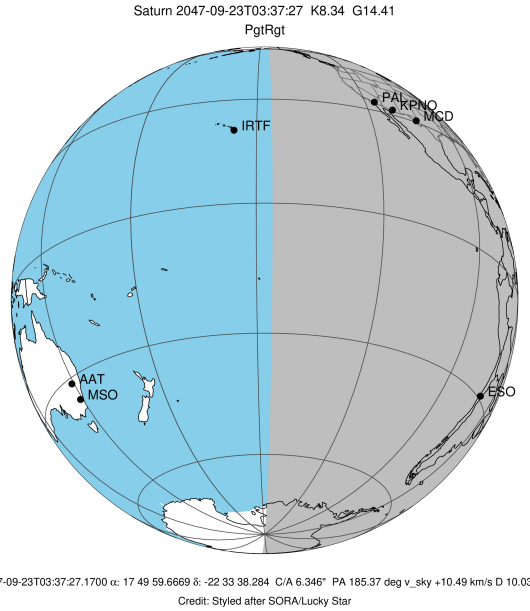
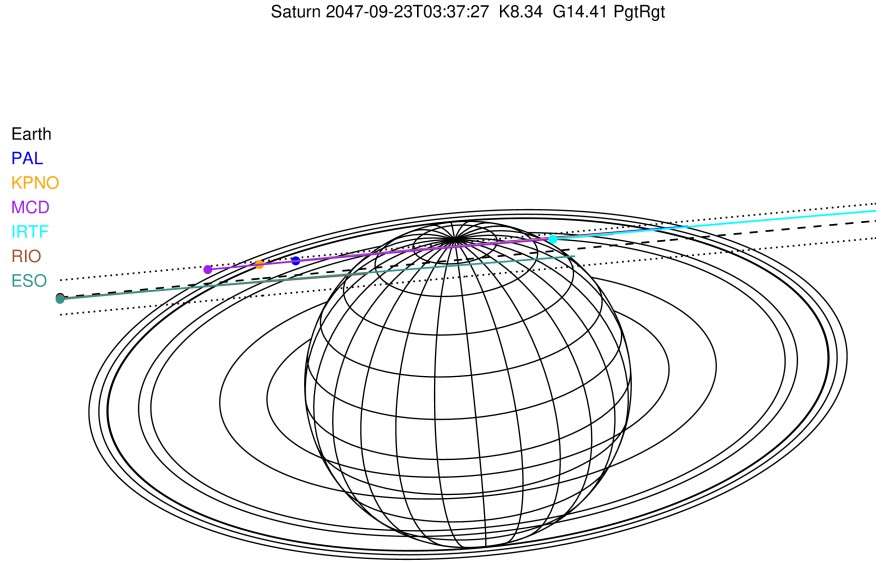
Stellar occultation prediction by rfrench@wellesley.edu Sat Jun 24 20:07:45 2023

target : Saturn
target radius (km) : 60268.00
C/A epoch : 2047-09-23T03:37:27.170
Event type : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Gaia source ID : 4068924713406711936
2Mass ID (if available) : 17495967-2233378

ICRS Star Coord at Epoch: 17h 49m 59.66690s -22:33:38.28414s
RUWE (>1.4 is poor) : 0.88
K magnitude : 8.340
G magnitude : 14.414
RP magnitude : 12.940
BP magnitude : 17.337
DUPflag : 0
Distance (au) : 10.025
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : 10.49
Sun-Target sep (deg) : 88.29
Sun-Moon sep (deg) : 41.65
B (ring opening deg) : 26.91
PA of pole (deg) : 5.32

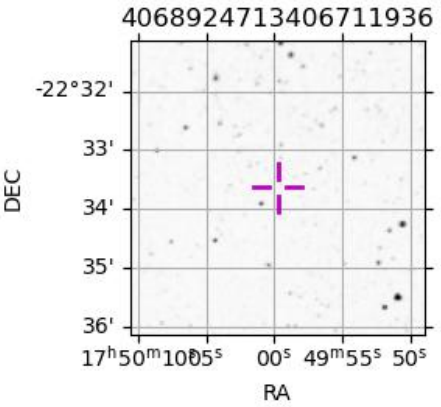
#	a(km)	ring
1	74490.6	C (IER)
2	91984.7	B (IER)
3	117571.2	B (OER)
4	122050.4	A (IER)
5	133423.3	Encke (IEG)
6	133744.9	Encke (OEG)
7	136774.4	A (OER)
8	140461.0	F ring



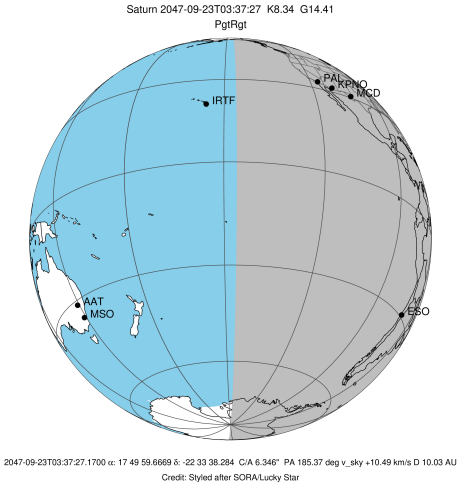


Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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	+ +	+ +	+ + + + + +	SEP 23 02:27 - SEP 23 05:59	PieRie
PMO	Purple Mtn Obs	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl	32.0	248.4	+ + + +	+ +	+ + + +	SEP 23 01:44 - SEP 23 05:41	PieRie
MCD	McDonald Obs.	30.7	256.0	+ + + + + +	+ +	+ +	SEP 23 01:25 - SEP 23 05:03	PieRie
TEN	Teide Obs./Ten	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5			+ + + + + +	SEP 23 04:36 - SEP 23 05:56	PnnRne
KAV	Kavalur Observ	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8	+ + + + + +	+		SEP 23 01:08 - SEP 23 02:43	PinRin
ESO	European South	-29.3	289.3	+ + + + + +	+ +		SEP 23 01:05 - SEP 23 04:51	PieRin
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_2047-09-23T03_37_27.1700_PAL.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:13:27 2023




