

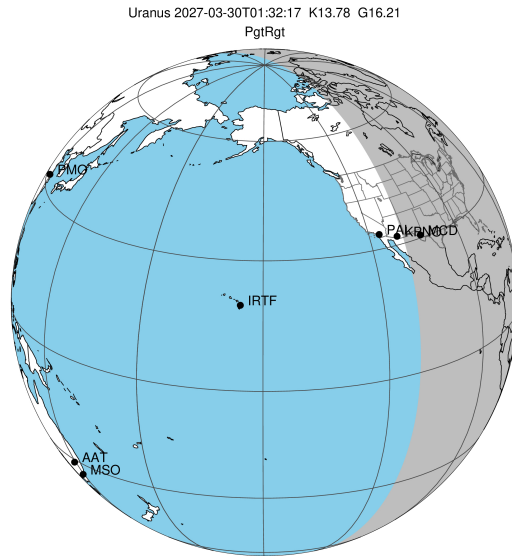
target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-03-30T01:32:17.680  
 Event type : PgtRgt  
 : Uranus occs: geocentric, topocentric  
 : Ring occs: geocentric, topocentric  
 Gaia source ID : 50656154256949632  
 2Mass ID (if available) : 04010925+2030380

Uranus 2027-03-30T01:32:17 K13.78 G16.21 PgtRgt

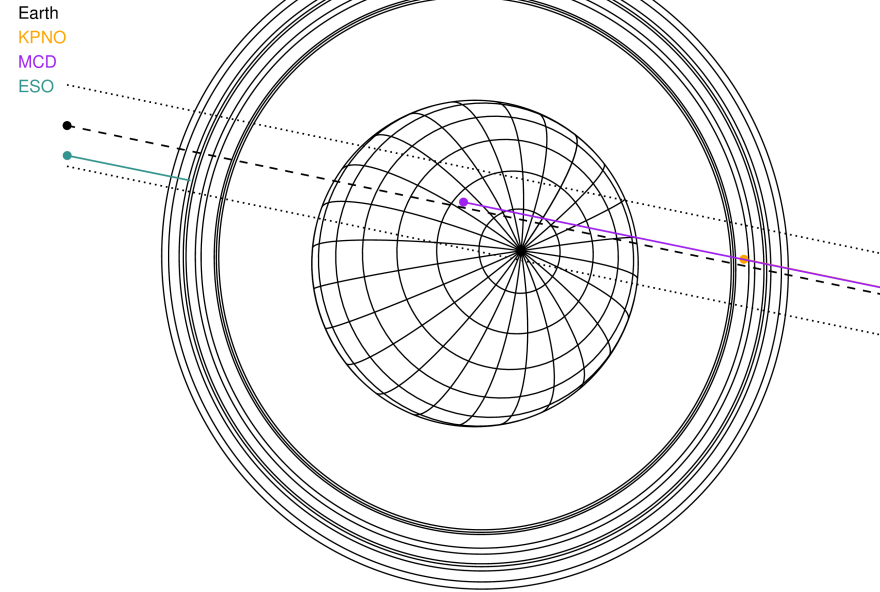
ICRS Star Coord at Epoch: 04h 01m 09.27745s +20:30:37.79970s

RUWE (>1.4 is poor) : 1.11  
 K magnitude : 13.780  
 G magnitude : 16.212  
 RP magnitude : 15.426  
 BP magnitude : 16.871  
 DUPflag : 0  
 Distance (au) : 19.984  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 24.00  
 Sun-Target sep (deg) : 53.59  
 Sun-Moon sep (deg) : 143.17  
 B (ring opening deg) : 72.95  
 PA of pole (deg) : -74.53

#	a(km)	ring
1	41837.2	6
2	42235.0	5
3	42571.2	4
4	44718.5	alpha
5	45661.1	beta
6	47176.1	eta
7	47626.3	gamma
8	48300.3	delta
9	50026.7	lambda
10	51149.4	epsilon

