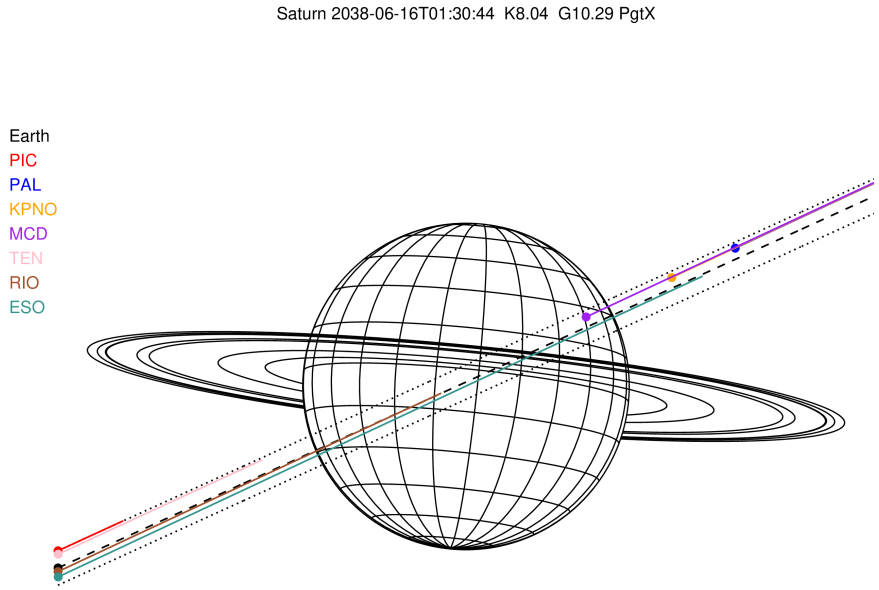
Stellar occultation prediction by rfrench@wellesley.edu Sat Jun 24 19:43:26 2023

target : Saturn
target radius (km) : 60268.00
C/A epoch : 2038-06-16T01:30:44.820
Event type : PgtX
: Saturn occs: geocentric, topocentric
: No ring occs
Gaia source ID : 3869381872857981312
2Mass ID (if available) : 10485154+0937390

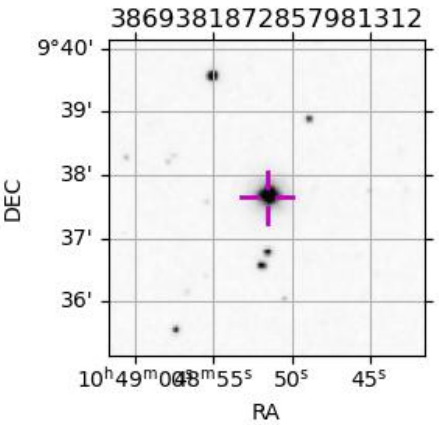
ICRS Star Coord at Epoch: 10h 48m 51.55009s +09:37:38.65396s
RUWE (>1.4 is poor) : 1.00
K magnitude : 8.036
G magnitude : 10.287
RP magnitude : 9.595
BP magnitude : 10.839
DUPflag : 0
Distance (au) : 9.575
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : 17.06
Sun-Target sep (deg) : 75.43
Sun-Moon sep (deg) : 90.38
B (ring opening deg) : -6.18
PA of pole (deg) : -5.57

#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring

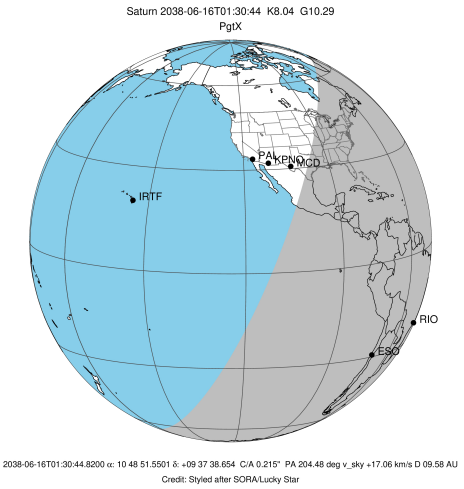


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

Obs	Location	lat	Elon	Rings I	Planet	Rings E	Observed Events Interval	OEcode
PIC	Pic du Midi	42.9	0.1					PnnRnn
PAL	Palomar Mt (20	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4					PnnRnn
MCD	McDonald Obs.	30.7	256.0		+		JUN 16 02:31 - JUN 16 02:31	PneRnn
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+			JUN 16 00:37 - JUN 16 00:37	PinRnn
ESO	European South	-29.3	289.3	+	+		JUN 16 00:36 - JUN 16 02:35	PieRnn
AAT	Siding Spring	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Ob	-35.3	149.0					PnnRnn