```
target                  : Saturn
target radius (km)      :  60268.00
C/A epoch               : 2047-09-23T03:41:40.250
Event type              : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code           : PAL
Location                : Palomar Mt (200")
Latitude (deg)          :  33.35622
E. Longitude (deg)      : 243.13601
Altitude (km)           :   1.706
Gaia source ID          : 4068924713406711936
2Mass ID (if available) : 17495967-2233378
ICRS Star Coord at Epoch: 17h 49m 59.66690s -22:33:38.28414s
RUWE (>1.4 is poor)     :   0.88
K magnitude             :  8.340
G magnitude             : 14.414
RP magnitude            : 12.940
BP magnitude            : 17.337
DUPflag                 : 0
Distance (au)           : 10.025
f0 (km)                 :       0.000
g0 (km)                 :       0.000
skyplane vel. (km/s)    :  10.49
Sun-Target sep (deg)    :   88.29
Sun-Moon sep (deg)      :   42.35
B (ring opening deg)    :   26.91
PA of pole (deg)        :    5.32
Pole direction: RA (deg):  40.60000
Dec (deg):  83.50000
C/A sky separation (")  :   7.058
C/A sky separation (km) :  51318.8
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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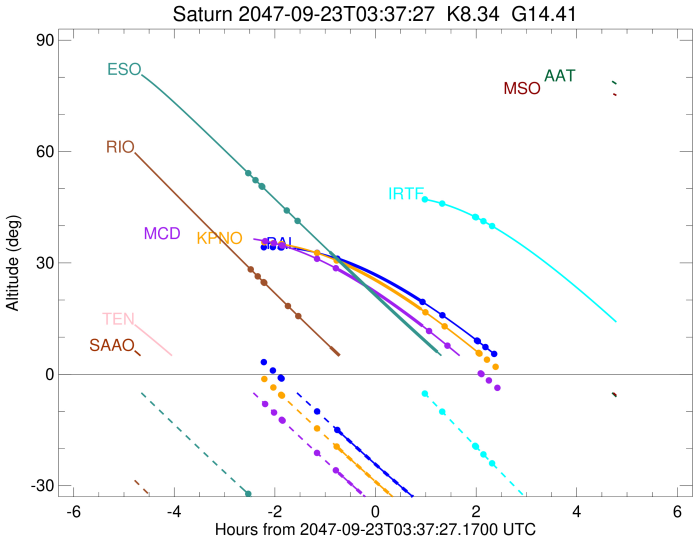
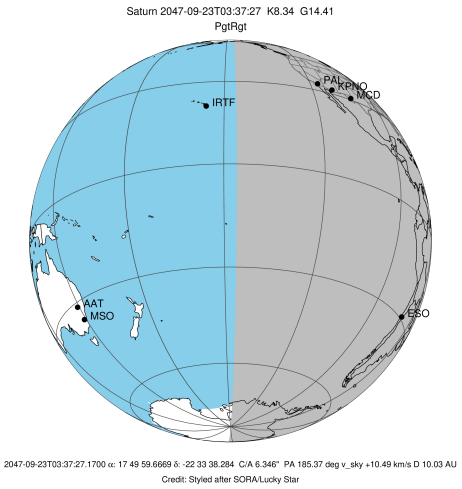


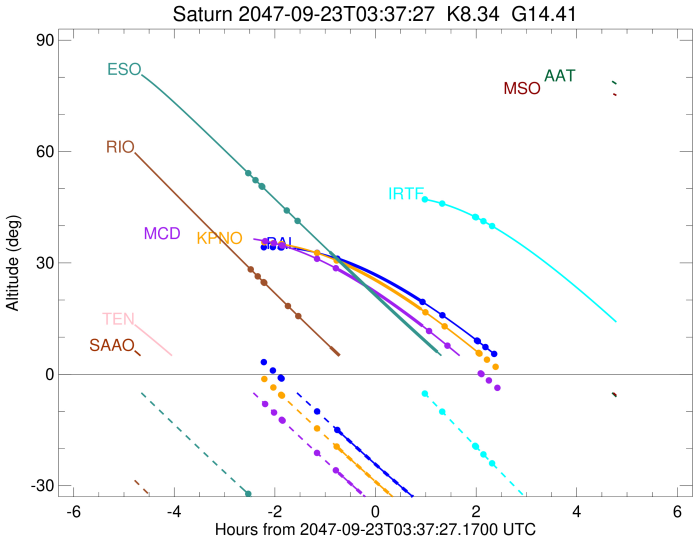
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-09-23T01:24:19.800		34.21	3.26x	140461.00	-5.84		
A (OER)	I	2047-09-23T01:35:07.394		34.24	1.00x	136774.40	-5.54		
Encke (OEG)	I	2047-09-23T01:44:28.856		34.18	-0.96x	133744.89	-5.25		
Encke (IEG)	I	2047-09-23T01:45:30.287		34.17	-1.17x	133423.31	-5.22		
A (IER)	I	2047-09-23T02:27:52.214		32.72	-10.02	122050.38	-3.66		
B (OER)	I	2047-09-23T02:51:38.211		31.15	-14.95	117571.16	-2.60		
Saturn	I	2047-09-23T02:52:20.034		31.10	-15.09	59393.95		50.49	55.81