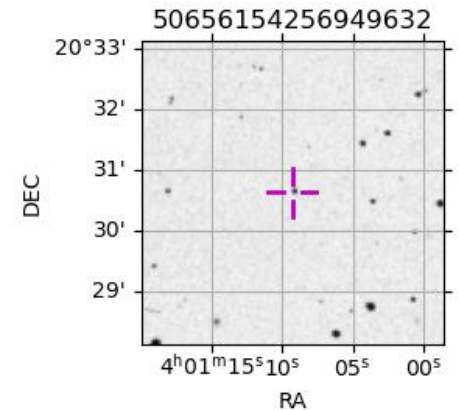


2027-03-30T01:32:17.6800 ex: 04 01 09.2774 s: +20 30 37.800 C/A 0.568° PA 168.30 deg v\_sky +24.00 km/s D 19.98 AU  
 Credit: Styled after SORA/Lucky Star



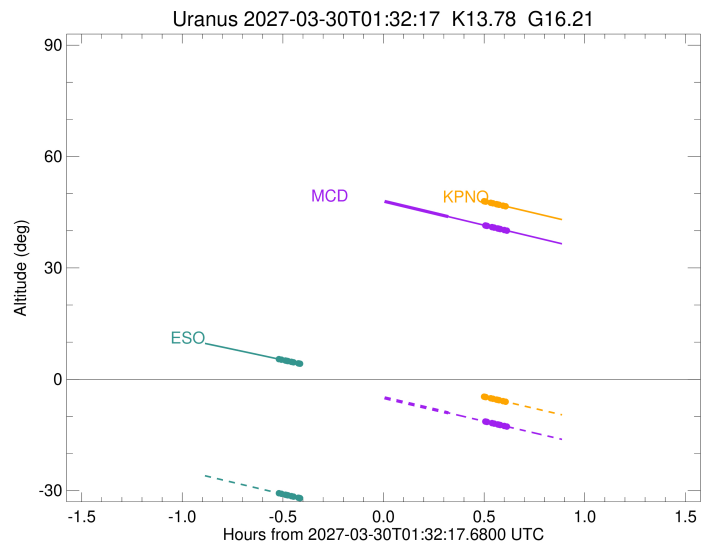
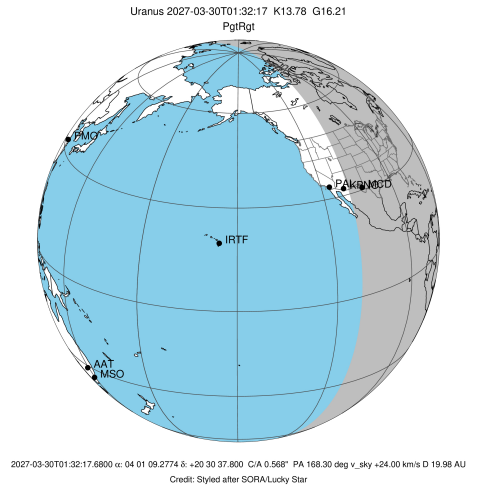
Observable events with sun below -5 deg and altitude above 5 deg unblocked by planet

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 (200")	33.4	243.1					PnnRnn
PMO	Purple Mtn Obs. Nanki	32.1	118.8					PnnRnn
KPNO	Kitt Peak Natl Obs	32.0	248.4			++++++	MAR 30 02:04 - MAR 30 02:08	PnnRne
MCD	McDonald Obs. 2.7m	30.7	256.0		+	+++++++	MAR 30 01:51 - MAR 30 02:08	PneRne
TEN	Teide Obs./Tenerife	28.3	343.5					PnnRnn
IRTF	Mauna Kea/IRTF	19.8	204.5					PnnRnn
KAV	Kavalur Observatory	12.6	78.8					PnnRnn
RIO	Rio de Janeiro	-22.9	316.8					PnnRnn
ESO	European Southern Obs	-29.3	289.3	+++			MAR 30 01:00 - MAR 30 01:03	PnnRin
AAT	Siding Spring (AAT)	-31.3	149.1					PnnRnn
SAAO	So. Afr. Astro. Obs.	-32.4	20.8					PnnRnn
MSO	Mt. Stromlo Observato	-35.3	149.0					PnnRnn



