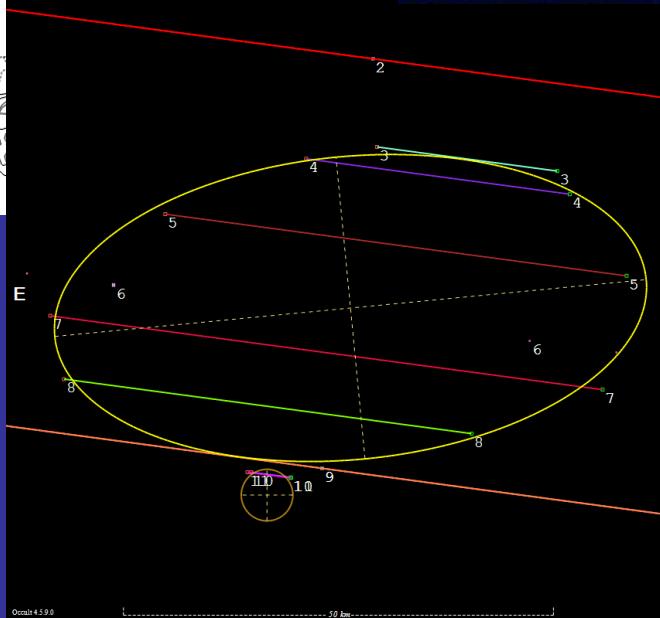
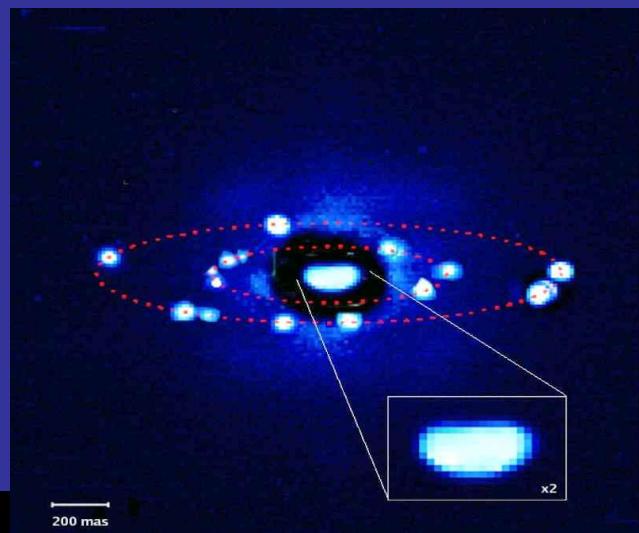
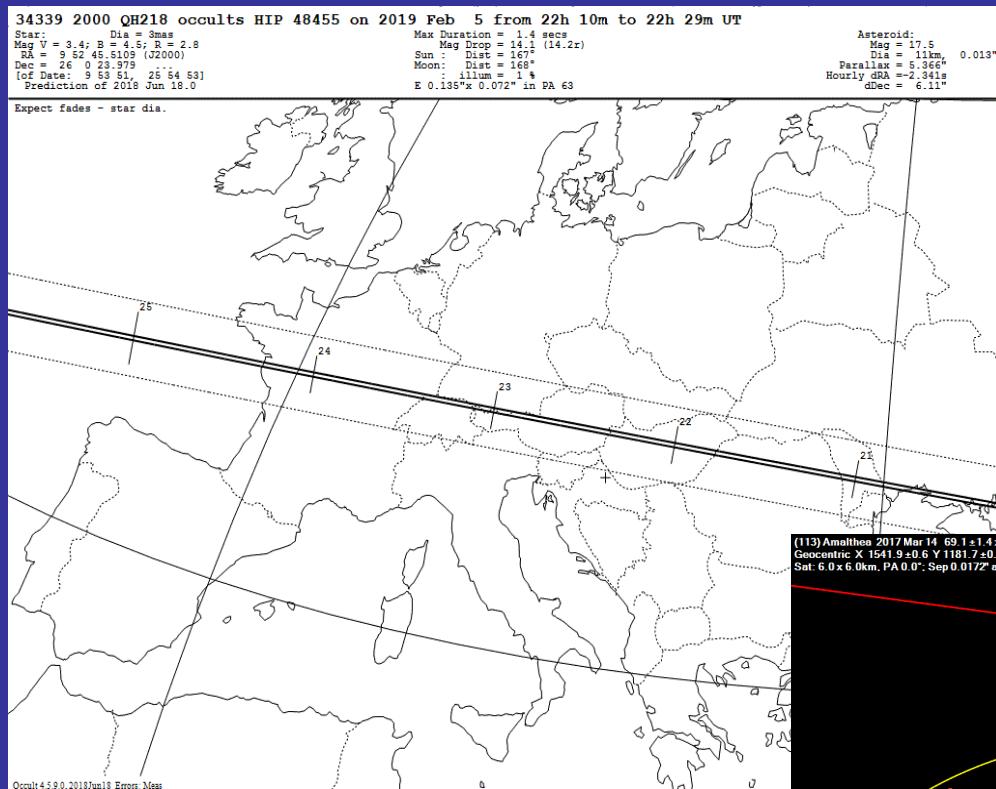


## Occultations by Asteroids - Highlights for Europe in 2019



*Oliver Klös, IOTA/ES*

# Occultations by Asteroids - Highlights for Europe in 2019

I.

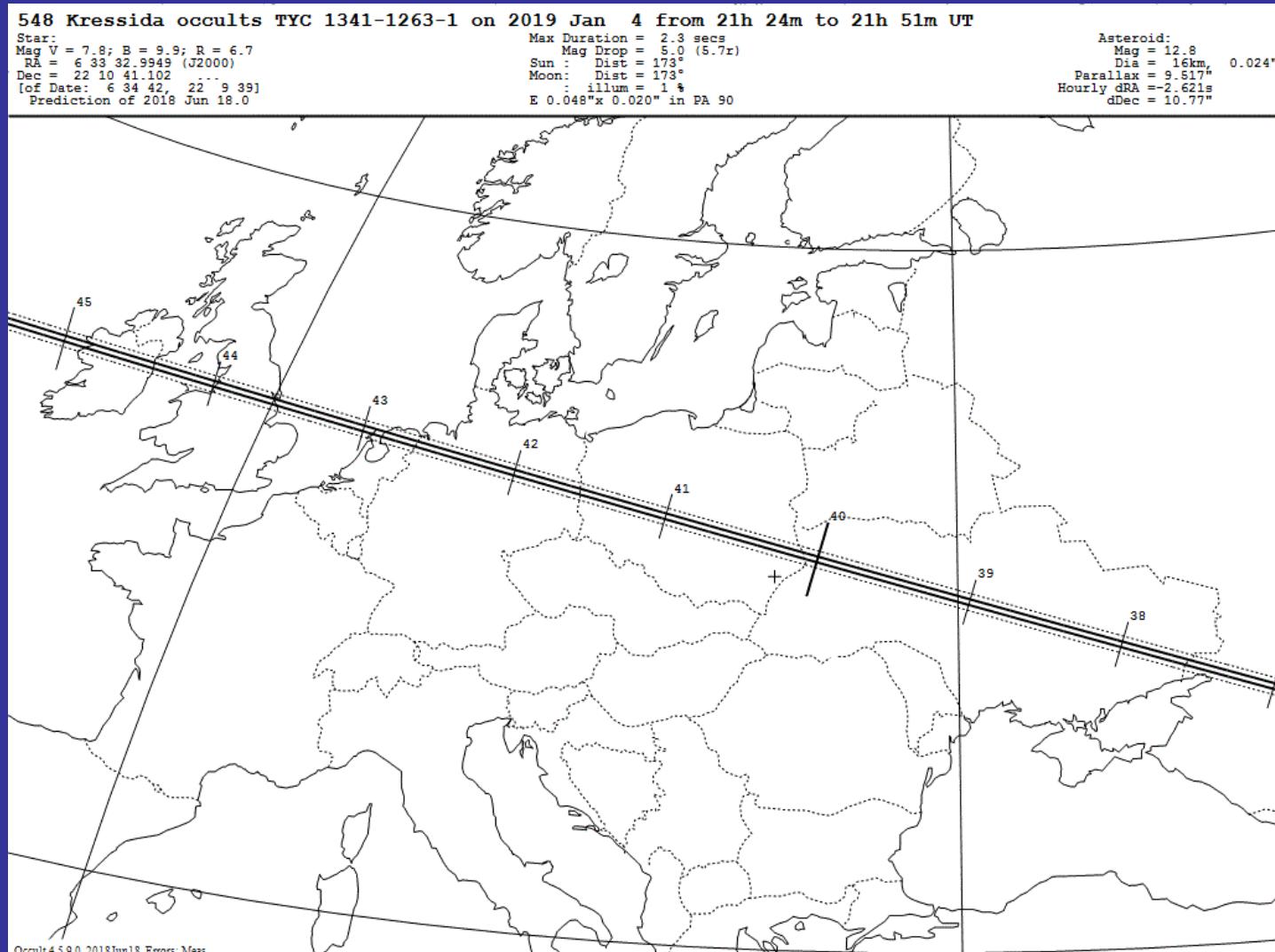
## Occultations of Bright Stars

All paths were predicted by  
Steve Preston (IOTA)  
in June 2018

# Occultations by Asteroids - Highlights for Europe in 2019

(548) **Kressida** TYC 1341-1263-1 (7m.8)