Saturn	E	2047-09-23T04:30:44.156		19.90	-34.63	59401.30		50.19	55.53
B (OER)	E	2047-09-23T04:34:09.569		19.40	-35.26	117571.16	2.64		
A (IER)	E	2047-09-23T04:57:30.861		15.85	-39.50	122050.38	3.74		
Encke (IEG)	E	2047-09-23T05:38:47.842		9.03	-46.34	133423.31	5.38		
Encke (OEG)	E	2047-09-23T05:39:47.386		8.86	-46.50	133744.89	5.42		
A (OER)	E	2047-09-23T05:48:50.942		7.28	-47.84	136774.40	5.73		
F ring	E	2047-09-23T05:59:16.419		5.43	-49.31	140461.00	6.06		

Saturn_2047-09-23T03_37_27.1700_KPNO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:15:14 2023

target : Saturn
target radius (km) : 60268.00
C/A epoch : 2047-09-23T03:42:33.440
Event type : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code : KPNO
Location : Kitt Peak Natl Obs
Latitude (deg) : 31.96333
E. Longitude (deg) : 248.40000
Altitude (km) : 2.120
Gaia source ID : 4068924713406711936
2Mass ID (if available) : 17495967-2233378
ICRS Star Coord at Epoch: 17h 49m 59.66690s -22:33:38.28414s
RUWE (>1.4 is poor) : 0.88
K magnitude : 8.340
G magnitude : 14.414
RP magnitude : 12.940
BP magnitude : 17.337
DUPflag : 0
Distance (au) : 10.025
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : 10.49
Sun-Target sep (deg) : 88.29
Sun-Moon sep (deg) : 42.38
B (ring opening deg) : 26.91
PA of pole (deg) : 5.32
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 7.035
C/A sky separation (km) : 51154.6
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

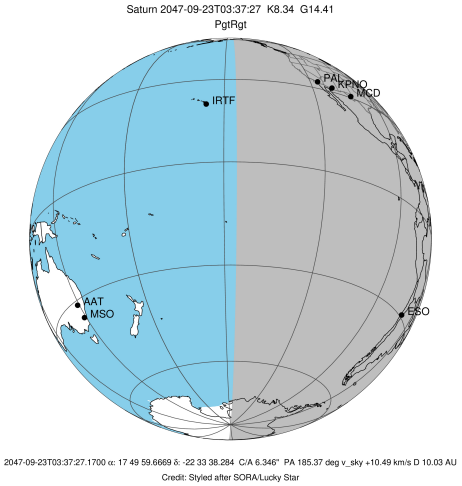




b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-09-23T01:24:56.297		35.55	-1.29x	140461.00	-5.87		
A (OER)	I	2047-09-23T01:35:40.179		35.34	-3.57x	136774.40	-5.57		
Encke (OEG)	I	2047-09-23T01:44:57.696		35.06	-5.55	133744.89	-5.29		
Encke (IEG)	I	2047-09-23T01:45:58.648		35.02	-5.76	133423.31	-5.26		
A (IER)	I	2047-09-23T02:27:47.871		32.66	-14.60	122050.38	-3.74		
B (OER)	I	2047-09-23T02:50:52.128		30.67	-19.42	117571.16	-2.72		