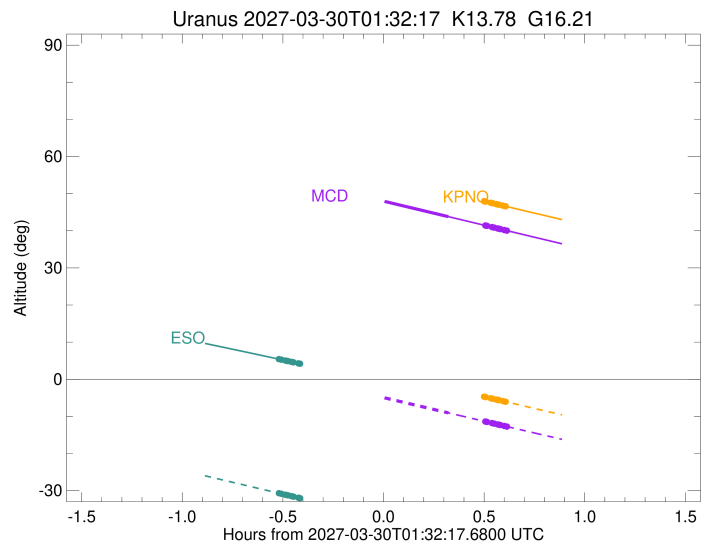
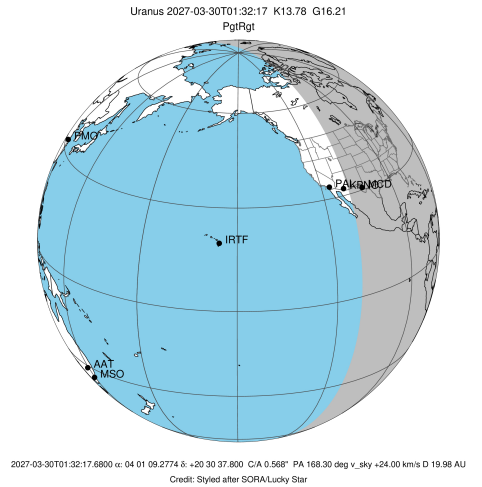
```

target                : Uranus
target radius (km)   : 25559.00
C/A epoch            : 2027-03-30T01:34:49.240
Event type          : PgtRgt
: Uranus 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      : 50656154256949632
2Mass ID (if available) : 04010925+2030380
ICRS Star Coord at Epoch: 04h 01m 09.27745s +20:30:37.79970s
RUWE (>1.4 is poor) : 1.11
K magnitude          : 13.780
G magnitude          : 16.212
RP magnitude         : 15.426
BP magnitude         : 16.871
DUPflag             : 0
Distance (au)       : 19.984
f0 (km)             : 0.000
g0 (km)             : 0.000
skyplane vel. (km/s) : 24.00
Sun-Target sep (deg) : 53.59
Sun-Moon sep (deg)  : 143.19
B (ring opening deg) : 72.95
PA of pole (deg)    : -74.53
Pole direction: RA (deg): 257.31100
Dec (deg): -15.17500
C/A sky separation (") : 0.630
C/A sky separation (km) : 9136.4
NAIF SPICE kernels  : RAJobs_U111+rgf15.spk
URKALLvl1.spk
urall1.bsp
IAU_URANUS_for_RINGFIT.tpc
vgr2.urall1.bsp
ural61.bsp
vgr2.ural61.bsp
peph.ural60.bsp
earthstns_itr93_040916.bsp
earth_720101_070426.bpc
earth_200101_990628_predict.bpc
pg3f0000r.bsp
pg490000r.bsp
naif0012.tls
earth_flat_IAU.spk
    
```



