 27 (Acesso em: 2020 Nov 21)

T 2021 Nov 1.8766 TT  
q 1.209038 Peri. 22.0377  
a 3.459128 Node 36.4535  
e 0.650479 Incl. 3.8722  
Ref: MPC 89011

Nota: Efemérides com intervalo de 2 dias.

Data	α(J2000.0)	δ(J2000.0)	delta	Rsol	Elong	Fase	Mag	"/min	AP
aaaa/mm./dd	h m s	o '	ua	ua					
2021 Ago 17	2 18 23.7	9 11 11	0.868	1.529	108.6	38.9	12.5	1.83	69.6
2021 Ago 19	2 24 1.3	9 42 6	0.845	1.515	109.0	39.2	12.4	1.87	69.7
2021 Ago 21	2 29 46.3	10 13 24	0.823	1.502	109.4	39.5	12.3	1.90	69.8
2021 Ago 23	2 35 38.8	10 45 5	0.802	1.488	109.8	39.8	12.2	1.94	70.0
2021 Ago 25	2 41 39.1	11 17 8	0.780	1.475	110.2	40.1	12.1	1.98	70.2
2021 Ago 27	2 47 47.6	11 49 33	0.760	1.461	110.5	40.4	12.1	2.02	70.3
2021 Ago 29	2 54 4.5	12 22 19	0.740	1.448	110.8	40.7	12.0	2.06	70.5
2021 Ago 31	3 0 30.2	12 55 24	0.721	1.436	111.0	41.0	11.9	2.10	70.7
2021 Set 2	3 7 4.7	13 28 46	0.702	1.423	111.3	41.4	11.8	2.14	71.0
2021 Set 4	3 13 48.5	14 2 23	0.684	1.411	111.5	41.7	11.7	2.18	71.2
2021 Set 6	3 20 41.6	14 36 13	0.666	1.399	111.7	42.1	11.6	2.22	71.5
2021 Set 8	3 27 44.3	15 10 12	0.649	1.387	111.8	42.4	11.5	2.26	71.7
2021 Set 10	3 34 56.8	15 44 19	0.633	1.375	112.0	42.8	11.4	2.31	72.0
2021 Set 12	3 42 19.3	16 18 28	0.617	1.364	112.0	43.2	11.3	2.35	72.3
2021 Set 14	3 49 51.8	16 52 37	0.602	1.353	112.1	43.5	11.2	2.39	72.7
2021 Set 16	3 57 34.6	17 26 40	0.588	1.342	112.1	43.9	11.1	2.43	73.1
2021 Set 18	4 5 27.5	18 0 33	0.574	1.332	112.1	44.3	11.0	2.47	73.5
2021 Set 20	4 13 30.6	18 34 10	0.561	1.322	112.1	44.7	11.0	2.51	73.9
2021 Set 22	4 21 43.7	19 7 24	0.549	1.312	112.0	45.2	10.9	2.54	74.3
2021 Set 24	4 30 6.3	19 40 8	0.537	1.303	112.0	45.6	10.8	2.58	74.8
2021 Set 26	4 38 38.2	20 12 15	0.526	1.294	111.9	46.0	10.7	2.61	75.3
2021 Set 28	4 47 18.6	20 43 37	0.515	1.285	111.8	46.4	10.7	2.64	75.8
2021 Set 30	4 56 7.0	21 14 8	0.505	1.277	111.6	46.8	10.6	2.66	76.4
2021 Out 2	5 5 2.5	21 43 39	0.496	1.270	111.5	47.2	10.5	2.68	77.0
2021 Out 4	5 14 4.1	22 12 2	0.488	1.262	111.3	47.6	10.5	2.69	77.6
2021 Out 6	5 23 10.9	22 39 12	0.480	1.255	111.2	48.0	10.4	2.70	78.2
2021 Out 8	5 32 21.6	23 5 1	0.472	1.249	111.0	48.3	10.3	2.70	78.8

2021	Out	10	5	41	35.1	23	29	25	0.465	1.243	110.8	48.7	10.3	2.69	79.5
2021	Out	12	5	50	50.2	23	52	18	0.459	1.237	110.7	49.0	10.2	2.69	80.1
2021	Out	14	6	0	5.5	24	13	36	0.453	1.232	110.5	49.3	10.2	2.67	80.8
2021	Out	16	6	9	19.7	24	33	17	0.448	1.228	110.4	49.6	10.1	2.65	81.5
2021	Out	18	6	18	31.2	24	51	18	0.444	1.223	110.3	49.8	10.1	2.62	82.2
2021	Out	20	6	27	38.8	25	7	40	0.440	1.220	110.3	50.0	10.1	2.59	82.8
2021	Out	22	6	36	40.7	25	22	22	0.436	1.217	110.2	50.1	10.1	2.55	83.5
2021	Out	24	6	45	35.4	25	35	26	0.433	1.214	110.2	50.2	10.0	2.51	84.1
2021	Out	26	6	54	21.6	25	46	56	0.430	1.212	110.2	50.3	10.0	2.46	84.8
2021	Out	28	7	2	57.7	25	56	55	0.428	1.211	110.3	50.3	10.0	2.40	85.4
2021	Out	30	7	11	22.3	26	5	29	0.426	1.210	110.4	50.3	10.0	2.34	86.0
2021	Nov	1	7	19	34.1	26	12	45	0.424	1.209	110.6	50.2	10.0	2.27	86.5
2021	Nov	3	7	27	31.8	26	18	48	0.423	1.209	110.8	50.1	10.0	2.20	87.0
2021	Nov	5	7	35	14.5	26	23	47	0.422	1.210	111.1	49.9	10.0	2.12	87.5
2021	Nov	7	7	42	41.0	26	27	49	0.421	1.211	111.5	49.6	10.0	2.04	87.9
2021	Nov	9	7	49	50.8	26	31	3	0.421	1.212	111.9	49.3	10.0	1.96	88.3
2021	Nov	11	7	56	43.1	26	33	36	0.421	1.214	112.4	48.9	10.0	1.88	88.6
2021	Nov	13	8	3	17.3	26	35	37	0.421	1.217	113.0	48.5	10.0	1.79	88.8
2021	Nov	15	8	9	33.1	26	37	13	0.421	1.220	113.6	48.0	10.0	1.71	89.0
2021	Nov	17	8	15	29.9	26	38	33	0.422	1.224	114.3	47.4	10.0	1.62	89.1
2021	Nov	19	8	21	7.3	26	39	42	0.422	1.228	115.0	46.8	10.0	1.53	89.1
2021	Nov	21	8	26	25.1	26	40	49	0.423	1.233	115.9	46.1	10.0	1.43	89.1
2021	Nov	23	8	31	22.9	26	42	0	0.424	1.238	116.8	45.4	10.1	1.34	88.9
2021	Nov	25	8	36	0.5	26	43	21	0.425	1.243	117.8	44.6	10.1	1.24	88.6
2021	Nov	27	8	40	17.5	26	44	57	0.426	1.250	118.8	43.8	10.1	1.15	88.2
2021	Nov	29	8	44	13.9	26	46	55	0.428	1.256	120.0	42.9	10.1	1.05	87.6
2021	Dez	1	8	47	49.4	26	49	17	0.429	1.263	121.2	41.9	10.2	0.95	86.8
2021	Dez	3	8	51	4.1	26	52	7	0.431	1.270	122.5	40.9	10.2	0.86	85.7
2021	Dez	5	8	53	57.9	26	55	27	0.433	1.278	123.8	39.8	10.2	0.76	84.3
2021	Dez	7	8	56	31.0	26	59	20	0.435	1.286	125.3	38.7	10.3	0.67	82.6
2021	Dez	9	8	58	43.6	27	3	44	0.437	1.295	126.8	37.5	10.3	0.58	80.3
2021	Dez	11	9	0	36.0	27	8	40	0.440	1.304	128.4	36.3	10.4	0.49	77.2
2021	Dez	13	9	2	8.6	27	14	6	0.442	1.313	130.0	35.0	10.4	0.40	72.9
2021	Dez	15	9	3	21.8	27	20	0	0.445	1.323	131.8	33.7	10.5	0.32	66.5
2021	Dez	17	9	4	16.0	27	26	20	0.448	1.333	133.6	32.3	10.5	0.25	56.7
2021	Dez	19	9	4	51.6	27	33	2	0.452	1.344	135.4	30.9	10.6	0.19	40.5
2021	Dez	21	9	5	9.2	27	40	3	0.455	1.354	137.3	29.5	10.6	0.15	15.2
2021	Dez	23	9	5	9.4	27	47	19	0.460	1.365	139.3	28.0	10.7	0.16	346.0
2021	Dez	25	9	4	53.0	27	54	43	0.464	1.377	141.3	26.5	10.7	0.19	323.9
2021	Dez	27	9	4	20.5	28	2	12	0.469	1.388	143.4	25.0	10.8	0.24	310.2
2021	Dez	29	9	3	33.1	28	9	38	0.474	1.400	145.5	23.5	10.8	0.29	301.5
2021	Dez	31	9	2	31.7	28	16	56	0.480	1.412	147.6	21.9	10.9	0.35	295.6