Saturn	I	2047-09-23T02:52:48.306		30.49	-19.82	59398.05		50.32	55.65
Saturn	E	2047-09-23T04:32:00.231		17.49	-39.42	59408.38		49.91	55.26
B (OER)	E	2047-09-23T04:37:33.261		16.60	-40.43	117571.16	2.76		
A (IER)	E	2047-09-23T05:00:09.437		12.86	-44.40	122050.38	3.83		
Encke (IEG)	E	2047-09-23T05:40:44.898		5.70	-50.71	133423.31	5.45		
Encke (OEG)	E	2047-09-23T05:41:43.708		5.52	-50.85	133744.89	5.49		
A (OER)	E	2047-09-23T05:50:40.894		3.88x	-52.05	136774.40	5.79		
F ring	E	2047-09-23T06:00:59.670		1.95x	-53.33	140461.00	6.12		

Saturn_2047-09-23T03_37_27.1700_MCD.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:16:06 2023

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target                  : Saturn
target radius (km)      :  60268.00
C/A epoch               : 2047-09-23T03:43:42.790
Event type              : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code           : MCD
Location                : McDonald Obs. 2.7m
Latitude (deg)          :  30.67158
E. Longitude (deg)      : 255.97844
Altitude (km)           :   2.075
Gaia source ID          : 4068924713406711936
2Mass ID (if available) : 17495967-2233378
ICRS Star Coord at Epoch: 17h 49m 59.66690s -22:33:38.28414s
RUWE (>1.4 is poor)     :   0.88
K magnitude             :  8.340
G magnitude             : 14.414
RP magnitude            : 12.940
BP magnitude            : 17.337
DUPflag                 : 0
Distance (au)           : 10.025
f0 (km)                 :       0.000
g0 (km)                 :       0.000
skyplane vel. (km/s)    :  10.49
Sun-Target sep (deg)    :   88.29
Sun-Moon sep (deg)      :   42.41
B (ring opening deg)    :   26.91
PA of pole (deg)        :    5.32
Pole direction: RA (deg):  40.60000
Dec (deg):  83.50000
C/A sky separation (")  :   7.004
C/A sky separation (km) :  50927.3