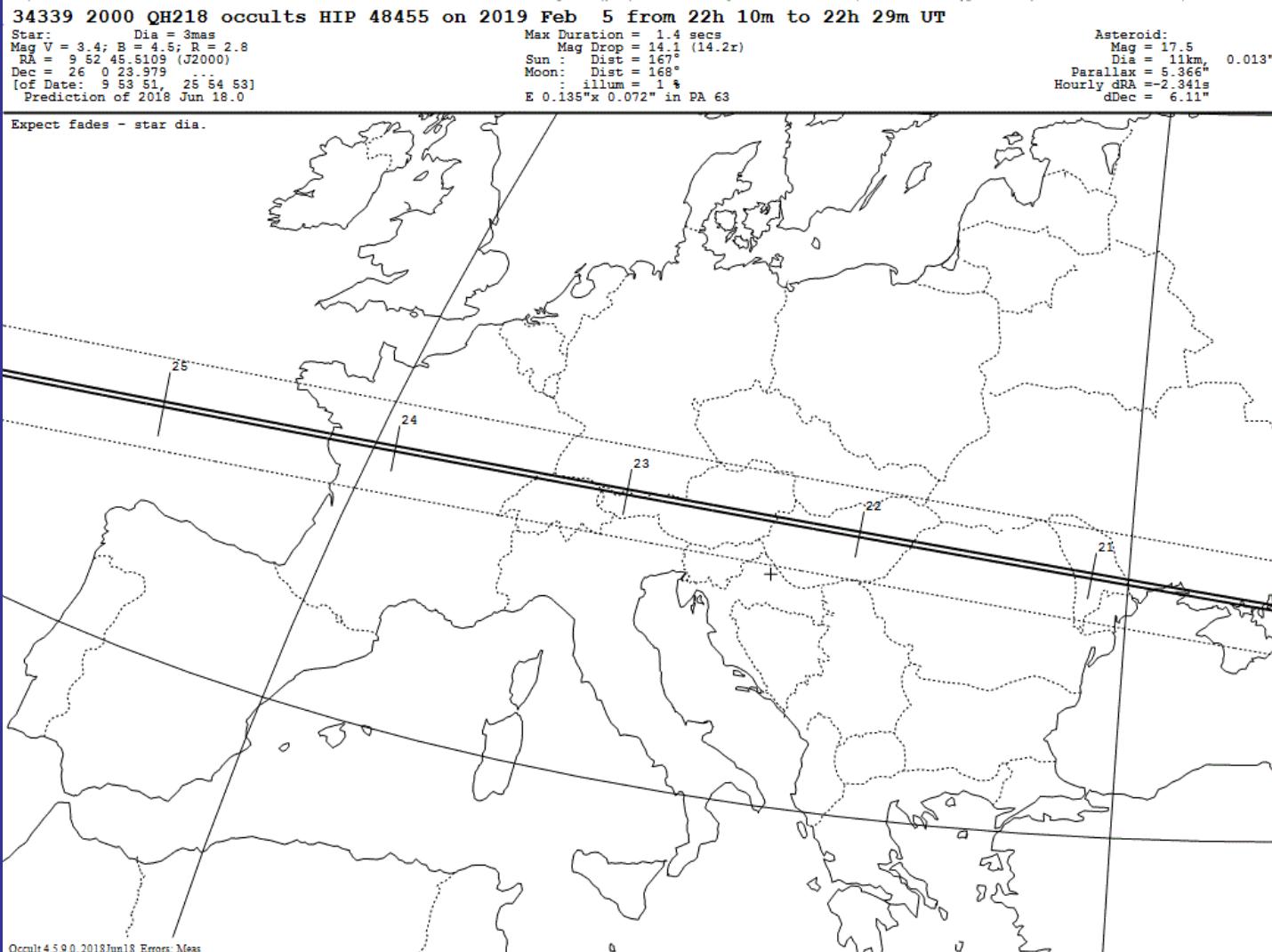
2019 Jan 04, 21:37 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

(34339) 2000 QH218 HIP 48455 (3m.4)

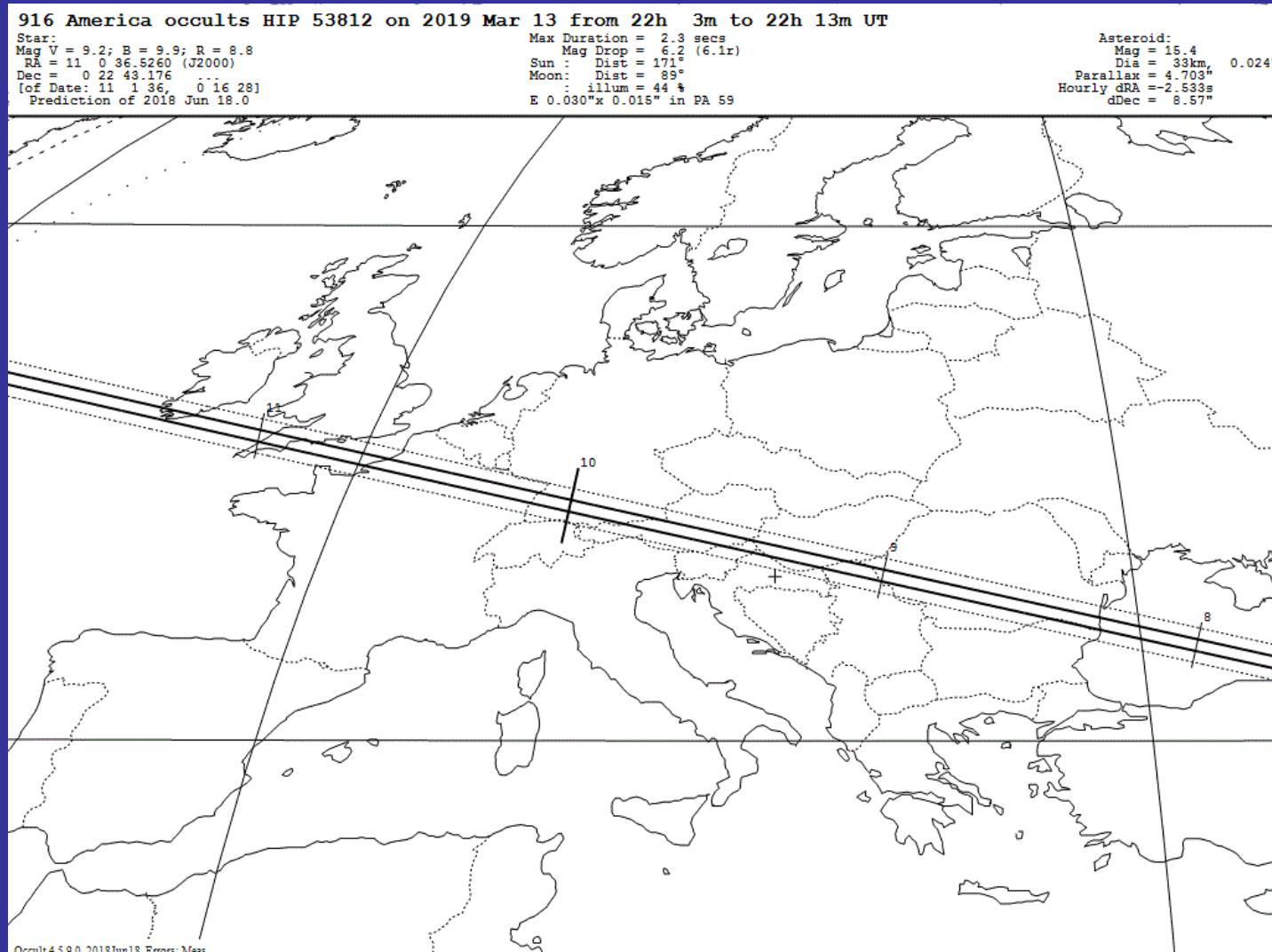
2019 Feb 05, 22:21 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

(916) America HIP 53812 (9m.2)

2019 Mar 13, 22:08 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

(826) **Henrika** HIP 66216 (7m.0)

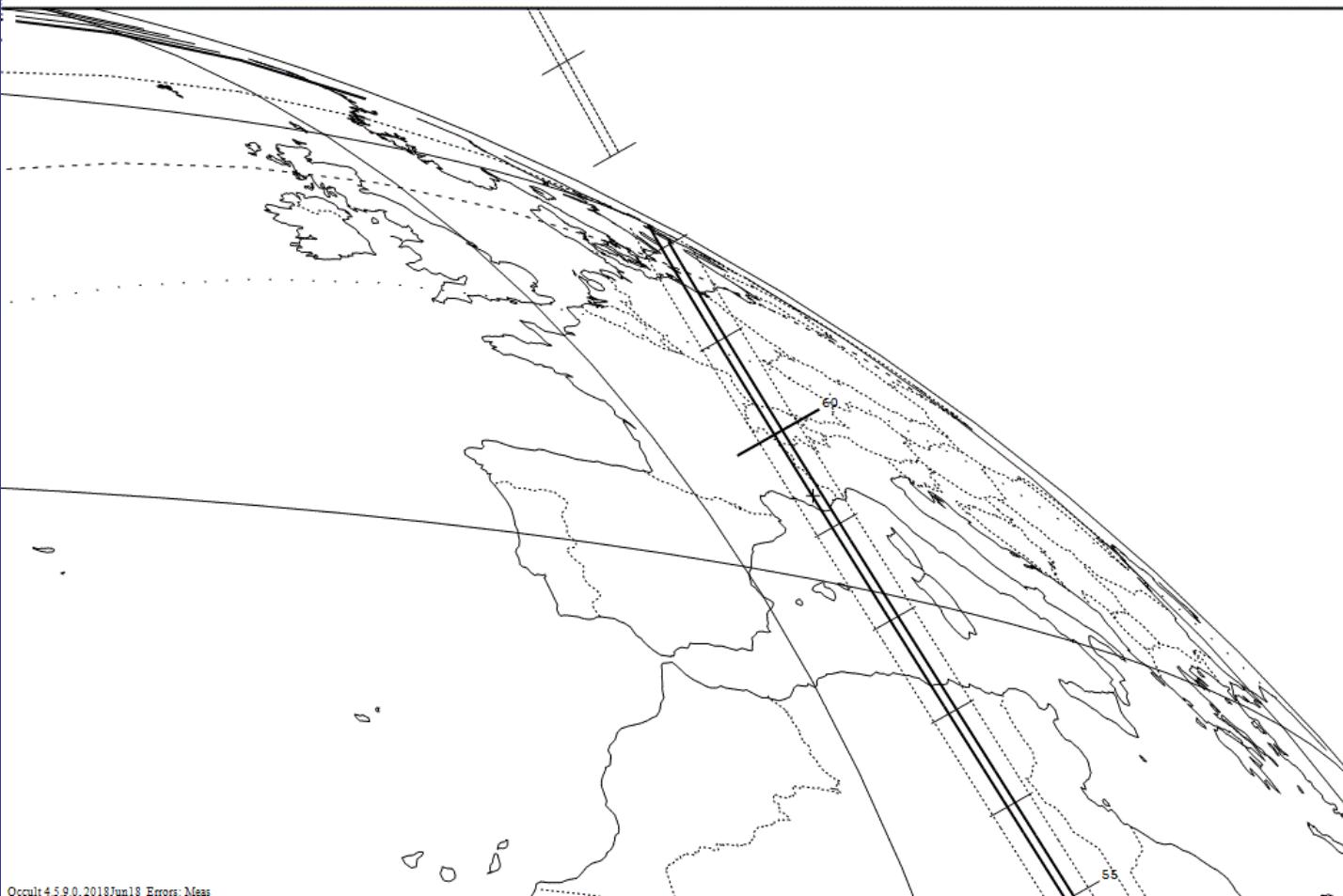
2019 May 26, 23:57 U.T.