C/2019 L3 (ATLAS) - 00:00 UTC (J2000)  
Última medida astrométrica realizada em: 2020 out 27 (Acesso em: 2020 Nov 21)

T 2022 Jan 9.7620 TT  
q 3.554045 Peri. 171.6386  
z -0.000233 Node 290.7854  
e 1.000829 Incl. 48.3661  
Ref: MPEC 2020-w26

Data aaaa/mm./dd	$\alpha$ (J2000.0) h m s	$\delta$ (J2000.0) o ' "	delta ua	Rsol ua	Elong	Fase	Mag	"/min	AP
2021 Nov 6	7 47 9.0	40 3 17	3.127	3.603	110.9	14.9	12.5	0.23	174.3
2021 Nov 7	7 47 11.0	39 57 49	3.113	3.601	111.9	14.8	12.5	0.23	177.5
2021 Nov 8	7 47 11.5	39 52 20	3.098	3.600	112.8	14.7	12.5	0.23	180.7
2021 Nov 9	7 47 10.3	39 46 48	3.083	3.598	113.8	14.6	12.5	0.23	183.8
2021 Nov 10	7 47 7.6	39 41 14	3.069	3.597	114.7	14.5	12.5	0.23	186.9
2021 Nov 11	7 47 3.4	39 35 38	3.054	3.596	115.7	14.4	12.5	0.24	189.9
2021 Nov 12	7 46 57.5	39 29 58	3.040	3.594	116.6	14.3	12.5	0.24	192.8
2021 Nov 13	7 46 50.0	39 24 16	3.026	3.593	117.6	14.1	12.5	0.25	195.6
2021 Nov 14	7 46 41.0	39 18 32	3.012	3.592	118.5	14.0	12.4	0.25	198.3
2021 Nov 15	7 46 30.4	39 12 44	2.998	3.590	119.5	13.9	12.4	0.26	200.8
2021 Nov 16	7 46 18.1	39 6 52	2.984	3.589	120.5	13.7	12.4	0.27	203.3
2021 Nov 17	7 46 4.3	39 0 58	2.971	3.588	121.5	13.6	12.4	0.27	205.6
2021 Nov 18	7 45 48.9	38 55 0	2.957	3.587	122.5	13.4	12.4	0.28	207.7
2021 Nov 19	7 45 31.9	38 48 58	2.944	3.585	123.5	13.3	12.4	0.29	209.8
2021 Nov 20	7 45 13.3	38 42 53	2.931	3.584	124.5	13.1	12.4	0.30	211.7
2021 Nov 21	7 44 53.2	38 36 43	2.918	3.583	125.5	13.0	12.4	0.31	213.5
2021 Nov 22	7 44 31.5	38 30 30	2.905	3.582	126.5	12.8	12.4	0.32	215.1
2021 Nov 23	7 44 8.1	38 24 12	2.892	3.581	127.5	12.6	12.3	0.33	216.7
2021 Nov 24	7 43 43.3	38 17 50	2.880	3.580	128.6	12.5	12.3	0.34	218.1
2021 Nov 25	7 43 16.9	38 11 23	2.867	3.579	129.6	12.3	12.3	0.35	219.5
2021 Nov 26	7 42 48.9	38 4 51	2.855	3.577	130.6	12.1	12.3	0.36	220.7

2021	Nov	27	7	42	19.4	37	58	14	2.843	3.576	131.7	11.9	12.3	0.37	221.9
2021	Nov	28	7	41	48.3	37	51	32	2.832	3.575	132.7	11.7	12.3	0.38	223.0
2021	Nov	29	7	41	15.8	37	44	45	2.820	3.574	133.8	11.5	12.3	0.40	223.9
2021	Nov	30	7	40	41.8	37	37	53	2.809	3.573	134.8	11.3	12.3	0.41	224.8
2021	Dez	1	7	40	6.3	37	30	54	2.798	3.573	135.9	11.1	12.3	0.42	225.7
2021	Dez	2	7	39	29.3	37	23	50	2.787	3.572	137.0	10.9	12.3	0.43	226.4
2021	Dez	3	7	38	50.9	37	16	40	2.776	3.571	138.0	10.6	12.2	0.44	227.1
2021	Dez	4	7	38	11.1	37	9	24	2.766	3.570	139.1	10.4	12.2	0.45	227.8
2021	Dez	5	7	37	29.9	37	2	1	2.756	3.569	140.2	10.2	12.2	0.47	228.4
2021	Dez	6	7	36	47.3	36	54	32	2.746	3.568	141.3	9.9	12.2	0.48	228.9
2021	Dez	7	7	36	3.4	36	46	56	2.736	3.567	142.4	9.7	12.2	0.49	229.4
2021	Dez	8	7	35	18.3	36	39	13	2.727	3.567	143.5	9.5	12.2	0.50	229.8
2021	Dez	9	7	34	31.9	36	31	24	2.717	3.566	144.6	9.2	12.2	0.51	230.1
2021	Dez	10	7	33	44.3	36	23	27	2.708	3.565	145.7	9.0	12.2	0.52	230.5
2021	Dez	11	7	32	55.5	36	15	23	2.700	3.564	146.8	8.7	12.2	0.54	230.8
2021	Dez	12	7	32	5.5	36	7	12	2.691	3.564	147.9	8.5	12.2	0.55	231.0
2021	Dez	13	7	31	14.5	35	58	53	2.683	3.563	149.0	8.2	12.2	0.56	231.2
2021	Dez	14	7	30	22.4	35	50	27	2.675	3.562	150.1	7.9	12.2	0.57	231.4
2021	Dez	15	7	29	29.3	35	41	53	2.668	3.562	151.2	7.7	12.1	0.58	231.6
2021	Dez	16	7	28	35.2	35	33	11	2.661	3.561	152.3	7.4	12.1	0.59	231.7
2021	Dez	17	7	27	40.2	35	24	22	2.654	3.561	153.4	7.1	12.1	0.60	231.8
2021	Dez	18	7	26	44.4	35	15	25	2.647	3.560	154.5	6.8	12.1	0.61	231.9
2021	Dez	19	7	25	47.6	35	6	20	2.641	3.560	155.6	6.6	12.1	0.62	231.9
2021	Dez	20	7	24	50.2	34	57	8	2.634	3.559	156.6	6.3	12.1	0.63	232.0
2021	Dez	21	7	23	51.9	34	47	47	2.629	3.559	157.7	6.0	12.1	0.64	232.0
2021	Dez	22	7	22	53.0	34	38	19	2.623	3.558	158.8	5.7	12.1	0.64	231.9
2021	Dez	23	7	21	53.5	34	28	42	2.618	3.558	159.9	5.5	12.1	0.65	231.9
2021	Dez	24	7	20	53.4	34	18	58	2.613	3.557	160.9	5.2	12.1	0.66	231.8
2021	Dez	25	7	19	52.7	34	9	6	2.609	3.557	162.0	4.9	12.1	0.67	231.8
2021	Dez	26	7	18	51.6	33	59	7	2.605	3.557	163.0	4.6	12.1	0.68	231.7
2021	Dez	27	7	17	50.1	33	48	59	2.601	3.556	164.0	4.4	12.1	0.68	231.5
2021	Dez	28	7	16	48.2	33	38	44	2.597	3.556	164.9	4.1	12.1	0.69	231.4
2021	Dez	29	7	15	46.0	33	28	22	2.594	3.556	165.9	3.9	12.1	0.69	231.2
2021	Dez	30	7	14	43.5	33	17	52	2.591	3.555	166.7	3.6	12.1	0.70	231.1
2021	Dez	31	7	13	40.9	33	7	14	2.589	3.555	167.6	3.4	12.1	0.71	230.9