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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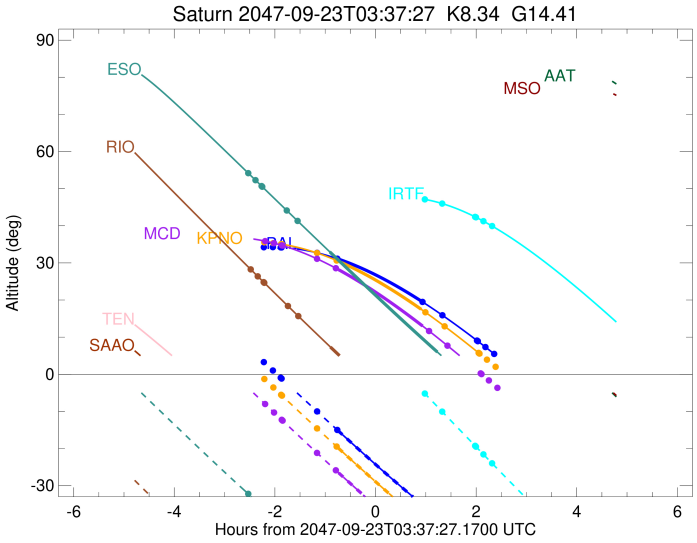
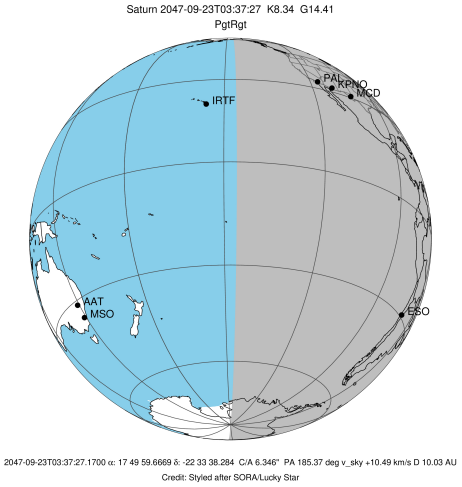


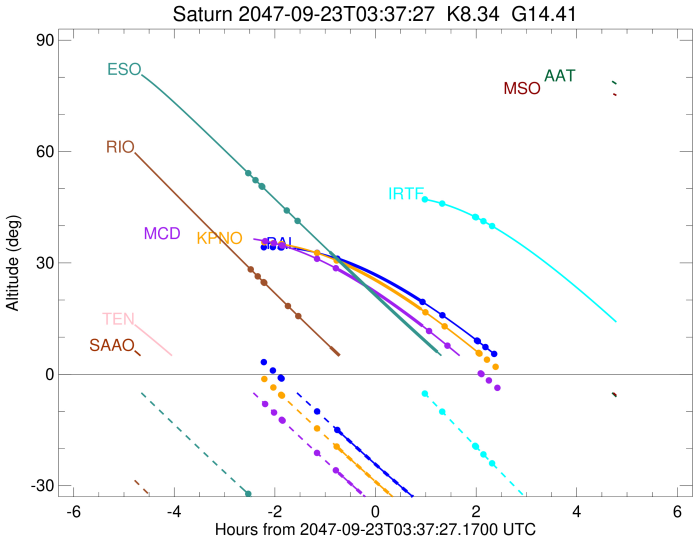
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-09-23T01:25:53.082		35.87	-8.03	140461.00	-5.92		
A (OER)	I	2047-09-23T01:36:31.114		35.30	-10.32	136774.40	-5.63		
Encke (OEG)	I	2047-09-23T01:45:42.590		34.73	-12.28	133744.89	-5.35		
Encke (IEG)	I	2047-09-23T01:46:42.819		34.66	-12.50	133423.31	-5.32		
A (IER)	I	2047-09-23T02:27:45.676		31.10	-21.20	122050.38	-3.84		
B (OER)	I	2047-09-23T02:49:56.156		28.60	-25.82	117571.16	-2.87		
Saturn	I	2047-09-23T02:53:26.950		28.17	-26.55	59403.69		50.10	55.43
Saturn	E	2047-09-23T04:33:37.597		13.00	-45.81	59418.08		49.51	54.89
B (OER)	E	2047-09-23T04:41:55.044		11.55	-47.22	117571.16	2.93		
A (IER)	E	2047-09-23T05:03:33.288		7.65	-50.65	122050.38	3.95		
Encke (IEG)	E	2047-09-23T05:43:11.470		0.18x	-55.84	133423.31	5.55		
Encke (OEG)	E	2047-09-23T05:44:09.239		-0.01x	-55.94	133744.89	5.58		
A (OER)	E	2047-09-23T05:52:57.372		-1.72x	-56.83	136774.40	5.89		
F ring	E	2047-09-23T06:03:06.572		-3.71x	-57.71	140461.00	6.21		

Saturn_2047-09-23T03_37_27.1700_IRTF.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:17:51 2023

target : Saturn
target radius (km) : 60268.00
C/A epoch : 2047-09-23T03:35:02.500
Event type : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code : IRTF
Location : Mauna Kea/IRTF
Latitude (deg) : 19.82622
E. Longitude (deg) : 204.52800
Altitude (km) : 4.168
Gaia source ID : 4068924713406711936
2Mass ID (if available) : 17495967-2233378
ICRS Star Coord at Epoch: 17h 49m 59.66690s -22:33:38.28414s
RUWE (>1.4 is poor) : 0.88
K magnitude : 8.340
G magnitude : 14.414
RP magnitude : 12.940
BP magnitude : 17.337
DUPflag : 0
Distance (au) : 10.025
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : 10.49
Sun-Target sep (deg) : 88.29