826 Henrika occults HIP 66216 on 2019 May 26 from 23h 37m to 24h 2m UT

Star:  
Mag V = 7.0; B = 7.6; R = 6.7  
RA = 13 34 17.7495 (J2000)  
Dec = -11 32 15.591  
[of Date: 13 35 20, -11 38 10]  
Prediction of 2018 Jun 18.0

Max Duration = 5.3 secs  
Mag Drop = 8.0 (7.9r)  
Sun : Dist = 141°  
Moon: Dist = 132°  
: illum = 47 %  
E 0.046" x 0.019" in PA 76

Asteroid:  
Mag = 15.0  
Dia = 24km, 0.024"  
Parallax = 6.336"  
Hourly dRA = -0.555°  
dDec = 14.35"



# Occultations by Asteroids - Highlights for Europe in 2019

(1013) **Tombecka** HIP 2735 (8m.6)

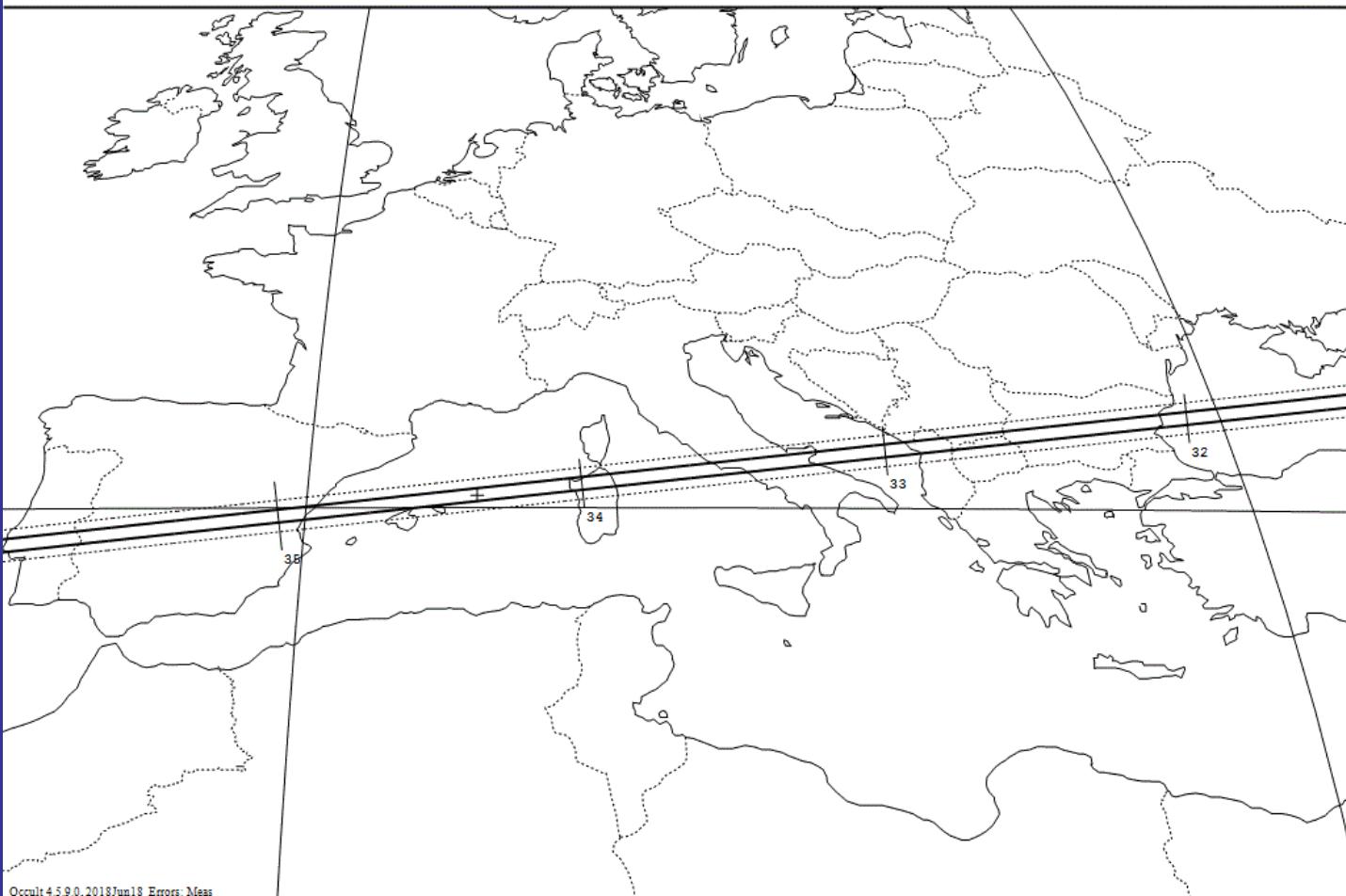
2019 Oct 15, 22:32 U.T.

1013 Tombecka occults HIP 2735 on 2019 Oct 15 from 22h 29m to 22h 41m UT

Star:  
Mag V = 8.6; B = 9.3; R = 8.2  
RA = 0 34 56.0101 (J2000)  
Dec = -1 18 37.269  
[of Date: 0 35 57, -1 12 5]  
Prediction of 2018 Jun 18.0

Max Duration = 2.6 secs  
Mag Drop = 5.8 (5.4r)  
Sun : Dist = 165°  
Moon: Dist = 38°  
. illum = 96 %  
E 0.028"x 0.015" in PA 57

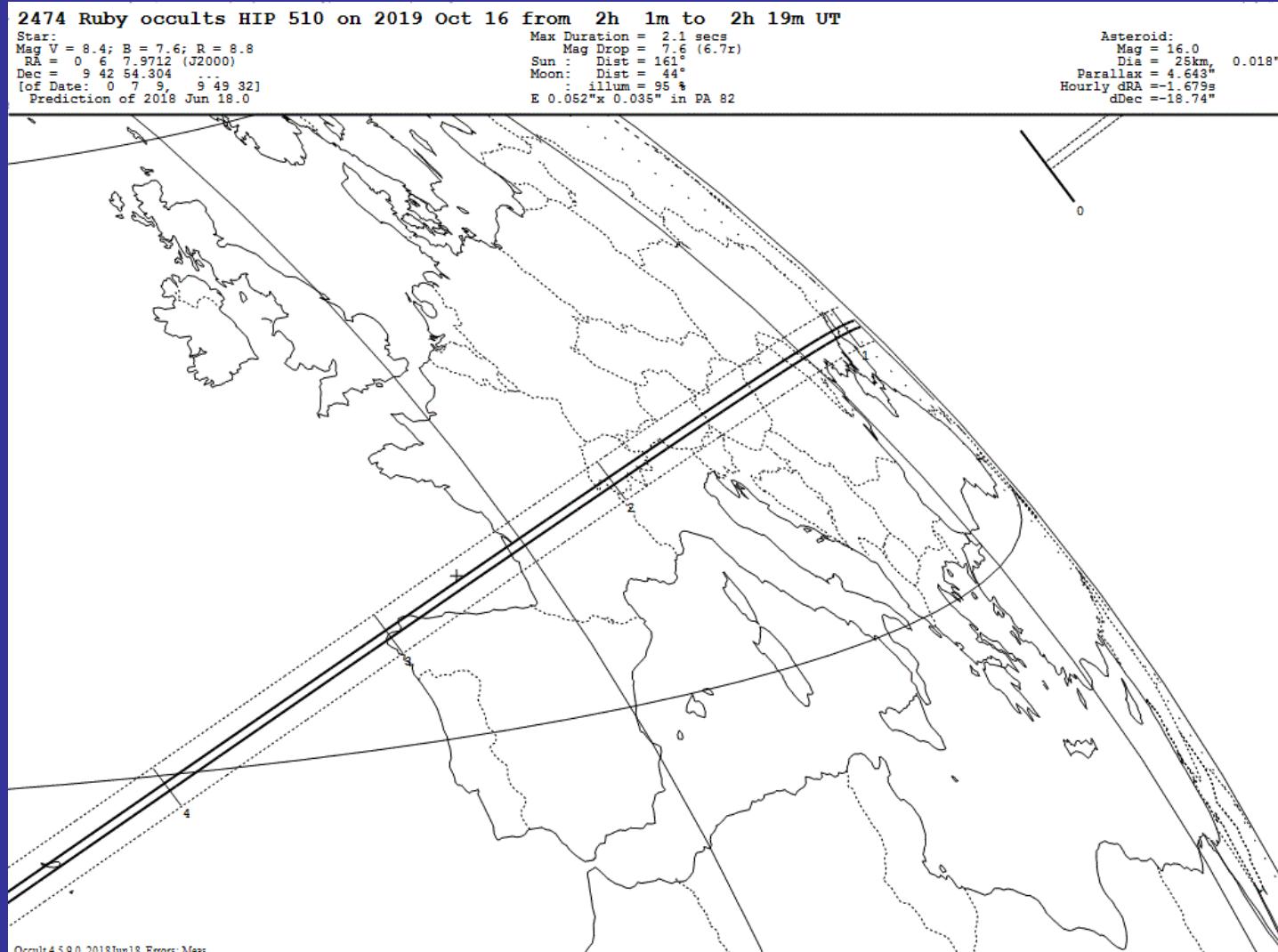
Asteroid:  
Mag = 14.1  
Dia = 34km, 0.026"  
Parallax = 4.783"  
Hourly dRA = -2.343"  
dDec = -3.87"