19P/Borrelly - 00:00 UTC (J2000)  
Última medida astrométrica realizada em: 2017 Mar 30 (Acesso em: 2020 Nov 21)

T 2022 Fev 1.6827 TT  
q 1.305238 Peri. 351.8360  
a 3.606636 Node 74.3510  
e 0.638101 Incl. 29.3476  
Ref: MPC 92984

Data aaaa/mm./dd	$\alpha$ (J2000.0) h m s	$\delta$ (J2000.0) o ' "	delta	Rsol	Elong	Fase	Mag	" /min	AP
2021 Set 19	23 47 39.3	-58 42 55	1.267	1.999	122.9	25.0	12.5	0.53	249.1
2021 Set 20	23 46 7.3	-58 47 9	1.263	1.991	122.4	25.2	12.5	0.52	251.9
2021 Set 21	23 44 34.5	-58 50 45	1.260	1.984	122.0	25.4	12.4	0.52	254.7
2021 Set 22	23 43 1.2	-58 53 43	1.257	1.976	121.5	25.7	12.4	0.52	257.7
2021 Set 23	23 41 27.5	-58 56 2	1.254	1.969	121.0	25.9	12.3	0.51	260.7
2021 Set 24	23 39 53.6	-58 57 42	1.252	1.962	120.5	26.1	12.3	0.51	263.7
2021 Set 25	23 38 19.7	-58 58 42	1.249	1.954	120.0	26.4	12.3	0.50	266.8
2021 Set 26	23 36 46.0	-58 59 2	1.246	1.947	119.5	26.6	12.2	0.50	270.0
2021 Set 27	23 35 12.6	-58 58 42	1.244	1.939	119.0	26.9	12.2	0.50	273.2
2021 Set 28	23 33 39.9	-58 57 42	1.241	1.932	118.5	27.1	12.1	0.50	276.4
2021 Set 29	23 32 7.9	-58 56 1	1.239	1.925	118.0	27.4	12.1	0.50	279.7
2021 Set 30	23 30 36.8	-58 53 40	1.237	1.917	117.5	27.6	12.0	0.50	283.0
2021 Out 1	23 29 6.9	-58 50 37	1.234	1.910	117.0	27.9	12.0	0.50	286.3
2021 Out 2	23 27 38.4	-58 46 55	1.232	1.902	116.5	28.1	11.9	0.50	289.6
2021 Out 3	23 26 11.4	-58 42 31	1.230	1.895	115.9	28.4	11.9	0.51	292.9
2021 Out 4	23 24 46.1	-58 37 27	1.228	1.888	115.4	28.6	11.8	0.51	296.2
2021 Out 5	23 23 22.7	-58 31 43	1.226	1.880	114.9	28.9	11.8	0.51	299.5
2021 Out 6	23 22 1.3	-58 25 18	1.224	1.873	114.3	29.1	11.8	0.52	302.7
2021 Out 7	23 20 42.1	-58 18 14	1.223	1.866	113.8	29.3	11.7	0.53	305.9
2021 Out 8	23 19 25.4	-58 10 30	1.221	1.858	113.3	29.6	11.7	0.53	309.0
2021 Out 9	23 18 11.1	-58 2 6	1.219	1.851	112.8	29.8	11.6	0.54	312.1
2021 Out 10	23 16 59.5	-57 53 4	1.218	1.844	112.2	30.1	11.6	0.55	315.1
2021 Out 11	23 15 50.7	-57 43 23	1.216	1.837	111.7	30.3	11.5	0.56	318.0
2021 Out 12	23 14 44.8	-57 33 4	1.215	1.829	111.2	30.6	11.5	0.57	320.9
2021 Out 13	23 13 41.8	-57 22 7	1.213	1.822	110.6	30.8	11.4	0.58	323.7
2021 Out 14	23 12 41.9	-57 10 33	1.212	1.815	110.1	31.1	11.4	0.59	326.3
2021 Out 15	23 11 45.2	-56 58 23	1.210	1.808	109.6	31.3	11.3	0.61	328.9
2021 Out 16	23 10 51.7	-56 45 37	1.209	1.801	109.0	31.6	11.3	0.62	331.5
2021 Out 17	23 10 1.4	-56 32 15	1.208	1.793	108.5	31.8	11.3	0.63	333.9