Sun-Moon sep (deg) : 42.12
B (ring opening deg) : 26.91
PA of pole (deg) : 5.32
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 6.920
C/A sky separation (km) : 50313.4
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	2047-09-23T01:09:03.209		29.33	42.92x	140461.00	-6.13		
A (OER)	I	2047-09-23T01:19:19.637		31.11	40.62x	136774.40	-5.83		
Encke (OEG)	I	2047-09-23T01:28:11.609		32.59	38.63x	133744.89	-5.56		
Encke (IEG)	I	2047-09-23T01:29:09.644		32.75	38.41x	133423.31	-5.53		
A (IER)	I	2047-09-23T02:08:19.131		38.72	29.46x	122050.38	-4.10		
B (OER)	I	2047-09-23T02:28:41.893		41.37	24.75x	117571.16	-3.21		
Saturn	I	2047-09-23T02:42:27.743		42.94	21.54x	59440.02		48.63	54.05
Saturn	E	2047-09-23T04:27:34.537		47.42	-3.14x	59424.25		49.27	54.65
B (OER)	E	2047-09-23T04:36:49.595		47.09	-5.32	117571.16	3.21		
A (IER)	E	2047-09-23T04:57:16.119		45.96	-10.13	122050.38	4.08		
Encke (IEG)	E	2047-09-23T05:36:34.591		42.36	-19.34	133423.31	5.50		
Encke (OEG)	E	2047-09-23T05:37:32.873		42.25	-19.57	133744.89	5.53		
A (OER)	E	2047-09-23T05:46:27.165		41.20	-21.65	136774.40	5.80		
F ring	E	2047-09-23T05:56:46.385		39.89	-24.05	140461.00	6.10		

Saturn_2047-09-23T03_37_27.1700_RIO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:19:36 2023

```
target                  : Saturn
target radius (km)      :  60268.00
C/A epoch               : 2047-09-23T03:47:50.470
Event type              : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
Observer code           : RIO
Location                : Rio de Janeiro
Latitude (deg)          : -22.89506
E. Longitude (deg)      : 316.77708
Altitude (km)           :   0.033
Gaia source ID          : 4068924713406711936
2Mass ID (if available) : 17495967-2233378
ICRS Star Coord at Epoch: 17h 49m 59.66690s -22:33:38.28414s
RUWE (>1.4 is poor)     :   0.88
K magnitude             :  8.340
G magnitude             : 14.414