Saturn_2038-06-16T01_30_44.8200_MCD.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:15:41 2023

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target                  : Saturn
target radius (km)      :  60268.00
C/A epoch               : 2038-06-16T01:31:27.720
Event type              : PgtX
: Saturn occs: geocentric, topocentric
: No ring occs
Observer code           : MCD
Location                : McDonald Obs. 2.7m
Latitude (deg)          :  30.67158
E. Longitude (deg)      : 255.97844
Altitude (km)           :   2.075
Gaia source ID          : 3869381872857981312
2Mass ID (if available) : 10485154+0937390
ICRS Star Coord at Epoch: 10h 48m 51.55009s +09:37:38.65396s
RUWE (>1.4 is poor)     :   1.00
K magnitude             :  8.036
G magnitude             : 10.287
RP magnitude            :  9.595
BP magnitude            : 10.839
DUPflag                 : 0
Distance (au)           :  9.575
f0 (km)                 :       0.000
g0 (km)                 :       0.000
skyplane vel. (km/s)    :  17.06
Sun-Target sep (deg)    :   75.43
Sun-Moon sep (deg)      :   91.27
B (ring opening deg)    :   -6.18
PA of pole (deg)        :   -5.57
Pole direction: RA (deg):  40.60000
Dec (deg):  83.50000
C/A sky separation (")  :   0.639
C/A sky separation (km) :   4440.8
NAIF SPICE kernels      : RAJobs_U111+rgf15.spk
URKALLv1.spk
Saturn_ring_plane.tf
sat378.bsp
sat286.bsp
vgr1.sat286.bsp
vgr2.sat286.bsp
HST1081HSPephemUTC.bsp
pfbl0000r.bsp
cassini.bsp
earthstns_itrf93_040916.bsp
earth_200101_990628_predict.bpc
earth_720101_070426.bpc
cpck28Mar2008.tpc
pck.sat440.tpc
IAU_SATURN_for_RINGFIT.tpc
naif0012.tls
earth_flat_IAU.spk
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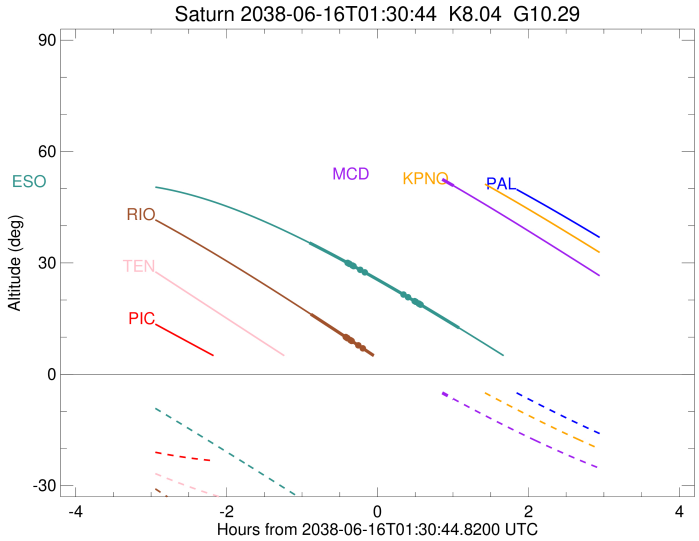
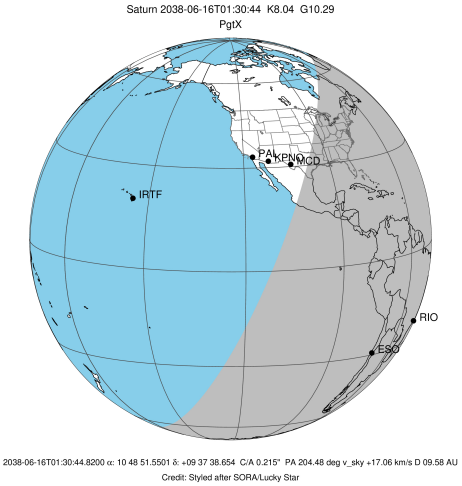