2021	Out	18	23	9	14.5	-56	18	18	1.207	1.786	108.0	32.0	11.2	0.65	336.2
2021	Out	19	23	8	31.0	-56	3	47	1.205	1.779	107.4	32.3	11.2	0.66	338.5
2021	Out	20	23	7	50.8	-55	48	41	1.204	1.772	106.9	32.5	11.1	0.68	340.6
2021	Out	21	23	7	14.0	-55	33	2	1.203	1.765	106.4	32.8	11.1	0.70	342.7
2021	Out	22	23	6	40.7	-55	16	50	1.202	1.758	105.9	33.0	11.0	0.71	344.7
2021	Out	23	23	6	10.8	-55	0	5	1.201	1.751	105.4	33.2	11.0	0.73	346.7
2021	Out	24	23	5	44.3	-54	42	48	1.200	1.744	104.8	33.5	10.9	0.75	348.5
2021	Out	25	23	5	21.4	-54	24	59	1.199	1.737	104.3	33.7	10.9	0.76	350.3
2021	Out	26	23	5	1.8	-54	6	39	1.198	1.730	103.8	33.9	10.8	0.78	352.0
2021	Out	27	23	4	45.7	-53	47	47	1.197	1.723	103.3	34.2	10.8	0.80	353.7
2021	Out	28	23	4	33.0	-53	28	26	1.196	1.716	102.8	34.4	10.8	0.82	355.2
2021	Out	29	23	4	23.7	-53	8	34	1.195	1.709	102.3	34.6	10.7	0.84	356.8
2021	Out	30	23	4	17.9	-52	48	12	1.194	1.702	101.8	34.8	10.7	0.86	358.2
2021	Out	31	23	4	15.3	-52	27	22	1.194	1.695	101.3	35.1	10.6	0.88	359.6
2021	Nov	1	23	4	16.1	-52	6	2	1.193	1.688	100.8	35.3	10.6	0.90	1.0
2021	Nov	2	23	4	20.2	-51	44	13	1.192	1.682	100.3	35.5	10.5	0.92	2.3
2021	Nov	3	23	4	27.6	-51	21	57	1.191	1.675	99.8	35.7	10.5	0.94	3.6
2021	Nov	4	23	4	38.2	-50	59	12	1.190	1.668	99.3	35.9	10.4	0.96	4.8
2021	Nov	5	23	4	52.0	-50	36	0	1.190	1.661	98.8	36.1	10.4	0.98	5.9
2021	Nov	6	23	5	8.9	-50	12	21	1.189	1.655	98.3	36.4	10.3	1.00	7.1
2021	Nov	7	23	5	28.9	-49	48	15	1.188	1.648	97.9	36.6	10.3	1.02	8.1
2021	Nov	8	23	5	52.0	-49	23	42	1.187	1.641	97.4	36.8	10.3	1.05	9.2
2021	Nov	9	23	6	18.1	-48	58	44	1.187	1.635	96.9	37.0	10.2	1.07	10.2
2021	Nov	10	23	6	47.1	-48	33	20	1.186	1.628	96.4	37.2	10.2	1.09	11.1
2021	Nov	11	23	7	19.0	-48	7	30	1.185	1.622	96.0	37.4	10.1	1.11	12.1
2021	Nov	12	23	7	53.7	-47	41	15	1.185	1.615	95.5	37.6	10.1	1.13	12.9
2021	Nov	13	23	8	31.2	-47	14	36	1.184	1.609	95.1	37.8	10.0	1.15	13.8
2021	Nov	14	23	9	11.3	-46	47	32	1.183	1.602	94.6	38.0	10.0	1.17	14.6
2021	Nov	15	23	9	54.1	-46	20	3	1.183	1.596	94.2	38.2	9.9	1.20	15.4
2021	Nov	16	23	10	39.4	-45	52	11	1.182	1.590	93.7	38.4	9.9	1.22	16.1
2021	Nov	17	23	11	27.2	-45	23	54	1.181	1.583	93.3	38.6	9.9	1.24	16.8
2021	Nov	18	23	12	17.5	-44	55	14	1.181	1.577	92.8	38.8	9.8	1.26	17.5
2021	Nov	19	23	13	10.2	-44	26	11	1.180	1.571	92.4	38.9	9.8	1.28	18.2
2021	Nov	20	23	14	5.2	-43	56	44	1.180	1.565	92.0	39.1	9.7	1.30	18.8
2021	Nov	21	23	15	2.5	-43	26	54	1.179	1.559	91.5	39.3	9.7	1.33	19.4
2021	Nov	22	23	16	2.0	-42	56	42	1.179	1.552	91.1	39.5	9.6	1.35	20.0
2021	Nov	23	23	17	3.6	-42	26	6	1.178	1.546	90.7	39.7	9.6	1.37	20.6
2021	Nov	24	23	18	7.4	-41	55	8	1.178	1.540	90.3	39.9	9.5	1.39	21.2
2021	Nov	25	23	19	13.3	-41	23	48	1.177	1.534	89.9	40.0	9.5	1.41	21.7
2021	Nov	26	23	20	21.2	-40	52	5	1.177	1.529	89.5	40.2	9.5	1.44	22.2
2021	Nov	27	23	21	31.0	-40	20	0	1.176	1.523	89.1	40.4	9.4	1.46	22.7
2021	Nov	28	23	22	42.8	-39	47	33	1.176	1.517	88.7	40.6	9.4	1.48	23.2
2021	Nov	29	23	23	56.5	-39	14	44	1.175	1.511	88.3	40.7	9.3	1.50	23.6
2021	Nov	30	23	25	12.1	-38	41	33	1.175	1.506	87.9	40.9	9.3	1.52	24.1
2021	Dez	1	23	26	29.4	-38	8	1	1.175	1.500	87.5	41.1	9.3	1.54	24.5
2021	Dez	2	23	27	48.5	-37	34	8	1.174	1.494	87.1	41.2	9.2	1.57	25.0
2021	Dez	3	23	29	9.3	-36	59	54	1.174	1.489	86.7	41.4	9.2	1.59	25.4
2021	Dez	4	23	30	31.9	-36	25	18	1.174	1.483	86.3	41.5	9.1	1.61	25.8
2021	Dez	5	23	31	56.1	-35	50	22	1.173	1.478	85.9	41.7	9.1	1.63	26.1
2021	Dez	6	23	33	21.9	-35	15	5	1.173	1.473	85.6	41.8	9.0	1.65	26.5
2021	Dez	7	23	34	49.2	-34	39	29	1.173	1.467	85.2	42.0	9.0	1.67	26.9
2021	Dez	8	23	36	18.1	-34	3	32	1.173	1.462	84.8	42.1	9.0	1.69	27.2
2021	Dez	9	23	37	48.5	-33	27	16	1.173	1.457	84.5	42.3	8.9	1.71	27.6
2021	Dez	10	23	39	20.4	-32	50	40	1.173	1.452	84.1	42.4	8.9	1.73	27.9
2021	Dez	11	23	40	53.6	-32	13	45	1.173	1.447	83.8	42.6	8.9	1.75	28.2
2021	Dez	12	23	42	28.3	-31	36	32	1.172	1.442	83.4	42.7	8.8	1.77	28.5
2021	Dez	13	23	44	4.3	-30	58	59	1.173	1.437	83.1	42.8	8.8	1.79	28.8
2021	Dez	14	23	45	41.5	-30	21	9	1.173	1.432	82.7	43.0	8.7	1.81	29.1
2021	Dez	15	23	47	20.1	-29	43	0	1.173	1.428	82.4	43.1	8.7	1.83	29.4
2021	Dez	16	23	48	59.9	-29	4	34	1.173	1.423	82.1	43.2	8.7	1.85	29.6
2021	Dez	17	23	50	40.9	-28	25	50	1.173	1.418	81.7	43.4	8.6	1.87	29.9
2021	Dez	18	23	52	23.2	-27	46	50	1.173	1.414	81.4	43.5	8.6	1.89	30.1
2021	Dez	19	23	54	6.6	-27	7	32	1.173	1.409	81.1	43.6	8.6	1.90	30.4
2021	Dez	20	23	55	51.1	-26	27	58	1.174	1.405	80.7	43.7	8.5	1.92	30.6
2021	Dez	21	23	57	36.7	-25	48	8	1.174	1.401	80.4	43.8	8.5	1.94	30.9
2021	Dez	22	23	59	23.5	-25	8	3	1.175	1.397	80.1	43.9	8.5	1.96	31.1
2021	Dez	23	0	1	11.3	-24	27	42	1.175	1.392	79.8	44.0	8.4	1.97	31.4
2021	Dez	24	0	3	0.2	-23	47	5	1.176	1.388	79.5	44.1	8.4	1.99	31.6
2021	Dez	25	0	4	50.1	-23	6	15	1.176	1.384	79.2	44.2	8.4	2.01	31.8
2021	Dez	26	0	6	41.1	-22	25	10	1.177	1.381	78.9	44.3	8.4	2.02	32.0
2021	Dez	27	0	8	33.1	-21	43	51	1.178	1.377	78.6	44.4	8.3	2.04	32.2
2021	Dez	28	0	10	26.1	-21	2	20	1.179	1.373	78.3	44.5	8.3	2.06	32.5
2021	Dez	29	0	12	20.1	-20	20	35	1.180	1.369	78.0	44.6	8.3	2.07	32.7
2021	Dez	30	0	14	15.1	-19	38	38	1.181	1.366	77.7	44.7	8.2	2.09	32.9
2021	Dez	31	0	16	11.0	-18	56	29	1.182	1.363	77.4	44.8	8.2	2.10	33.1

T 2022 Dez 19.8536 TT

q 1.798412 Peri. 236.1765  
 z -0.000264 Node 88.2547  
 e 1.000474 Incl. 87.5472

Ref: MPEC 2020-URO

Nota: Efemérides com intervalo de 2 dias.