# Occultations by Asteroids - Highlights for Europe in 2019

(2474) **Ruby** HIP 510 (8m.4)

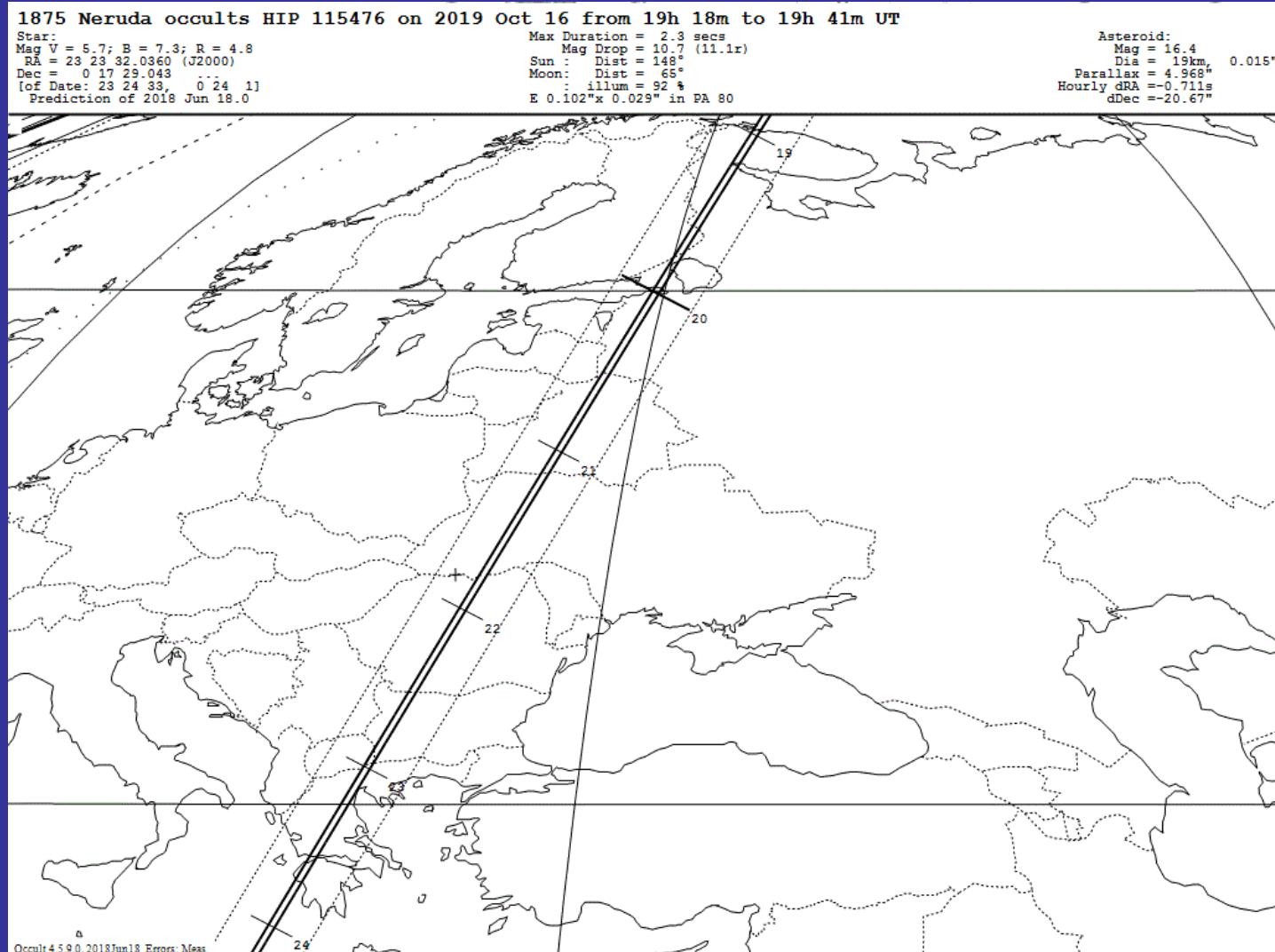
2019 Oct 16, 02:00 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

(1875) **Neruda** HIP 115476 (5m.7)

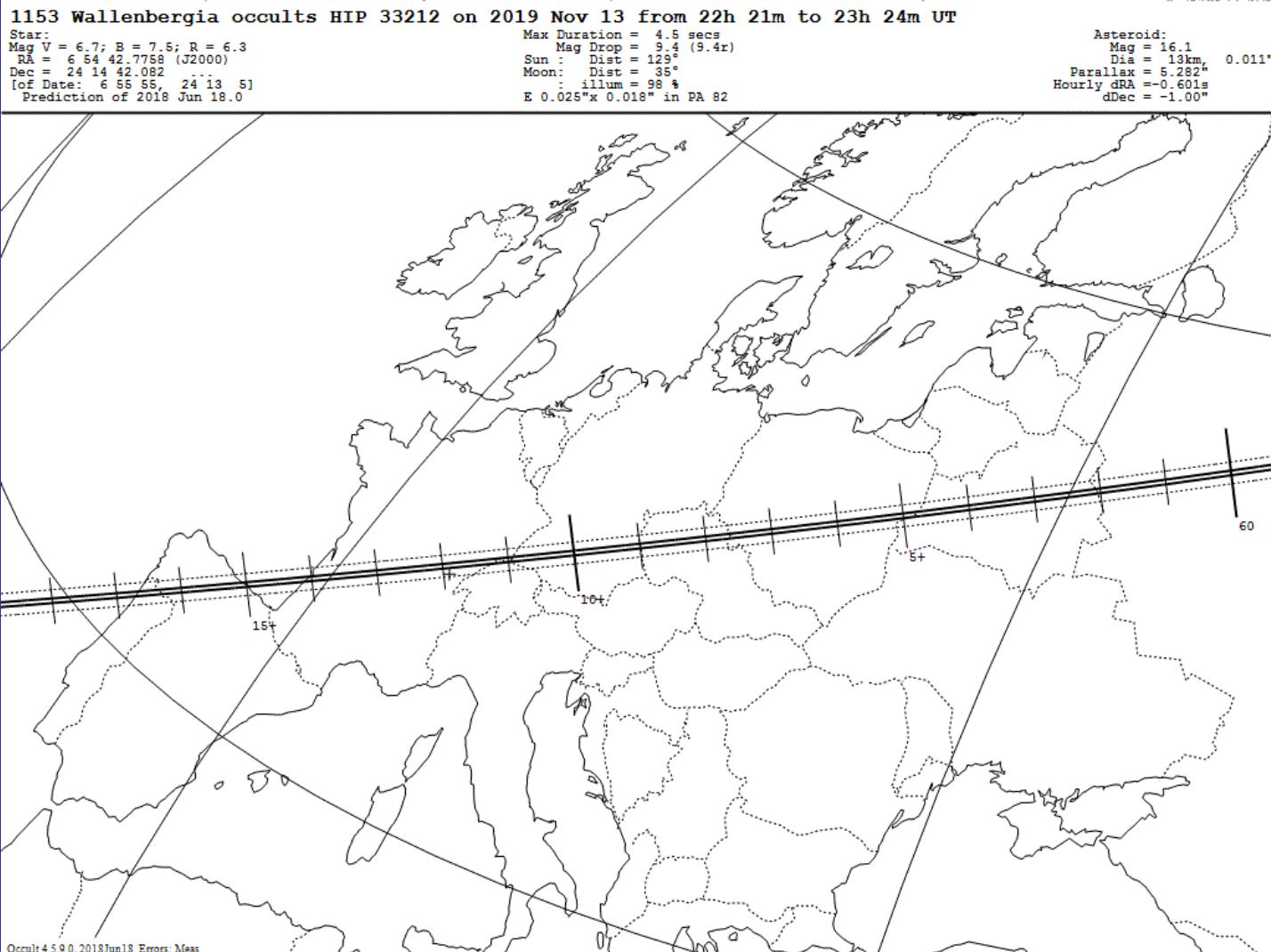
2019 Oct 16, 19:19 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

(1153) *Wallenbergia* HIP 33212 (6m.7)