RP magnitude            : 12.940
BP magnitude            : 17.337
DUPflag                 : 0
Distance (au)           : 10.026
f0 (km)                 :       0.000
g0 (km)                 :       0.000
skyplane vel. (km/s)    :  10.49
Sun-Target sep (deg)    :   88.29
Sun-Moon sep (deg)      :   42.23
B (ring opening deg)    :   26.91
PA of pole (deg)        :    5.32
Pole direction: RA (deg):  40.60000
Dec (deg):  83.50000
C/A sky separation (")  :   6.009
C/A sky separation (km) :  43692.3
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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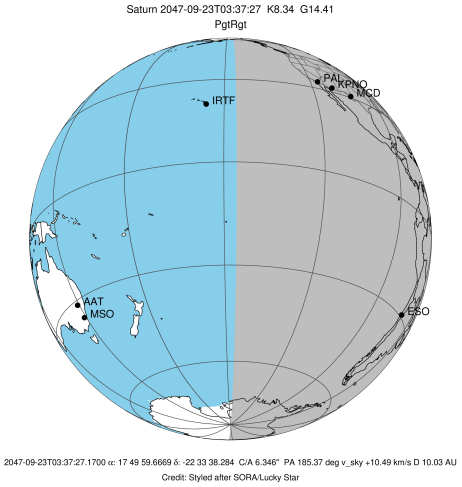
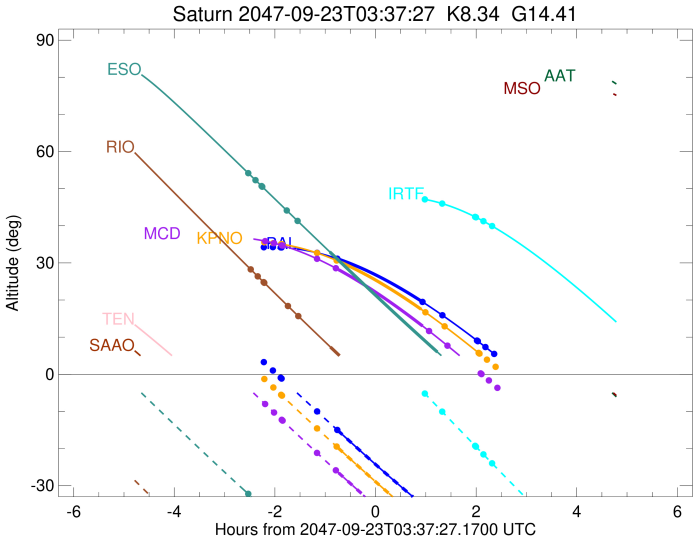
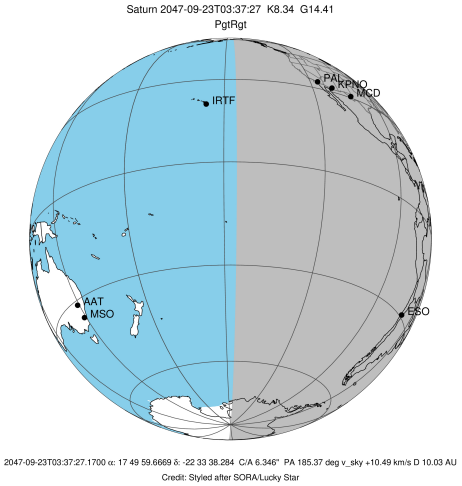




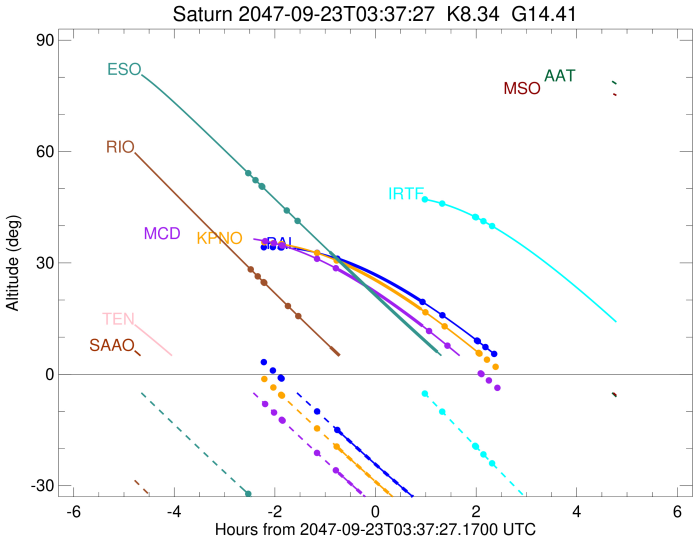
b: ring blocked by planet x: target alt < 5.0 deg or sun > -5.0 deg

Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
F ring	I	2047-09-23T01:08:42.780		28.24	-57.30	140461.00	-7.42		
A (OER)	I	2047-09-23T01:17:05.174		26.36	-58.73	136774.40	-7.25		
Encke (OEG)	I	2047-09-23T01:24:07.390		24.79	-59.87	133744.89	-7.10		
Encke (IEG)	I	2047-09-23T01:24:52.759		24.63	-59.99	133423.31	-7.08		
A (IER)	I	2047-09-23T01:53:05.958		18.37	-63.94	122050.38	-6.32		
B (OER)	I	2047-09-23T02:05:18.356		15.68	-65.25	117571.16	-5.91		
Saturn	I	2047-09-23T02:43:41.025		7.34	-67.23	59620.14		41.48	47.10
Saturn	E	2047-09-23T04:51:13.662		-18.65x	-51.82	59653.85		40.14	45.75
B (OER)	E	2047-09-23T05:35:48.784		-26.66x	-42.69	117571.16	6.20		
A (IER)	E	2047-09-23T05:47:24.831		-28.61x	-40.21	122050.38	6.66		
Encke (IEG)	E	2047-09-23T06:14:00.842		-32.78x	-34.40	133423.31	7.55		
Encke (OEG)	E	2047-09-23T06:14:43.362		-32.88x	-34.24	133744.89	7.57		
A (OER)	E	2047-09-23T06:21:18.466		-33.85x	-32.78	136774.40	7.76		
F ring	E	2047-09-23T06:29:07.219		-34.95x	-31.04	140461.00	7.97		

Saturn_2047-09-23T03_37_27.1700_ESO.txt