Data aaaa/mm./dd	$\alpha$ (J2000.0) h m s	$\delta$ (J2000.0) ° ' "	delta ua	Rsol ua	Elong	Fase	Mag	"/min	AP
2021 Ago 29	16 57 44.1	33 15 2	5.382	5.487	90.6	10.6	12.5	0.52	190.2
2021 Ago 31	16 57 24.7	32 50 18	5.384	5.470	89.5	10.6	12.5	0.52	188.4
2021 Set  2	16 57  9.0	32 25 27	5.386	5.453	88.4	10.7	12.5	0.52	186.7
2021 Set  4	16 56 56.9	32  0 30	5.388	5.435	87.3	10.7	12.5	0.52	185.0
2021 Set  6	16 56 48.4	31 35 29	5.391	5.418	86.2	10.7	12.5	0.52	183.3
2021 Set  8	16 56 43.3	31 10 25	5.394	5.401	85.1	10.7	12.5	0.52	181.6
2021 Set 10	16 56 41.8	30 45 21	5.397	5.384	83.9	10.7	12.5	0.52	179.9
2021 Set 12	16 56 43.7	30 20 16	5.400	5.367	82.8	10.7	12.5	0.52	178.2
2021 Set 14	16 56 49.0	29 55 12	5.403	5.350	81.6	10.7	12.4	0.52	176.6
2021 Set 16	16 56 57.5	29 30 11	5.406	5.333	80.5	10.7	12.4	0.52	174.9
2021 Set 18	16 57  9.3	29  5 13	5.409	5.316	79.3	10.7	12.4	0.52	173.3
2021 Set 20	16 57 24.3	28 40 21	5.413	5.298	78.1	10.7	12.4	0.52	171.7
2021 Set 22	16 57 42.4	28 15 34	5.416	5.281	77.0	10.7	12.4	0.52	170.1
2021 Set 24	16 58  3.6	27 50 53	5.419	5.264	75.8	10.6	12.4	0.52	168.5
2021 Set 26	16 58 27.8	27 26 20	5.423	5.247	74.6	10.6	12.4	0.52	166.9
2021 Set 28	16 58 54.9	27  1 55	5.426	5.230	73.5	10.6	12.4	0.52	165.3
2021 Set 30	16 59 25.0	26 37 40	5.429	5.212	72.3	10.5	12.3	0.52	163.8
2021 Out  2	16 59 57.8	26 13 35	5.432	5.195	71.1	10.5	12.3	0.52	162.2
2021 Out  4	17  0 33.5	25 49 40	5.435	5.178	70.0	10.5	12.3	0.53	160.7
2021 Out  6	17  1 11.9	25 25 58	5.437	5.160	68.8	10.4	12.3	0.53	159.2
2021 Out  8	17  1 52.9	25  2 28	5.440	5.143	67.6	10.4	12.3	0.53	157.7
2021 Out 10	17  2 36.5	24 39 12	5.442	5.126	66.5	10.3	12.3	0.53	156.2
2021 Out 12	17  3 22.6	24 16 10	5.444	5.109	65.3	10.2	12.3	0.53	154.8
2021 Out 14	17  4 11.2	23 53 24	5.446	5.091	64.2	10.2	12.2	0.53	153.3
2021 Out 16	17  5 2.2	23 30 52	5.448	5.074	63.0	10.1	12.2	0.53	151.9
2021 Out 18	17  5 55.5	23  8 37	5.449	5.056	61.9	10.0	12.2	0.53	150.5
2021 Out 20	17  6 51.0	22 46 38	5.450	5.039	60.8	9.9	12.2	0.53	149.1
2021 Out 22	17  7 48.7	22 24 55	5.451	5.022	59.6	9.8	12.2	0.53	147.8
2021 Out 24	17  8 48.5	22  3 31	5.451	5.004	58.5	9.8	12.2	0.53	146.4
2021 Out 26	17  9 50.4	21 42 24	5.451	4.987	57.4	9.7	12.2	0.53	145.1
2021 Out 28	17 10 54.3	21 21 35	5.450	4.969	56.4	9.6	12.1	0.53	143.8
2021 Out 30	17 12  0.1	21  1  5	5.450	4.952	55.3	9.5	12.1	0.53	142.5
2021 Nov  1	17 13  7.9	20 40 53	5.448	4.934	54.2	9.4	12.1	0.53	141.3
2021 Nov  3	17 14 17.5	20 21  2	5.447	4.917	53.2	9.3	12.1	0.54	140.0
2021 Nov  5	17 15 28.9	20  1 30	5.444	4.900	52.2	9.2	12.1	0.54	138.8
2021 Nov  7	17 16 42.0	19 42 19	5.442	4.882	51.2	9.1	12.1	0.54	137.5
2021 Nov  9	17 17 56.8	19 23 28	5.439	4.865	50.2	9.0	12.0	0.54	136.3
2021 Nov 11	17 19 13.1	19  4 58	5.435	4.847	49.3	8.9	12.0	0.54	135.2
2021 Nov 13	17 20 31.0	18 46 49	5.431	4.829	48.3	8.8	12.0	0.54	134.0
2021 Nov 15	17 21 50.3	18 29  2	5.426	4.812	47.4	8.7	12.0	0.54	132.9
2021 Nov 17	17 23 11.0	18 11 35	5.420	4.794	46.5	8.6	12.0	0.54	131.8
2021 Nov 19	17 24 33.0	17 54 31	5.415	4.777	45.7	8.5	12.0	0.54	130.7
2021 Nov 21	17 25 56.4	17 37 48	5.408	4.759	44.9	8.4	11.9	0.54	129.6
2021 Nov 23	17 27 20.9	17 21 27	5.401	4.742	44.1	8.3	11.9	0.54	128.5
2021 Nov 25	17 28 46.7	17  5 28	5.393	4.724	43.3	8.2	11.9	0.54	127.5
2021 Nov 27	17 30 13.5	16 49 50	5.385	4.706	42.6	8.2	11.9	0.54	126.4
2021 Nov 29	17 31 41.5	16 34 36	5.376	4.689	41.9	8.1	11.9	0.54	125.4
2021 Dez  1	17 33 10.5	16 19 43	5.366	4.671	41.3	8.0	11.8	0.54	124.4
2021 Dez  3	17 34 40.4	16  5 13	5.356	4.653	40.7	7.9	11.8	0.54	123.4
2021 Dez  5	17 36 11.2	15 51  6	5.345	4.636	40.2	7.9	11.8	0.54	122.4
2021 Dez  7	17 37 42.9	15 37 21	5.333	4.618	39.7	7.8	11.8	0.54	121.4
2021 Dez  9	17 39 15.3	15 23 59	5.321	4.600	39.2	7.8	11.8	0.54	120.5
2021 Dez 11	17 40 48.5	15 11  0	5.308	4.583	38.8	7.7	11.7	0.54	119.6
2021 Dez 13	17 42 22.3	14 58 24	5.294	4.565	38.5	7.7	11.7	0.54	118.7
2021 Dez 15	17 43 56.7	14 46 10	5.280	4.547	38.2	7.7	11.7	0.54	117.8
2021 Dez 17	17 45 31.6	14 34 19	5.265	4.529	38.0	7.7	11.7	0.54	116.9
2021 Dez 19	17 47  7.0	14 22 50	5.249	4.512	37.8	7.7	11.6	0.54	116.0
2021 Dez 21	17 48 42.9	14 11 43	5.232	4.494	37.7	7.7	11.6	0.54	115.1
2021 Dez 23	17 50 19.1	14  0 59	5.215	4.476	37.6	7.7	11.6	0.53	114.3
2021 Dez 25	17 51 55.6	13 50 37	5.197	4.458	37.6	7.7	11.6	0.53	113.4
2021 Dez 27	17 53 32.5	13 40 38	5.178	4.440	37.7	7.8	11.5	0.53	112.6
2021 Dez 29	17 55  9.5	13 31  0	5.158	4.423	37.8	7.8	11.5	0.53	111.8
2021 Dez 31	17 56 46.7	13 21 45	5.138	4.405	38.0	7.9	11.5	0.53	111.0