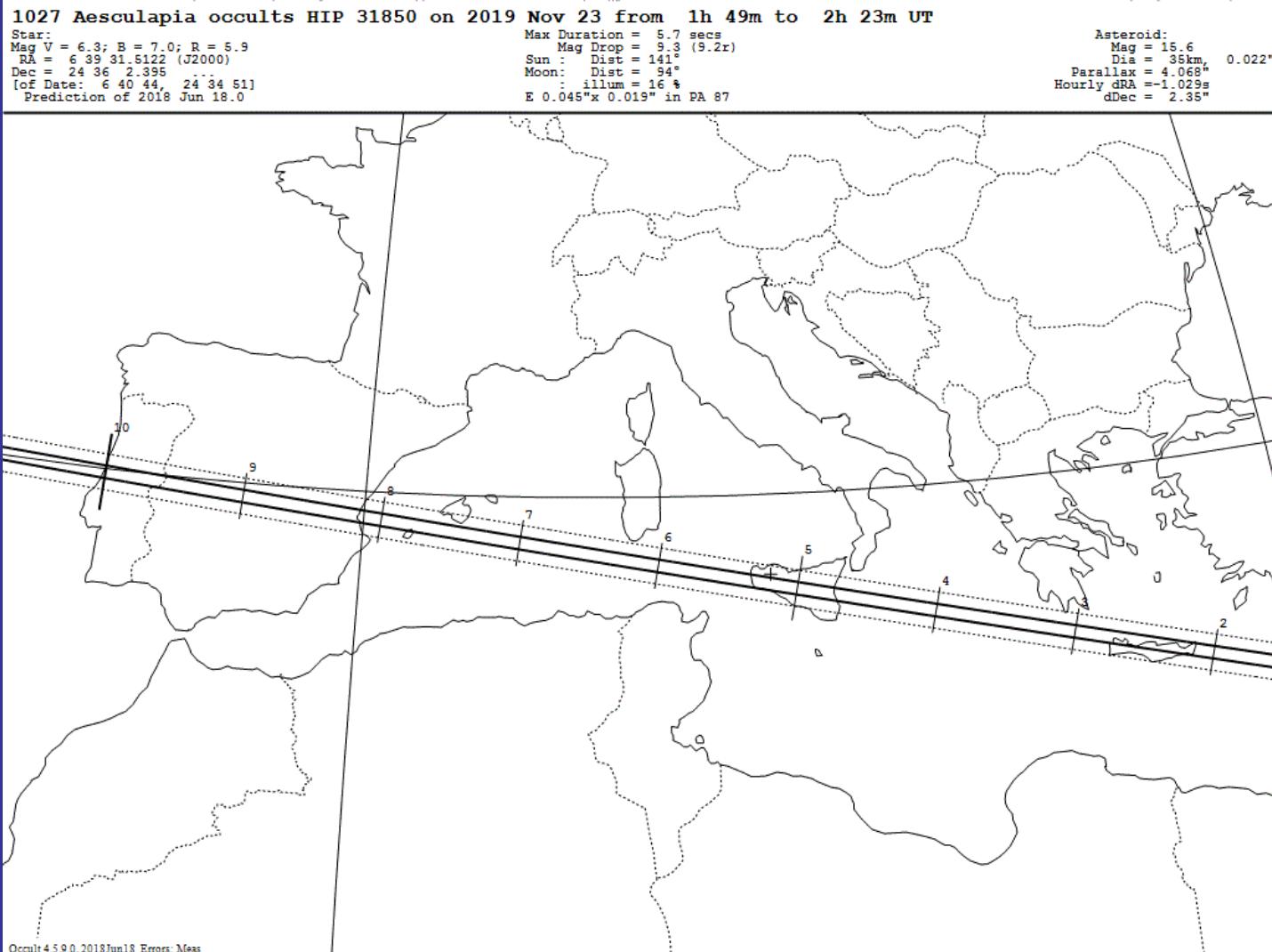
2019 Nov 13, 23:04 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

(1027) **Aesculapia** HIP 31850 (6m.3)

2019 Nov 23, 02:02 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

II.

## Occultations of Asteroids with Satellites

All paths were predicted with ephemerides by  
MIRIADE (IMCCE)  
in July / August 2018

# Occultations by Asteroids - Highlights for Europe in 2019

(90) *Antiope*

*Observation with ESO's VLT*

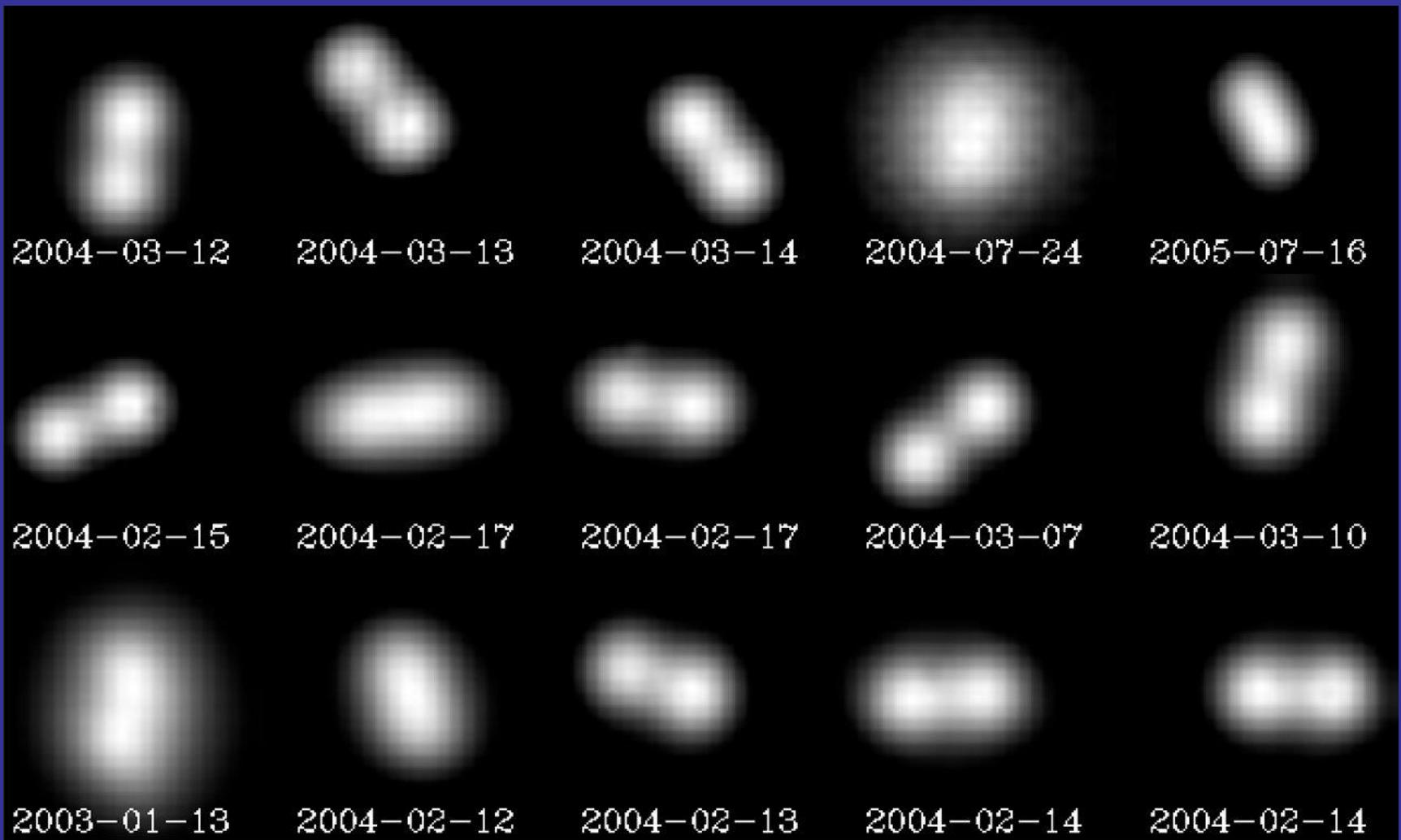


Image credit: ESO

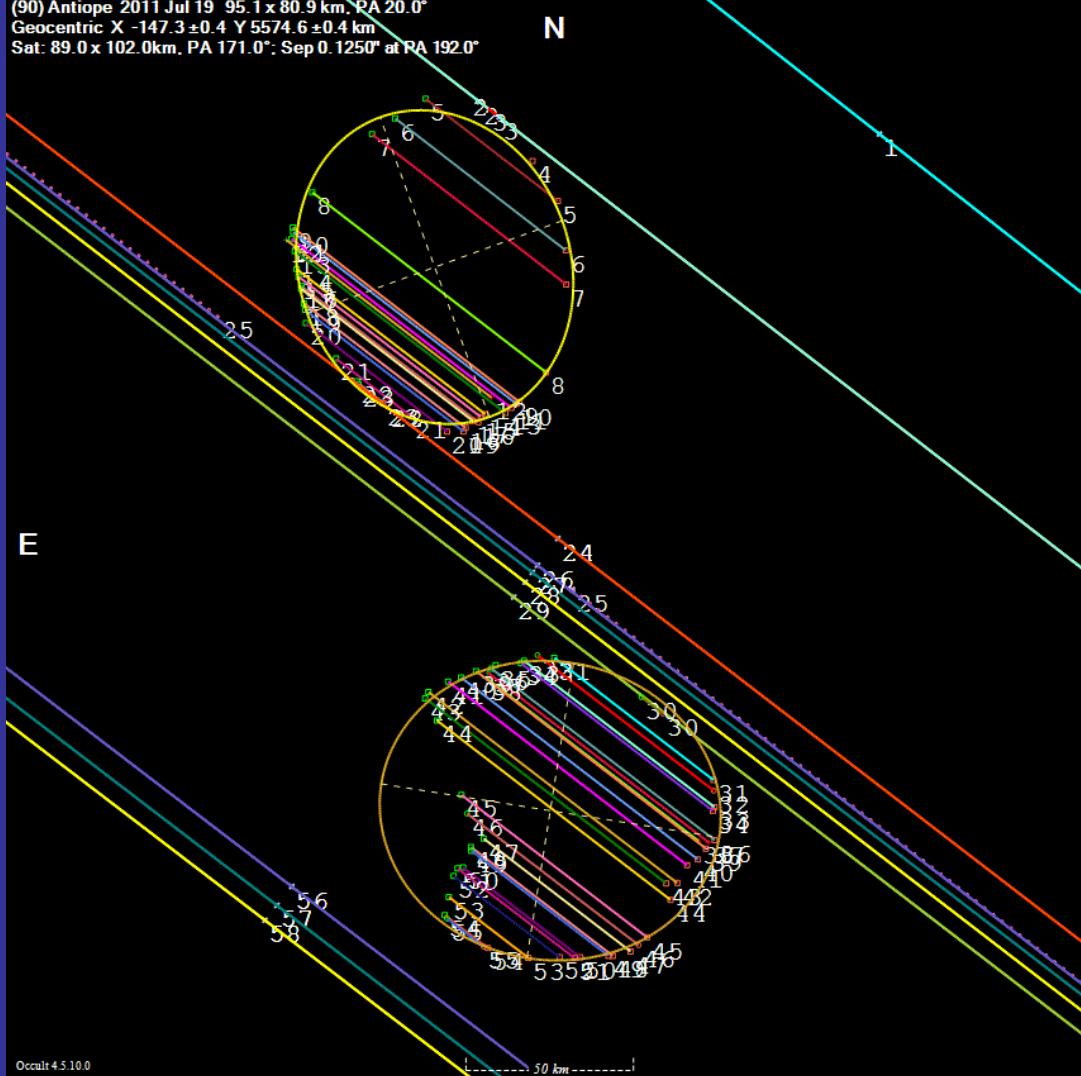
# Occultations by Asteroids - Highlights for Europe in 2019