b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2038-06-16T00:55:19.683	b	66.34	11.88x	140461.00	-80.14		
A (OER)	I	2038-06-16T00:56:05.688	b	66.26	11.73x	136774.40	-80.13		
Encke (OEG)	I	2038-06-16T00:56:43.498	b	66.19	11.60x	133744.89	-80.12		
Encke (IEG)	I	2038-06-16T00:56:47.511	b	66.19	11.59x	133423.31	-80.12		
A (IER)	I	2038-06-16T00:59:09.494	b	65.93	11.11x	122050.38	-80.08		
B (OER)	I	2038-06-16T01:00:05.436	b	65.82	10.92x	117571.16	-80.06		
B (IER)	I	2038-06-16T01:05:25.347	b	65.19	9.85x	91984.69	-79.88		
C (IER)	I	2038-06-16T01:09:04.657	b	64.72	9.12x	74490.57	-79.64		
Saturn	I	2038-06-16T00:31:29.349		68.30	16.74x	60255.04	-26.24	-31.08	
Saturn	E	2038-06-16T02:31:12.824		50.77	-6.65	60246.60	34.62	40.10	
C (IER)	E	2038-06-16T01:39:10.136	b	60.27	3.18x	74490.57	80.77		
B (IER)	E	2038-06-16T01:42:53.454	b	59.65	2.45x	91984.69	77.74		
B (OER)	E	2038-06-16T01:48:19.868	b	58.72	1.40x	117571.16	79.03		
A (IER)	E	2038-06-16T01:49:16.483	b	58.56	1.22x	122050.37	79.20		
Encke (IEG)	E	2038-06-16T01:51:39.739	b	58.15	0.76x	133423.31	79.56		
Encke (OEG)	E	2038-06-16T01:51:43.781	b	58.14	0.75x	133744.88	79.56		
A (OER)	E	2038-06-16T01:52:21.839	b	58.02	0.63x	136774.40	79.64		
F ring	E	2038-06-16T01:53:08.105	b	57.89	0.48x	140461.00	79.72		