## XI - Tabelas, Textos e Símbolos

### Horário Mundial

Diferença de hora entre o Brasil e Outros países

África do Sul	+5:00	Canadá		Estados Unidos	
Alemanha (Boom, Frankfurt, Dusseldorf, Hamburgo e Munique)	+4:00	Zona Central (Winnipeg)	-3:00	Zona Central (Chicago, New Orleans)	-3:00
		Zona das Montanhas (Regina)	-4:00	Zona das Montanhas	-4:00
Arábia Saudita	+6:00	Zona do Pacífico (Vancouver)	-5:00	Salt Lake City	
				Zona do Pacífico	-5:00
Austrália				São Francisco	
Zona Ocidental (Pert)	+11:00	Chile	-1:00	Filipinas	+11:00
Zona Central (Porto Darwin)	+12:30	China	+11:00	França	+ 4:00
Zona Oriental (Melbourne, Sidney)	+13:00	Dinamarca	+4:00	Grã Bretanha	+ 3:00
Austria	+4:00	Egito	+5:00	Grécia	+ 5:00
Bélgica	+4:00	Equador	-2:00	Holanda	+ 4:00
Bolívia	-1:00	Espana	+4:00	Hungria	+ 4:00
Canadá		Estados Unidos		Israel	+ 5:00
Zona Este (Montreal, Ottawa, Quebec e Toronto)	-2:00	Zona Este (Boston, Philadelphia, New York, Washington)	-2:00	Itália	+ 4:00
				Iugoslávia	+ 4:00
				Japão	+12:00
				México	- 3:00
				Noruega	+ 4:00
				Panamá	- 2:00
				Paraguai	- 1:00
				Peru	- 2:00
				Polônia	+ 4:00
				Portugal	+ 3:00
				Romênia	+ 5:00
				Rússia (Moscou)	+ 6:00
				Singapura	+11:00
				Suécia	+ 4:00
				Suíça	+ 4:00
				Tchecoslováquia	+ 4:00
				Turquia	+ 5:00
				União Sul-africana	+ 5:00
				Venezuela	- 01:30

Observação: Argentina, Uruguai, Guianas e o Suriname, não possuem diferenças de fuso horário com o Brasil; assim o mesmo Horário de Brasília, será o horário corrente naquelas respectivas nações.

# Unidades de Medidas Legais no Brasil

As unidades de base do sistema SI são apresentadas em **MAIÚSCULAS** em negrito.

As unidade derivadas do sistema SI estão apresentadas em **pequenas MAIÚSCULAS**.

As unidades admitidas internacionalmente com sistema SI estão apresentadas em minúsculas.

As unidades (não aceitas pelo sistema SI) em crescente desuso estão apresentadas com asterisco.

## MULTIPOS E SUBMÚLTIPLOS DECIMAIS

yotta	Y	$10^{24}$	de unidades	deci	d	$10^{-1}$	unidades
zetta	Z	$10^{21}$	de unidades	centi	c	$10^{-2}$	unidades
Exa	E	$10^{18}$	de unidades	mili	m	$10^{-3}$	unidades
peta	P	$10^{15}$	de unidades	micro	$\mu$	$10^{-6}$	unidades
tera	T	$10^{12}$	de unidades	nano	n	$10^{-9}$	unidades
giga	G	$10^9$	de unidades	pico	p	$10^{-12}$	unidades
mega	M	$10^6$	de unidades	femto	f	$10^{-15}$	unidades
kilo	k	$10^3$	unidades	atto	a	$10^{-18}$	unidades
ecto	h	$10^2$	unidades	zepto	z	$10^{-21}$	unidades
deca	da	$10^1$	unidades	yocto	y	$10^{-24}$	unidades

## I – UNIDADES GEOMÉTRICAS

### Comprimento

#### METRO

Milha internacional	M	1.852 m	Massa	KILOGRAMA	
Quilômetro	Km	1.000 m	(os prefixos associam à unidade grama)		Kg
			Tonelada		t 1000Kg
			GRAMA		g 0,001g
			Quilate métrico*		0,0002g
			Unidade de Massa atômica		u 1.660 57.10 <sup>-27</sup> kg
área ou superfície			Massa linear		
METRO QUADRADO	$M^2$		KILOGRAMA POR METRO		kg/m
Are	a	100m <sup>2</sup>	tex		tex 0,000 001 kg/m
Hectare	a	10.000m <sup>2</sup>			
Barn	b	$10^{-28}m^2$			
Volume			Massa superficial		
METRO CÚBICO	$M^3$		KILOGRAMA POR METRO QUADRADO		Kg/m <sup>2</sup>
Litro	l (ou L)	0,001 m <sup>3</sup>			
ângulo plano			Massa específica		
RADIANO	rad		KILOGRAMA POR METRO CÚBICO		Kg/m <sup>3</sup>
volta ou rotação					
grado*		$2\pi rad$	Volume específico		
grau		$\pi/200 rad$	METRO CÚBICO POR KILOGRAMA		Kg/m <sup>4</sup>
minuto		$\pi/180 rad$			
segundo		$\pi/10.800 rad$			
		$\pi/648.000 rad$			

## III – UNIDADES DE TEMPO

Tempo				
SEGUNDO		s		
minuto		min		
hora				60s
dia		d		3.600s
				86.400s

## IV – UNIDADES MECÂNICAS

Velocidade				
METRO POR SEGUNDO				
nó		m/s		1.852/3.600m/s
Velocidade angular				
RADIANO POR SEGUNDO		rad/s		
Rotação por minuto		rpm		$2\pi r/60 rad/s$
Rotação por segundo		rps		$2\pi r/3.600 rad/s$
aceleração				
METRO POR SEGUNDO AO QUADRADO		$m/s^2$		
gal*		Gal		0,01 m/s <sup>2</sup>
aceleração angular				
RADIANO POR SEGUNDO AO QUADRADO			rad/s <sup>2</sup>	
Força Newton				N
Momento de uma força NEWTON-METRO				N.m