(90) Antiope

Profile

2011 Jul 19

(90) Antiope 2011 Jul 19 95.1 x 80.9 km, PA 20.0°  
 Geocentric X -147.3±0.4 Y 5574.6±0.4 km  
 Sat: 89.0 x 102.0km, PA 171.0°: Sep 0.1250° at RA 192.0°



1 (M)	A Lowe,Calgary, Canada
2 (M)	T George,Burns, OR
3 (M)	T George,Burns, OR
4	S Preston,Burns, OR
5	T George/J Garlitz,Burns, OR
6	S Preston,Burns, OR
7	T George,Burns, OR
8	G Lyzenga,Chico, CA
9	S Degenhardt,Chico, CA
10	P Maley,Cortena, CA
11	S Degenhardt,Chico, CA
12	P Sullivan,Sebastopol, CA
13	P Maley,Williams, CA
14	S Degenhardt,Oroville, CA
15	P Maley,Williams, CA
16	P Maley,Geneva, CA
17	S Degenhardt,Oroville, CA
18	S Degenhardt,Honcut, CA
19	P Maley/B Merline,Arbuckle, CA
20	P Maley/B Merline,Harrington, CA
21	J Berthier/D Falla, Arbuckle, CA
22	P Maley/B Merline,Hershey, CA
23	S Degenhardt,Honcut, CA
24 (M)	J Berthier/M Allain, IMCCE/SETI
25 (P)	Predicted Centerline w/Time
26 (M)	E Bredner, Woodland, CA
27 (M)	P Maley/W Hopkins,Zamora, CA
28 (M)	R Venable,Standish, CA
29 (M)	S Maximoff,Vacaville CA
30	M Vincent,Woodland, CA
31	T Swift,Davis, CA
32	R Summer/R Bardarson,Portola, CA
33	P Dunckel,Grass Valley, CA
34	R Venable,Doyle, CA
35	R Venable,Doyle, CA
36	D Kenyon,Rocklin, CA
37	D Machholz,Colfax, CA
38	T Case,Walnut Creek, CA
39	D Becker,Boise, ID
40	R Venable,Chilcoot-Vinton, CA
41	R Venable,Chilcoot-Vinton, CA
42	F Vachier/E Enriquez, Folsom, CA
43	F Vachier/J Fixelle, Folsom, CA
44	F Vachier/J Cooper/W Meldman-Floch, CA
45	P Jenniskens/M Phillips, Lodwinery, CA
46	D Dunham/J Dunham,Mountain House, CA
47	T Beard,Reno, NV
48	P Jenniskens/S Hicks, Wallace, CA
49	D Dunham/J Dunham,Tracy Airport, CA
50	J Albers, San Jose, CA
51	D Dunham/J Dunham,San Joaquin City,CA
52	F Colas, IMCCE - D1
53	F Colas, IMCCE - D2
54	F Colas, IMCCE - D3
55	D Dunham/J Dunham,Westley, CA
56 (M)	D Dunham/J Dunham,Newman, CA
57 (M)	D Dunham/J Dunham,Ingomar, CA
58 (M)	D Dunham/J Dunham,Santa Nella, CA

Source: OCCULT V4

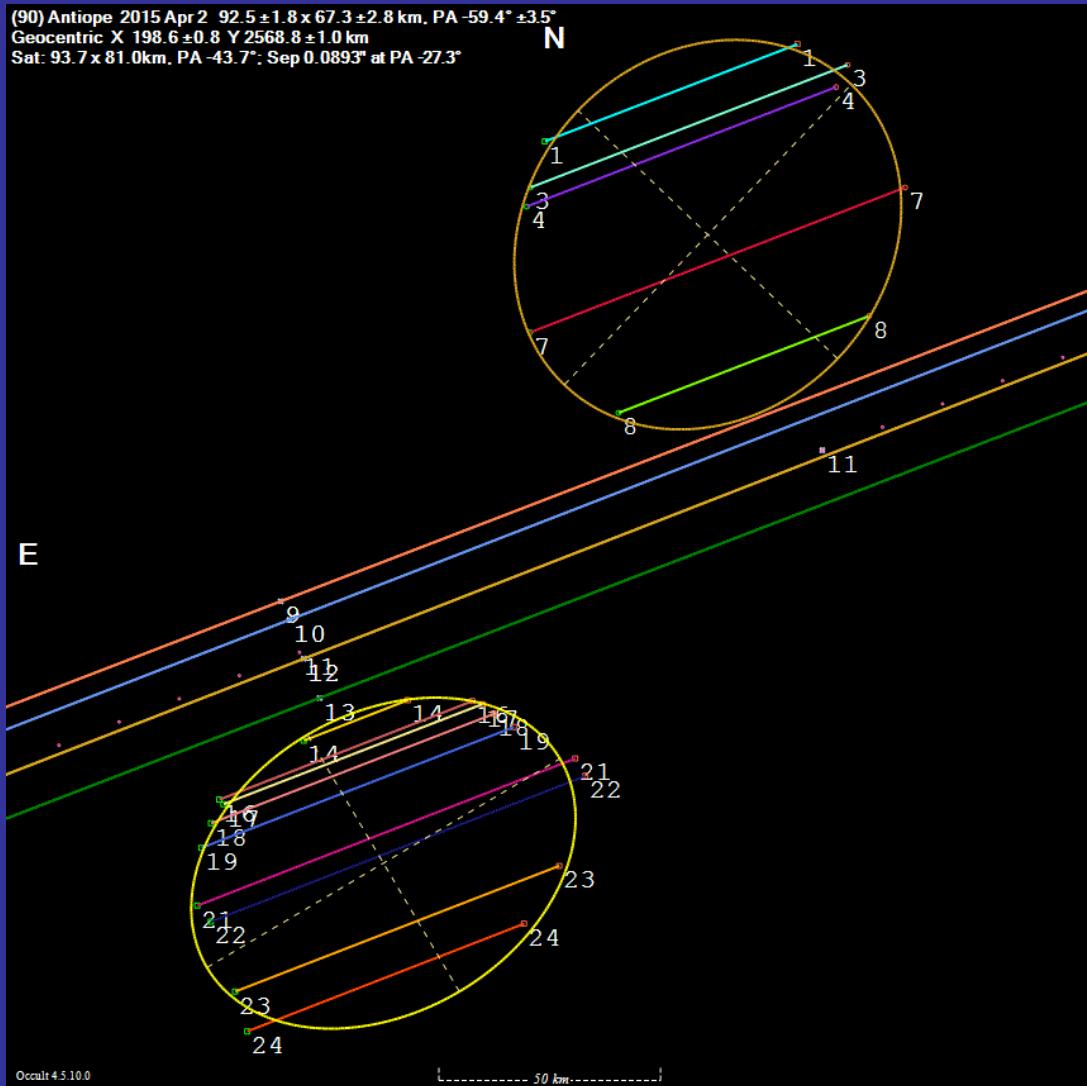
# Occultations by Asteroids - Highlights for Europe in 2019

(90) Antiope

Profile

2015 Apr 02

(90) Antiope 2015 Apr 2  $92.5 \pm 1.8 \times 67.3 \pm 2.8$  km, PA  $-59.4^\circ \pm 3.5^\circ$   
 Geocentric X  $198.6 \pm 0.8$  Y  $2568.8 \pm 1.0$  km  
 Sat:  $93.7 \times 81.0$  km, PA  $-43.7^\circ$ : Sep 0.0893° at PA  $-27.3^\circ$