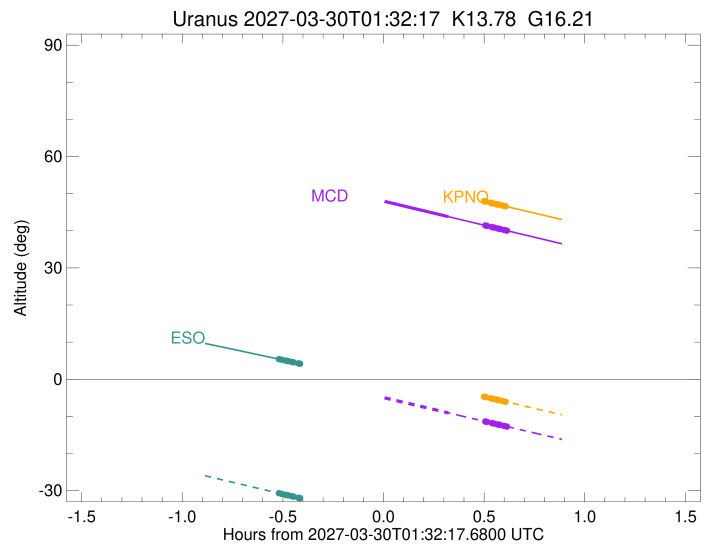
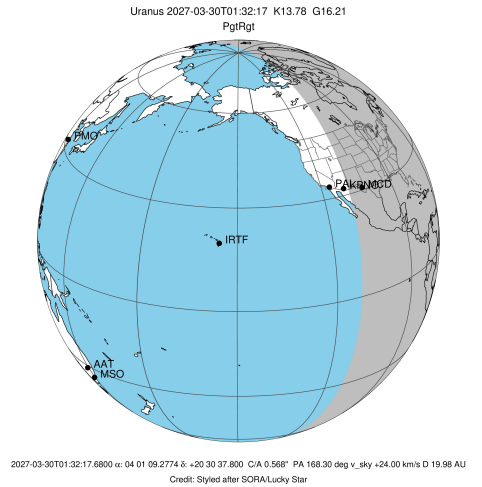
Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-03-30T01:00:13.279	60.99	8.45x	51433.28	-24.13		
lambda	I	2027-03-30T01:01:11.660	60.79	8.25x	50026.71	-24.08		
delta	I	2027-03-30T01:02:23.392	60.54	7.99x	48300.35	-24.05		
gamma	I	2027-03-30T01:02:51.579	60.45	7.89x	47622.59	-24.04		
eta	I	2027-03-30T01:03:10.155	60.38	7.83x	47176.12	-24.03		
beta	I	2027-03-30T01:04:12.984	60.17	7.60x	45667.07	-24.00		
alpha	I	2027-03-30T01:04:51.247	60.04	7.47x	44750.34	-23.98		
4	I	2027-03-30T01:06:23.001	59.72	7.14x	42548.19	-23.91		
5	I	2027-03-30T01:06:35.098	59.68	7.10x	42265.97	-23.91		
6	I	2027-03-30T01:06:51.397	59.62	7.04x	41879.38	-23.91		
Uranus	I	2027-03-30T01:18:11.864	57.27	4.63x	25317.82		-11.25	-11.77
Uranus	E	2027-03-30T01:51:12.662	50.31	-2.36x	25029.00		16.96	17.71
6	E	2027-03-30T02:02:14.109	47.97	-4.69x	41801.58	23.98		
5	E	2027-03-30T02:02:29.448	47.92	-4.74x	42175.39	23.98		
4	E	2027-03-30T02:02:46.577	47.86	-4.80x	42575.59	23.99		
alpha	E	2027-03-30T02:04:14.579	47.54	-5.11	44694.10	24.06		
beta	E	2027-03-30T02:04:54.983	47.40	-5.25	45663.26	24.08		
eta	E	2027-03-30T02:05:57.743	47.18	-5.47	47176.12	24.11		
gamma	E	2027-03-30T02:06:16.491	47.11	-5.54	47628.22	24.12		
delta	E	2027-03-30T02:06:44.348	47.01	-5.64	48300.35	24.13		
lambda	E	2027-03-30T02:07:55.830	46.76	-5.89	50026.71	24.17		
epsilon	E	2027-03-30T02:08:35.339	46.62	-6.03	50981.89	24.22		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-03-30T01:35:13.270  
 Event type : PgtRgt  
 : Uranus 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 : 50656154256949632  
 2Mass ID (if available) : 04010925+2030380  
 ICRS Star Coord at Epoch: 04h 01m 09.27745s +20:30:37.79970s  
 RUWE (>1.4 is poor) : 1.11  
 K magnitude : 13.780  
 G magnitude : 16.212  
 RP magnitude : 15.426  
 BP magnitude : 16.871  
 DUPflag : 0  
 Distance (au) : 19.984  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 24.00  
 Sun-Target sep (deg) : 53.59  
 Sun-Moon sep (deg) : 143.09  
 B (ring opening deg) : 72.95  
 PA of pole (deg) : -74.53  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.625  
 C/A sky separation (km) : 9057.2  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