## Continuação

energia, trabalho, quantidade de energia térmica						
JOULE	J					
Watt-ora	W					3.600J
(somente para eletricidade)						
elÉtron-volt	eV					1,602 19.19 <sup>-19</sup> J
Potência WATT						
Pressão						
PASCAL	Pa					
Bar	bar					
Milímetro de mercúrio						100.000 Pa
Viscosidade dinâmica						133.332 Pa
PASCAL-SEGUNDO	Pa.s					
Poise*	P					0.1 Pa.s
Viscosidade cinemática						
METRO QUADRADO POR SEGUNDO	m/s <sup>2</sup>					
stokes*	ST					0,000 1 m/s <sup>2</sup>
<b>V – UNIDADES ELÉTRICAS</b>						
Intensidade de corrente elétrica	AMPERE	A	Força eletromotriz diferença de potencial (ou tensão)	VOLT	V	
Potência WATT	W		Potência aparente volt ampere	VA		
Potência reativa var	Var		Resistência elétrica OM	Ω		
Condutância elétrica SIEMENS	S		Intensidade de campo elétrico VOLT POR METRO	V/m		
Quantidade de eletricidade, carga elétrica						
COULOMB	C					
Ampére-hora	A					3.600 C
Capacidade elétrica	FARAD					F
Indutância elétrica	ENRY					
Fluxo de indução magnética	TESLA					T
Intensidade de campo magnético	AMPERE POR METRO					A/m
Força magnetomotriz	AMPERE					A
<b>VI – UNIDADES TÉRMICAS</b>						
Temperatura termodinâmica	KELVIN			K		
Temperatura Celsius	GRAU CELSIUS			°C		
Quantidade de energia térmica (ver unidades mecânicas (energia)						
Fluxo de energia térmica	WATT			W		
Capacidade de energia térmica	JOULE POR KELVIN			J/K		
Capacidade de energia térmica (calor específico)	JOULE POR KILOGRAMA-KELVIN			J/(kg.k)		
Condutividade térmica	WATT POR METRO-KELVIN			W/(m.K)		
<b>VII – UNIDADES ÓPTICAS</b>						
Intensidade luminosa	CANDELA			Cd		
Intensidade radiante ou energética	WATT POR ESFERORRADIANO			W/sr		
Fluxo luminoso	LÚMEN			Lm		
Fluxo de energia luminosa	WATT			W		
iluminância	LUX			Lx		
Taxa de fluéncia de energia radiante	WATT POR METRO QUADRADO			W/m <sup>2</sup>		
Luminância	CANDELA POR METRO QUADRADO			Cd//m <sup>2</sup>		
vergênciā	1 POR METRO (ou dioptria)			m <sup>-1</sup> (ou δ)		
<b>VIII – UNIDADES DE RADIOATIVIDADE</b>						
Atividade radionuclear	BECQUEREL			Bq		
Curie*	Ci			3,7.10 <sup>10</sup> Bq		
Exposição de raios X ou γ						
COULOMB POR KILOGRAMA	C/kg					
röntgen*	R			2.58.10 <sup>-4</sup> C/kg		
Dose absorvida	GRAY			Gy		
Rad*	rf			0,01Gy		
Equivalente de dose	SIEVERT			Sv		
Rem*	rem			0,01Sv		
<b>VIII – QUANTIDADE DE MATÉRIA</b>						
MOL	mol					

## Conversão de Pesos e Medidas

1 grão	0,0648 grama	1 pé quadrado	0,0929 m quadrado
1 quilate (em geral: 5 quilates – 1 gr)	0,205 grama	1 Jarda quadrada	0,8361 m quadrado
1 onça-troy	31,104 gramas	1 milímetro quadrado	0,00155 pol. Quadrada
1 Libra (lb) (1 pound)	453,6 gramas	1 centímetro quadrado	0,155 pol. Quadrada
1 CWT (Ingl.) 112 lbs	50.80 quilos	1 metro quadrado	10.7639 pés quadrado
1 CWT (EE.UU) 100 lbs	45.36 quilos	1 metro quadrado	1.196 jardas quadrada
1 net ton (2000 lbs)	907,2 quilos	1 libra por pé	1.4882 Kg por metro
1 gross ton (2240 lbs)	1016 quilos	1 libra por jarda	0,4691 Kg por metro
1 quilo	2,2046 lbs	1 libra por pol. quadrada	0,0703 Kg por cm quadrado
100 quilos	220,466 lbs	1 libra por pé quadrado	4,88225 Kg por m quadrado
1 metr. ton (1000 kg)	2204,6 lbs	1 quilo por metro	0,6720 libras por pé
1 metr. ton (1000 Kg)	0,9842 gross ton	1 quilo por mm quadrado	1.422,32 libra por pol. quadrada
1 metr. ton (1000 kg)	1,1033 net ton	1 quilo por cm quadrado	14.2232 libra por pol. Quadrada
1 barril	158.984 litros	1 quilo por metro	0,2048 lbs por pé quadrado
1 barril	42 galões americanos	1 quilo por metro	1,8433 lbs por jarda quadrada
1 polegada	25,40 milímetros	1 picul (China)	60.453 quilos
1 pé (12 pol.)	30,48 centímetros	1 pood (Rússia)	16.380 quilos
1 jarda (3 pés)	91,44 centímetros	1 libra (Rússia)	409.500 gramas
1 milha (1760 jardas)	1.309,35 metros	1 galão (EE.UU)	3.785 litros
1 milha Marítima	1.853 metros	1 galão (Inglaterra)	4,54 litros
1 milímetro	0,03937 pol.	1 bushel	35.23 litros
1 metro	39,37 pol – 3.2808 pés	1 acre (Ingl. - EE.UU)	4047 m quadrados
1 quilometro	0.62137 milha	1 milha quadrada	2.59 Km quadrados
1 quilometro	1.093,6 jardas	1 ha	10.000 m quadrados
1 pol. quadrada	6.4516 cm quadrado	1 Kin (Japão)	0,600 quilo
1 pol. quadrada	645.16 mm quadrado	1 .P	1.014 C.V.

## Pesos e Medidas Brasileiras

1 palmo	22 cm	1 Alqueire do Norte	27,225 metros quadrados
1 arroba	14,689 quilos	1 Alqueire Paulista	24.200 metros quadrado
1 quintal	58,328 quilos	1 Légua SesMaria	6.000 metros
1 Alqueire Mineiro	48,400 m quadrados	1 Légua Marítima	5.555,55 metros

## Estados Brasileiros

Estado	Sigla	Estado	Sigla	Estado	Sigla
Acre	AC	Maranhão	MA	Rio Grande do Norte	RN
Alagoas	AL	Minas Gerais	MG	Rondônia	RO
Amazonas	AM	Mato Grosso do Sul	MS	Roraima	RR
Amapá	AP	Mato Grosso	MT	Rio Grande do Sul	RS
Bahia	BA	Pará	PA	Santa Catarina	SC
Ceará	CE	Paraíba	PB	Sergipe	SE
Distrito Federal	DF	Pernambuco	PE	São Paulo	SP
Espírito Santo	ES	Piauí	PI	Tocantins	TO
Goiás	GO	Paraná	PR		
Maranhão	MA	Rio de Janeiro	RJ		

## Medidas de superfície Mais usadas no Brasil

Medidas	Dimensões em metro	Superfícies m <sup>2</sup>	Hectares
Metro quadrado	1 x 1	1	-
Braça quadrada	2.20 x 2.20	4.84	-
Hectare	100 x 100	10.000	1.00
Palmo de Sesmaria	0.22 x 6.600	1.452	-
Braça de Sesmaria	2.20 x 6.600	14.520	1.45
Quadra quadrada	132 x 132	17.424	1.74
Alqueire	110 x 220	24.200	2.42
Quadra de sesmaria	132 x 6.600	871.200	87.12
Milhão	1.000 x 1.000	1.000.000	100.00
Data de campo	1.650 x 1.650	2.722.500	272.25
Data de mato	1.650 x 3.300	5.445.000	544.50
Sesmaria de mato	1.650 x 6.600	10.890.000	1.089.00
Légua de sesmaria	6.600 x 6.600	43.560.000	4.356.00
Sesmaria de campo	6.600 x 19.800	130.680.00	13.680.00

## Alfabeto Grego

$\alpha$	Alpha	$\eta$	Eta	$\nu$	Nu	$\tau$	Tau
$\beta$	Beta	$\theta$	Theta	$\xi$	Xi	$\upsilon$	Upsilon
$\gamma$	Gamma	$\iota$	Iota	$\circ$	Omicron	$\phi$	Phi
$\delta$	Delta	$\kappa$	Kappa	$\pi$	Pi	$\chi$	Chi
$\epsilon$	Epsilon	$\lambda$	Lambda	$\rho$	Rho	$\psi$	Psi
$\zeta$	Zeta	$\mu$	Mu	$\sigma$	Sigma	$\omega$	Omega

## Magnitude Limite de um Telescópio

Todos os telescópios tem uma magnitude de limite visual teórica, a qual denominamos como **MALE** (Limite de Magnitude Visual Observado). Em noites com a ausência da Lua, notamos estrelas de até 6.5 magnitude. Você poderá comparar este limite através da observação direta com estrelas de baixa magnitude e a magnitude da estrela Mais baixa de seu atlas celeste, ou então determiná-lo através da seguinte fórmula:

$$\text{MALE} = 6.5 + 5 \log D \text{ (cm)}$$

Onde: D = Diâmetro do telescópio.