Occultation predictions computed by rfrench@wellesley.edu Sun Jun 11 11:20:29 2023



target : Saturn
target radius (km) : 60268.00
C/A epoch : 2047-09-23T03:47:28.220
Event type : PgtRgt
: Saturn occs: geocentric, topocentric
: Ring occs: geocentric, topocentric
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 : 4068924713406711936
2Mass ID (if available) : 17495967-2233378
ICRS Star Coord at Epoch: 17h 49m 59.66690s -22:33:38.28414s
RUWE (>1.4 is poor) : 0.88
K magnitude : 8.340
G magnitude : 14.414
RP magnitude : 12.940
BP magnitude : 17.337
DUPflag : 0
Distance (au) : 10.026
f0 (km) : 0.000
g0 (km) : 0.000
skyplane vel. (km/s) : 10.49
Sun-Target sep (deg) : 88.29
Sun-Moon sep (deg) : 42.50
B (ring opening deg) : 26.91
PA of pole (deg) : 5.32
Pole direction: RA (deg): 40.60000
Dec (deg): 83.50000
C/A sky separation (") : 6.071
C/A sky separation (km) : 44146.3
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	2047-09-23T01:05:47.440		54.16	-32.23	140461.00	-7.21		
A (OER)	I	2047-09-23T01:14:25.090		52.27	-33.99	136774.40	-7.03		
Encke (OEG)	I	2047-09-23T01:21:40.780		50.68	-35.45	133744.89	-6.87		
Encke (IEG)	I	2047-09-23T01:22:27.635		50.51	-35.61	133423.31	-6.85		
A (IER)	I	2047-09-23T01:51:42.578		44.11	-41.33	122050.38	-6.07		
B (OER)	I	2047-09-23T02:04:26.584		41.33	-43.72	117571.16	-5.65		
Saturn	I	2047-09-23T02:42:50.985		32.99	-50.40	59610.17		41.87	47.49
Saturn	E	2047-09-23T04:51:18.634		5.97	-60.61	59639.75		40.70	46.32
B (OER)	E	2047-09-23T05:35:17.435		-2.75x	-57.52	117571.16	5.93		
A (IER)	E	2047-09-23T05:47:23.384		-5.07x	-56.14	122050.38	6.40		
Encke (IEG)	E	2047-09-23T06:14:57.017		-10.23x	-52.37	133423.31	7.32		
Encke (OEG)	E	2047-09-23T06:15:40.912		-10.37x	-52.26	133744.89	7.34		
A (OER)	E	2047-09-23T06:22:28.461		-11.60x	-51.21	136774.40	7.53		
F ring	E	2047-09-23T06:30:31.259		-13.05x	-49.91	140461.00	7.74		