Ring	I/E	UTC	b? alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-03-30T01:00:39.144	54.79	1.85x	51432.56	-24.16		
lambda	I	2027-03-30T01:01:37.423	54.58	1.64x	50026.71	-24.11		
delta	I	2027-03-30T01:02:49.064	54.32	1.39x	48300.35	-24.08		
gamma	I	2027-03-30T01:03:17.214	54.22	1.29x	47622.60	-24.07		
eta	I	2027-03-30T01:03:35.767	54.16	1.22x	47176.12	-24.06		
beta	I	2027-03-30T01:04:38.514	53.93	0.99x	45667.02	-24.03		
alpha	I	2027-03-30T01:05:16.725	53.80	0.86x	44750.31	-24.01		
4	I	2027-03-30T01:06:48.346	53.47	0.53x	42548.30	-23.95		
5	I	2027-03-30T01:07:00.423	53.43	0.49x	42266.18	-23.94		
6	I	2027-03-30T01:07:16.706	53.37	0.43x	41879.36	-23.94		
Uranus	I	2027-03-30T01:18:35.842	50.93	-2.00x	25315.57		-11.30	-11.83
Uranus	E	2027-03-30T01:51:36.771	43.81	-9.05	25029.26		16.96	17.71
6	E	2027-03-30T02:02:36.817	41.44	-11.38	41801.55	24.02		
5	E	2027-03-30T02:02:52.132	41.38	-11.43	42175.45	24.02		
4	E	2027-03-30T02:03:09.228	41.32	-11.49	42575.64	24.03		
alpha	E	2027-03-30T02:04:37.064	41.00	-11.80	44694.08	24.10		
beta	E	2027-03-30T02:05:17.394	40.86	-11.94	45663.25	24.12		
eta	E	2027-03-30T02:06:20.041	40.63	-12.16	47176.12	24.15		
gamma	E	2027-03-30T02:06:38.755	40.56	-12.23	47628.22	24.16		
delta	E	2027-03-30T02:07:06.562	40.46	-12.32	48300.35	24.18		
lambda	E	2027-03-30T02:08:17.916	40.21	-12.57	50026.71	24.21		
epsilon	E	2027-03-30T02:08:57.343	40.07	-12.71	50981.61	24.26		