Saturn_2038-06-16T01_30_44.8200_RIO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:19:10 2023




```
target                  : Saturn
target radius (km)      :  60268.00
C/A epoch               : 2038-06-16T01:36:57.550
Event type              : PgtX
: Saturn occs: geocentric, topocentric
: No ring occs
Observer code           : RIO
Location                : Rio de Janeiro
Latitude (deg)          : -22.89506
E. Longitude (deg)      : 316.77708
Altitude (km)           :   0.033
Gaia source ID          : 3869381872857981312
2Mass ID (if available) : 10485154+0937390
ICRS Star Coord at Epoch: 10h 48m 51.55009s +09:37:38.65396s
RUWE (>1.4 is poor)     :   1.00
K magnitude             :  8.036
G magnitude             : 10.287
RP magnitude            :  9.595
BP magnitude            : 10.839
DUPflag                 : 0
Distance (au)           :  9.575
f0 (km)                 :       0.000
g0 (km)                 :       0.000
skyplane vel. (km/s)    :  17.06
Sun-Target sep (deg)    :   75.43
Sun-Moon sep (deg)      :   90.47
B (ring opening deg)    :   -6.18
PA of pole (deg)        :   -5.57
Pole direction: RA (deg):  40.60000
Dec (deg):  83.50000
C/A sky separation (")  :   0.231
C/A sky separation (km) :   1601.6
NAIF SPICE kernels      : RAJobs_U111+rgf15.spk
URKALLv1.spk
Saturn_ring_plane.tf
sat378.bsp
sat286.bsp
vgr1.sat286.bsp
vgr2.sat286.bsp
HST1081HSPephemUTC.bsp
pfbl0000r.bsp
cassini.bsp
earthstns_itrf93_040916.bsp
earth_200101_990628_predict.bpc
earth_720101_070426.bpc
cpck28Mar2008.tpc
pck.sat440.tpc
IAU_SATURN_for_RINGFIT.tpc
naif0012.tls
earth_flat_IAU.spk
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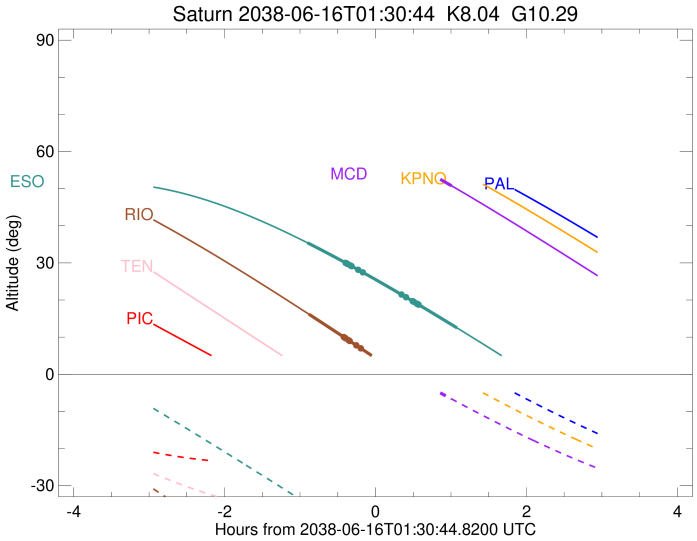
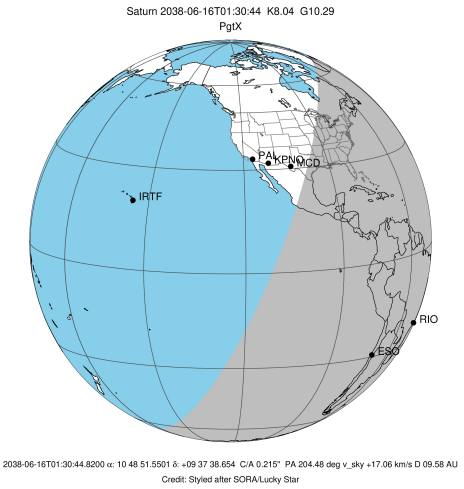


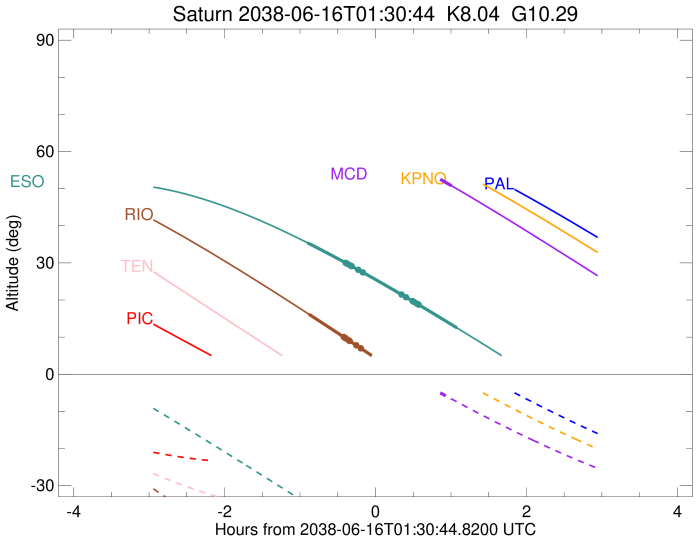
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2038-06-16T01:05:40.022	b	9.99	-65.22	140461.00	-80.97		
A (OER)	I	2038-06-16T01:06:25.554	b	9.82	-65.39	136774.41	-80.96		
Encke (OEG)	I	2038-06-16T01:07:02.975	b	9.68	-65.53	133744.89	-80.95		
Encke (IEG)	I	2038-06-16T01:07:06.947	b	9.67	-65.55	133423.31	-80.95		
A (IER)	I	2038-06-16T01:09:27.480	b	9.14	-66.08	122050.38	-80.90		
B (OER)	I	2038-06-16T01:10:22.855	b	8.94	-66.29	117571.17	-80.88		
B (IER)	I	2038-06-16T01:15:39.651	b	7.75	-67.50	91984.70	-80.62		
C (IER)	I	2038-06-16T01:19:17.139	b	6.94	-68.33	74490.58	-80.20		
Saturn	I	2038-06-16T00:37:49.871		16.17	-58.85	60252.73		-28.68	-33.77
Saturn	E	2038-06-16T02:35:40.292		-10.46x	-85.85	60249.84		31.55	36.86
C (IER)	E	2038-06-16T01:49:17.570	b	0.15x	-75.22	74490.57	77.44		
B (IER)	E	2038-06-16T01:52:59.858	b	-0.69x	-76.07	91984.69	79.59		
B (OER)	E	2038-06-16T01:58:18.920	b	-1.91x	-77.29	117571.16	80.61		
A (IER)	E	2038-06-16T01:59:14.454	b	-2.12x	-77.50	122050.38	80.70		
Encke (IEG)	E	2038-06-16T02:01:35.218	b	-2.65x	-78.04	133423.31	80.88		