**6.5 = Limite de magnitude estrelar observado a olho nu.**

Na tabela seguinte, você poderá encontrar uma boa referência sobre a capacidade visual de seu instrumento, bem como seu limite prático de aumento.

## Resolução, Limite de Aumento e MALE para pequenos Equipamentos Óticos

Diâmetro da objetiva (mm)	Diâmetro da objetiva (pol.)	MALE	Resolução (Segundos de arco)	Limite de Aumento	Observações*
30	1.2	9.9	4	-	A
40	4.6	10.5	3	-	A
50	2	11	2.4	-	A
60	2.4	11.4	2	150	B
70	2.8	11.7	1.7	170	B
80	3.1	12	1.5	180	B
100	4	12.5	1.2	240 e 180	C
130	5.1	13	0.9	300 e 230	C
150	6	13.4	0.8	350 e 260	C
180	7	13.7	0.7	360	D
200	8	14	0.6	340	D
250	10	14.5	0.5	400	D
300	12	14.9	0.4	450	D
360	14	15.2	0.3	480	D
400	16	15.5	0.3	500	D

\* Observações:

**A** = Refere-se a binóculos;

**B** = Refere-se a refratores (lunetas);

**C** = Refere-se a refratores e refletores;

**D** = Refere-se somente a refletores.

## Símbolos Mais utilizados em astronomia

$\alpha$	Ascensão reta
$\delta$	Declinação
d	Dia
H - h	Horas
M - m	Minutos de tempo
S	Segundos de tempo
°	Graus
'	Minutos de arco
"	Segundos de arco
N	Norte
S	Sul
E	Leste
W	Oeste
$\phi$	Latitude
L	Longitude
TU	Tempo Universal

## Abreviatura das Constelações

And, Ant, Aps, Aqr, Aql, Ara, Ari, Aur, Boo, Cae, Cam, Cnc, CVn, CMa, CMi, Cap, Car, Cas, Cen, Cep, Cet, Cha, Cir, Col, Com, CrA, CrB, Crv, Crt, Cru, Cyg, Del, Dor, Dra, Equ, Eri, For, Gem, Gru, Her, Hor, Hya, Hyi, Ind, Lac, Leo, LMi, Lep, Lib, Lup, Lyn, Lyr, Men, Mic, Mon, Mus, Nor, Oct, Oph, Ori, Pav, Peg, Per, Phe, Pic, Psc, PsA, Pup, Pyx, Ret, Sge, Sgr, Sco, Scl, Sct, Ser, Sex, Tau, Tel, Tri, TrA, Tuc, UMa, UMi, Vel, Vir, Vol, Vul.

**Fonte:**

<https://www.iau.org/public/themes/constellations/brazilian-portuguese/> - Acesso em: 11 Nov. 2020.

## Símbolos & Abreviaturas utilizadas neste Almanaque

Jan	Janeiro	AP	Ângulo de Posição Nota: 3
Fev	Fevereiro	AV	Ângulo de Vértice Nota: 4
Mar	Março	Mag. ou Mv =	Magnitude Visual
Abr	Abril	Elong. °	Elongação
Mai	Maio	Ang. PH	Ângulo de Fase
Jun	Junho	MC	Meridiano Central
Jul	Julho	TT	Tempo Terrestre
Ago	Agosto	$\alpha(J2000.0)$	Ascensão reta no Equinócio J2000.0
Set	Setembro	$\delta(J2000.0)$	Declinação no Equinócio J2000.0
Out	Outubro	A	Semi-eixo Maior orbital de cometa
Nov	Novembro	E	Excentricidade orbital
Dez	Dezembro	T	Data de passagem no Periélio
Seg	Segunda-feira	Ref: MPC	Referência do Minor Planet Center
Ter	Terça-feira	Peri	Argumento do Periélio (graus)
Qua	Quarta-feira	P/2006 T1 (Levy)	Designação e Nome de Cometa periódico (> 200 anos).
Qui	Quinta-feira	Node	Longitude de Nodo Ascendente
Sex	Sexta-feira	Incl.	Inclinação Orbital (graus)
Sab	Sábado	(15) – Eunomia	Número e Nome de Asteroide e/ou Planeta Anão.
Dom	Domingo	PO°	Ângulo de posição da extremidade N do disco solar, (+) E; (-) W.
DT (ua)* ou (ua)	Distância a Terra em ua Nota: 1	BO°	Latitude heliográfica do centro do disco solar. (+) N; (-) S.
Ø	Diâmetro	LO°	Longitude heliográfica do meridiano central do Sol.
%ill	Percentual Iluminado	NRC	Número de rotação Solar de Carrington série iniciada em Novembro 1853 9,946.
P.H	Paralaxe Horizontal	aaaa/mm./dd	Ano/mês/dia
Alt.	Altura	$\lambda_L$	Latitude selenográfica
Az.	Azimute	$\beta_L$	Longitude selenográfica
AC	Ângulo de Cúspide (em graus). Nota: 2	UTC	(Coordinated Universal Time) Tempo Universal Coordenado

### Catálogos Referenciados

M	Objetos Messier
NGC	New General Catalogue
NSV	Catálogo de Estrelas Variáveis Novas e Suspeitas
HR	Harvard Revised Photometry Catalogue
BD / CD / CPD	Bonner Durchmusterung / Cordoba Durchmusterung / Cape Photographic Durchmusterung
HD	Henry Draper Catalogue
SAO	Smithsonian Astrophysical Observatory Star Catalog
FK5	Fifth Fundamental Catalogue

**Nota: 1 - (ua)\*** Conforme a Resolução da IAU 2012 B2, acolhendo proposta do grupo de trabalho "Numerical Standards for Fundamental Astronomy", redefiniu-se a unidade astronômica de comprimento correspondendo à distância media da Terra ao Sol equivalendo assim a 149.597.870.700 metros.

### Referência:

<http://www.observatorio.iag.usp.br/index.php/mencurio/curiodefin.html> - Acesso em 24 Out. 2017.

**Nota: 2 -** É o ângulo entre a cúspide Mais próxima e a posição onde a ocultação irá ocorrer. Geralmente são utilizadas as cúspides Norte (N) e Sul (S). Quando o fenômeno ocorre no limbo escuro, o valor é negativo. Quando em limbo iluminado, é positivo.

Se durante um eclipse lunar, AC indica o percentual de distância do centro da umbra, e é procedido por um "U".

**Nota: 3 -** Em relação ao Norte lunar. Este ângulo é medido partindo do pólo Norte e em direção ao Leste. Assim, para um evento que ocorra exatamente na cúspide Leste da Lua, PA = 90°.

**Nota: 4 -** Tomando-se uma reta do centro do disco lunar até o zênite, é o ângulo entre a intercessão desta reta no limbo lunar e a estrela, em sentido anti-horário.

### Referência:

<http://www.rea-brasil.org/ocultacoes/predicoes.htm> - Acesso em 24 Out. 2017

## **Numeração utilizada para identificação dos satélites galileanos**

### **SATÉLITES DE JÚPITER**

1. = Io;
  2. = Europa;
  3. = Ganimedes;
  4. = Callisto;
- Ec = Eclipse do satélite pela sombra do disco do planeta;  
Tr = Trânsito do satélite pelo disco do planeta;  
Sh = Trânsito da sombra do satélite pelo disco do planeta;  
Oc = Ocultação do satélite pelo disco do planeta;  
I = Imersão;  
E = Emersão;  
D = Desaparecimento;  
R = Reaparecimento.

### **FENÔMENOS MÚTUOS**

Em função da distância à Terra, os satélites galileanos apresentam as seguintes magnitudes:

Io = 5.5; Europa = 6.1; Ganimedes = 5.1 e Callisto = 6.2.

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