target : Uranus  
 target radius (km) : 25559.00  
 C/A epoch : 2027-03-30T01:35:33.410  
 Event type : PgtRgt  
 : Uranus 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 : 50656154256949632  
 2Mass ID (if available) : 04010925+2030380  
 ICRS Star Coord at Epoch: 04h 01m 09.27745s +20:30:37.79970s  
 RUWE (>1.4 is poor) : 1.11  
 K magnitude : 13.780  
 G magnitude : 16.212  
 RP magnitude : 15.426  
 BP magnitude : 16.871  
 DUPflag : 0  
 Distance (au) : 19.985  
 f0 (km) : 0.000  
 g0 (km) : 0.000  
 skyplane vel. (km/s) : 24.00  
 Sun-Target sep (deg) : 53.59  
 Sun-Moon sep (deg) : 142.67  
 B (ring opening deg) : 72.95  
 PA of pole (deg) : -74.53  
 Pole direction: RA (deg): 257.31100  
 Dec (deg): -15.17500  
 C/A sky separation (") : 0.270  
 C/A sky separation (km) : 3907.3  
 NAIF SPICE kernels : RAJobs\_U111+rgf15.spk  
 URKALLvl.spk  
 ura111.bsp  
 IAU\_URANUS\_for\_RINGFIT.tpc  
 vgr2.ura111.bsp  
 ura161.bsp  
 vgr2.ura161.bsp  
 peph.ura160.bsp  
 earthstns\_itr93\_040916.bsp  
 earth\_720101\_070426.bpc  
 earth\_200101\_990628\_predict.bpc  
 pg3f0000r.bsp  
 pg490000r.bsp  
 naif0012.tls  
 earth\_flat\_IAU.spk



Ring	I/E	UTC	b?	alt	alt-sun	radius	r-dot	lat-geo	lat-geodetic
epsilon	I	2027-03-30T01:00:57.275		5.45	-30.66	51400.27	-24.64		
lambda	I	2027-03-30T01:01:53.044		5.27	-30.86	50026.71	-24.63		
delta	I	2027-03-30T01:03:03.148		5.04	-31.10	48300.35	-24.62		
gamma	I	2027-03-30T01:03:30.654		4.95x	-31.20	47623.05	-24.62		
eta	I	2027-03-30T01:03:48.806		4.89x	-31.27	47176.12	-24.62		
beta	I	2027-03-30T01:04:50.182		4.69x	-31.48	45664.71	-24.62		
alpha	I	2027-03-30T01:05:27.467		4.57x	-31.61	44748.65	-24.62		
4	I	2027-03-30T01:06:56.475		4.28x	-31.93	42553.43	-24.60		
5	I	2027-03-30T01:07:08.120		4.24x	-31.97	42275.37	-24.60		
6	I	2027-03-30T01:07:24.292		4.19x	-32.02	41878.27	-24.61		
Uranus	I	2027-03-30T01:18:11.034		2.06x	-34.29	25203.21		-13.75	-14.38
Uranus	E	2027-03-30T01:52:48.783		-4.92x	-41.40	25073.01		16.20	16.92
6	E	2027-03-30T02:03:23.919		-7.10x	-43.51	41798.99	24.72		
5	E	2027-03-30T02:03:39.301		-7.15x	-43.56	42182.41	24.72		
4	E	2027-03-30T02:03:55.830		-7.21x	-43.62	42581.04	24.72		
alpha	E	2027-03-30T02:05:20.987		-7.50x	-43.89	44691.55	24.74		
beta	E	2027-03-30T02:06:00.278		-7.64x	-44.02	45661.00	24.74		
eta	E	2027-03-30T02:07:01.479		-7.85x	-44.22	47176.12	24.75		
gamma	E	2027-03-30T02:07:19.766		-7.91x	-44.28	47628.74	24.75		
delta	E	2027-03-30T02:07:46.896		-8.00x	-44.37	48300.35	24.76		
lambda	E	2027-03-30T02:08:56.617		-8.24x	-44.60	50026.71	24.77		
epsilon	E	2027-03-30T02:09:33.723		-8.37x	-44.72	50945.75	24.78		