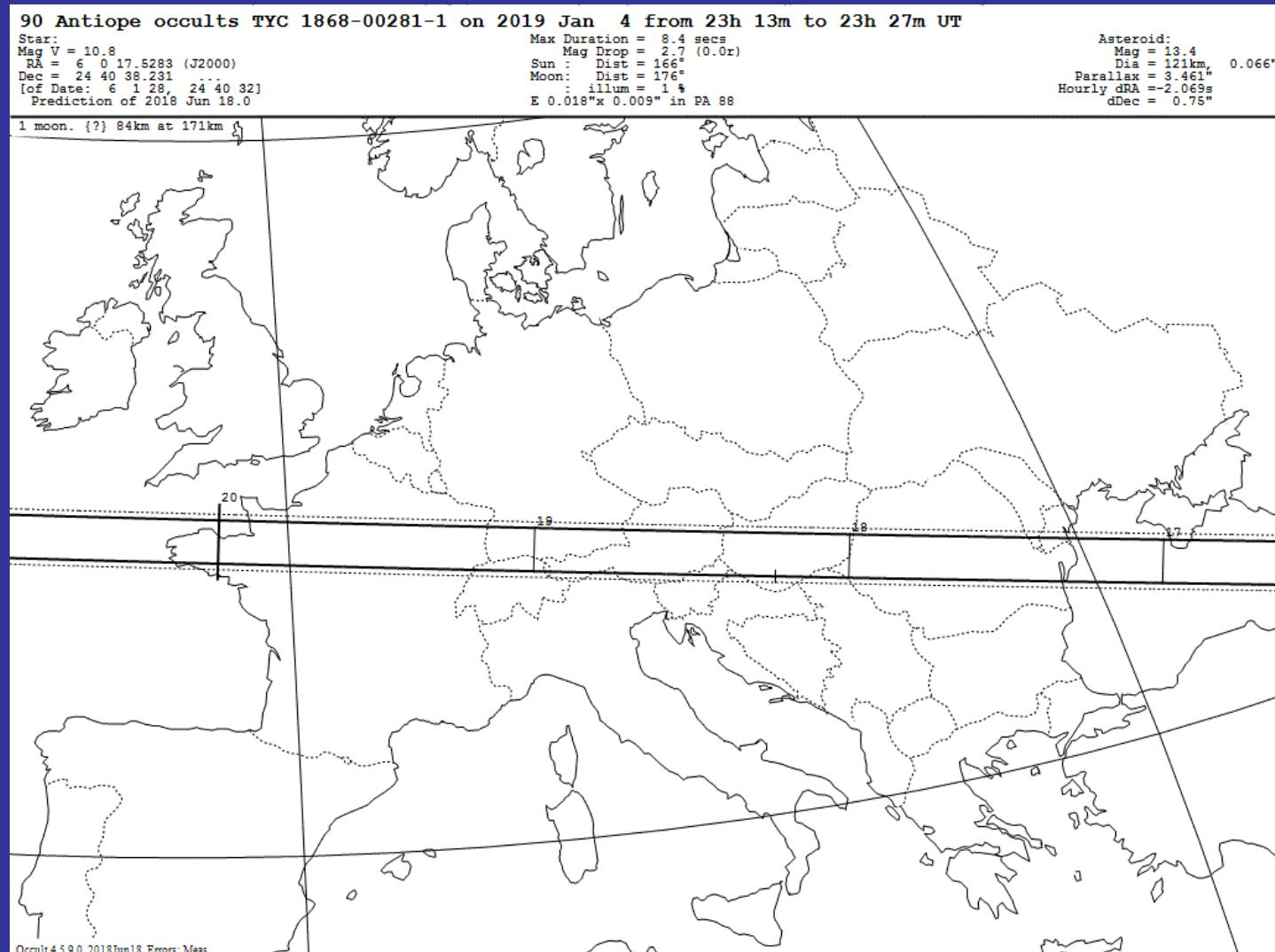
1	R Venable, Howey-In-The-Hills, FL
3	D Dunham, Fritch, TX
4	D Dunham, Santa Fe Trail Hwy 136, TX
7	D Dunham, Amarillo, TX
8	D Dunham, Canyon, TX
9 (M)	C MacDougal, Tampa, FL
10 (M)	T George, Farmington, NM
11 (P)	Predicted Centerline w/Time
12 (M)	C Arrowsmith et al, Quincy, CA
13 (M)	T Campbell, Balm, FL
14	D Breit, Corning, CA
16	W Morgan, Corning, CA
17	P Maley, Kress, TX
18	E Mroz, Santa Fe, NM
19	P Maley, Kress, TX
21	T Swift, Orland, CA
22	J Bean et al, Carson City, NV
23	T Blank, Kanab, UT
24	J Bardecker, Gardnerville, NV
25 (M)	Y Liu, Sunnyvale, CA
26 (M)	R King et al, Lake Havasu City, AZ
27 (M)	R Ekins, Calipatria, CA
28 (M)	W Thomas, Yuma, AZ

Source: OCCULT V4

# Occultations by Asteroids - Highlights for Europe in 2019

(90) **Antiope** TYC 1868-00281-1 (10m.8)

2019 Jan 04, 23:17 U.T.

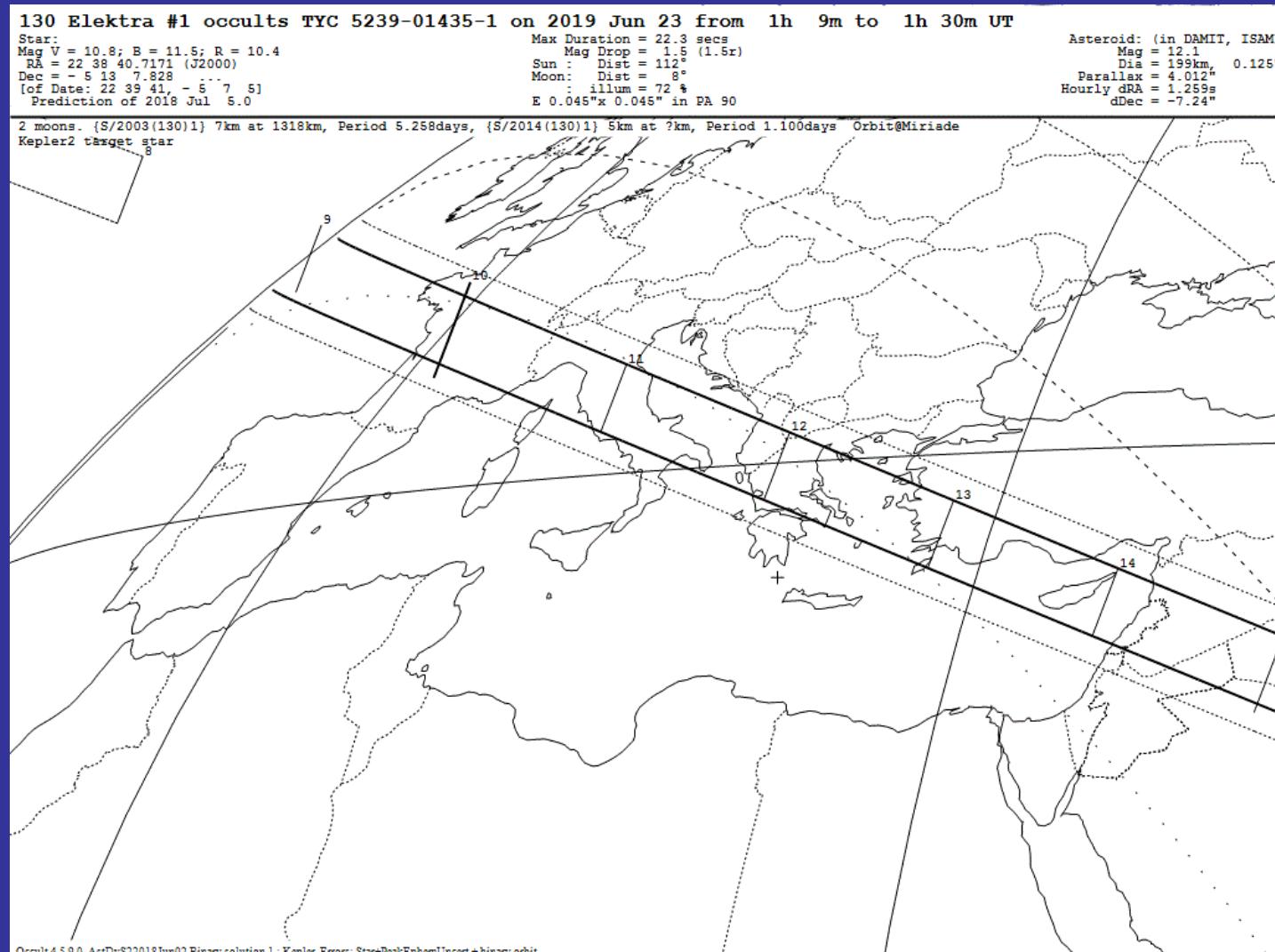


# Occultations by Asteroids - Highlights for Europe in 2019

(130) **Elektra**

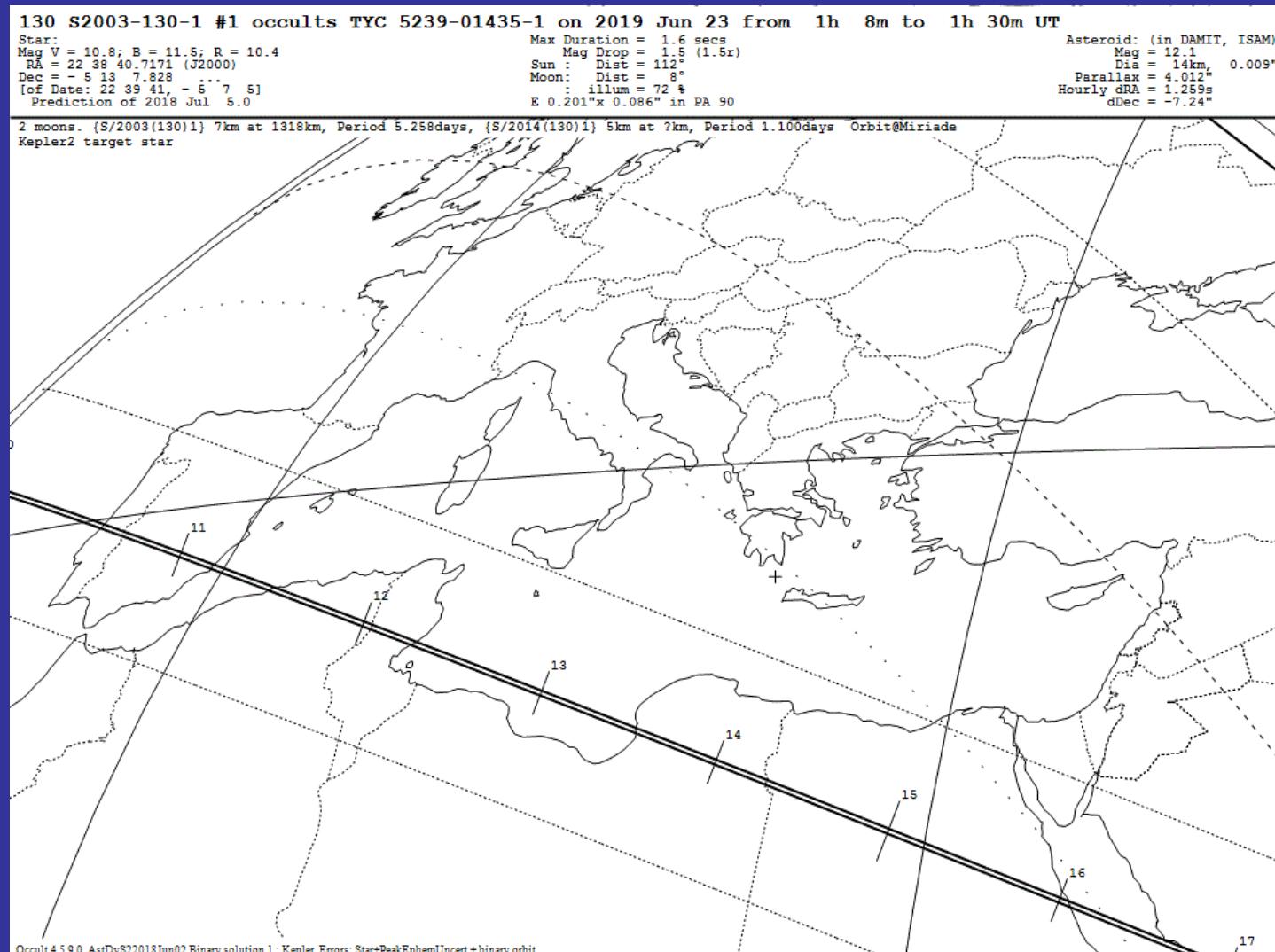
TYC 5239-01435-1 (10m.8)