Encke (OEG)	E	2038-06-16T02:01:39.194	b	-2.67x	-78.05	133744.88	80.88		
A (OER)	E	2038-06-16T02:02:16.641	b	-2.81x	-78.20	136774.40	80.92		
F ring	E	2038-06-16T02:03:02.189	b	-2.98x	-78.37	140461.00	80.96		

Saturn_2038-06-16T01_30_44.8200_ESO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:20:02 2023

target : Saturn
target radius (km) : 60268.00
C/A epoch : 2038-06-16T01:36:15.530
Event type : PgtX
: Saturn occs: geocentric, topocentric
: No ring occs
Observer code : ESO
Location : European Southern Obs. (3.6m)
Latitude (deg) : -29.26097
E. Longitude (deg) : 289.26831
Altitude (km) : 2.400
Gaia source ID : 3869381872857981312
2Mass ID (if available) : 10485154+0937390
ICRS Star Coord at Epoch: 10h 48m 51.55009s +09:37:38.65396s
RUWE (>1.4 is poor) : 1.00
K magnitude : 8.036
G magnitude : 10.287
RP magnitude : 9.595
BP magnitude : 10.839
DUPflag : 0
Distance (au) : 9.575
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : 17.06
Sun-Target sep (deg) : 75.43
Sun-Moon sep (deg) : 90.83
B (ring opening deg) : -6.18
PA of pole (deg) : -5.57
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 0.021
C/A sky separation (km) : 142.6
NAIF SPICE kernels : RAJobs_U111+rgf15.spk
URKALLv1.spk
Saturn_ring_plane.tf
sat378.bsp
sat286.bsp
vgr1.sat286.bsp
vgr2.sat286.bsp
HST1081HSPephemUTC.bsp
pfbl0000r.bsp
cassini.bsp
earthstns_itrf93_040916.bsp
earth_200101_990628_predict.bpc
earth_720101_070426.bpc
cpck28Mar2008.tpc
pck.sat440.tpc
IAU_SATURN_for_RINGFIT.tpc
naif0012.tls
earth_flat_IAU.spk





b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2038-06-16T01:07:11.369	b	29.97	-41.54	140461.00	-80.57		
A (OER)	I	2038-06-16T01:07:57.131	b	29.83	-41.71	136774.40	-80.55		
Encke (OEG)	I	2038-06-16T01:08:34.744	b	29.72	-41.84	133744.88	-80.53		
Encke (IEG)	I	2038-06-16T01:08:38.737	b	29.70	-41.86	133423.31	-80.53		
A (IER)	I	2038-06-16T01:11:00.027	b	29.27	-42.37	122050.38	-80.45		
B (OER)	I	2038-06-16T01:11:55.720	b	29.09	-42.57	117571.16	-80.41		
B (IER)	I	2038-06-16T01:17:14.711	b	28.10	-43.73	91984.70	-79.93		
C (IER)	I	2038-06-16T01:20:54.624	b	27.40	-44.52	74490.58	-79.03		
Saturn	I	2038-06-16T00:36:33.517		35.43	-34.92	60251.18	-30.23	-35.45	
Saturn	E	2038-06-16T02:35:35.947		12.48	-60.82	60251.01	30.41	35.63	
C (IER)	E	2038-06-16T01:51:05.880	b	21.54	-51.10	74490.57	78.90		
B (IER)	E	2038-06-16T01:54:45.839	b	20.81	-51.91	91984.69	79.99		
B (OER)	E	2038-06-16T02:00:04.333	b	19.74	-53.06	117571.16	80.58		
A (IER)	E	2038-06-16T02:00:59.899	b	19.56	-53.27	122050.38	80.64		
Encke (IEG)	E	2038-06-16T02:03:20.831	b	19.08	-53.78	133423.31	80.75		
Encke (OEG)	E	2038-06-16T02:03:24.813	b	19.07	-53.79	133744.88	80.75		
A (OER)	E	2038-06-16T02:04:02.323	b	18.94	-53.93	136774.40	80.78		
F ring	E	2038-06-16T02:04:47.953	b	18.79	-54.10	140461.00	80.81		