2019 Jun 23, 01:09 U.T.



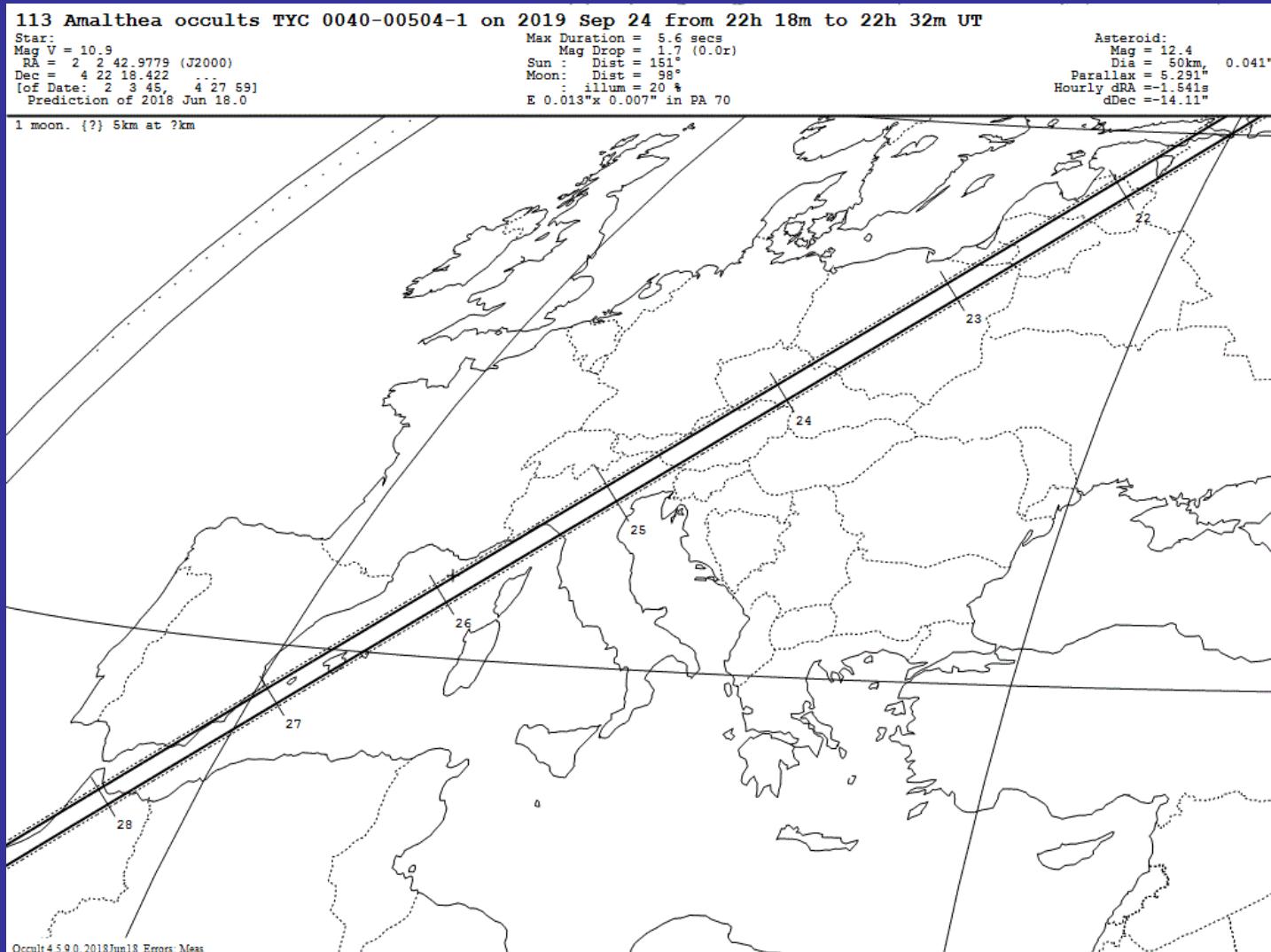
# Occultations by Asteroids - Highlights for Europe in 2019

(130) S2003-130-1 TYC 5239-01435-1 (10m.8) **1.6 sec** 2019 Jun 23, 01:10 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

(113) **Amalthea** TYC 0040-00504-1 (10m.9) 0.5 sec ? 2019 Sep 24, 22:22 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

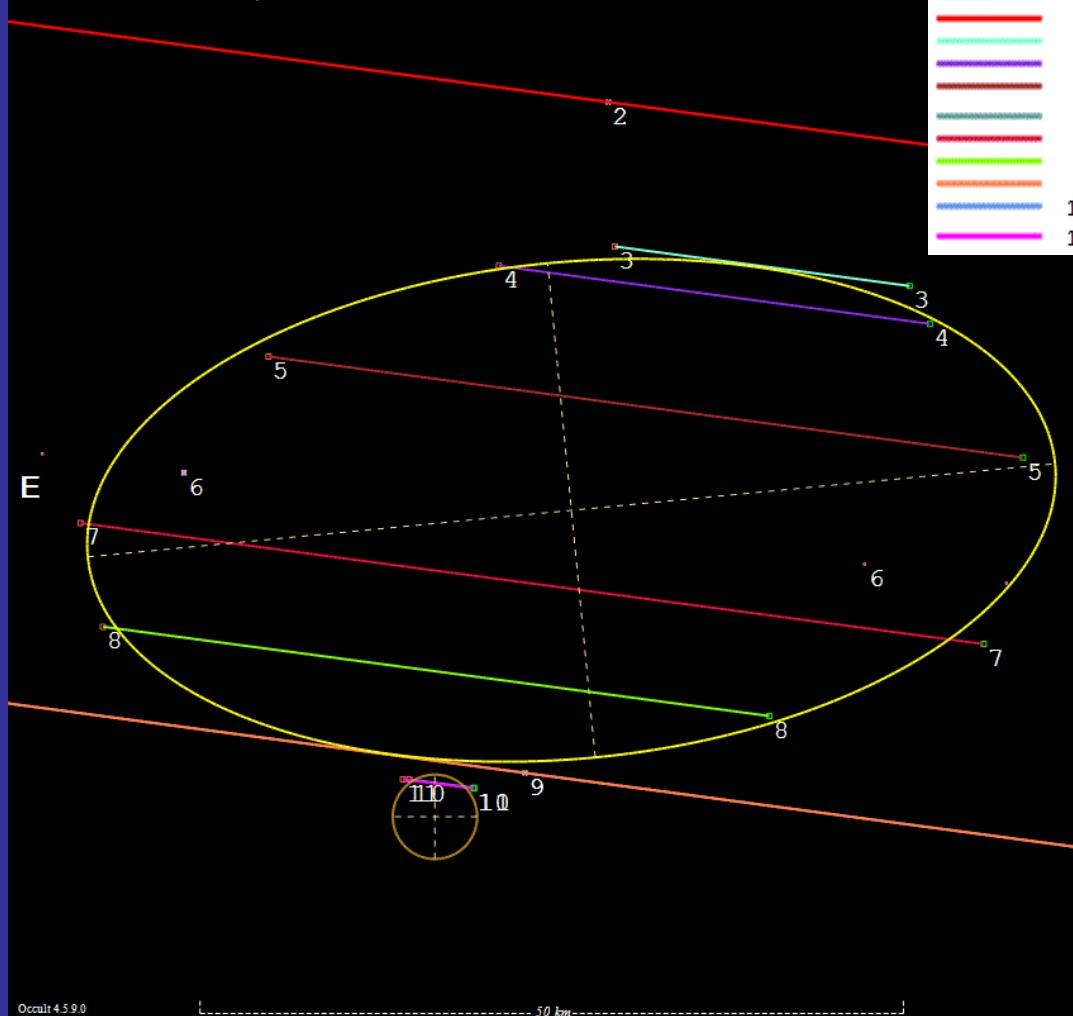
(113) Amalthea

Profile with Satellite

2017 Mar 14

(113) Amalthea 2017 Mar 14  $69.1 \pm 1.4 \times 35.3 \pm 1.4$  km, PA  $-84.5^\circ \pm 1.7^\circ$   
Geocentric X  $1541.9 \pm 0.6$  Y  $1181.7 \pm 0.4$  km  
Sat:  $6.0 \times 6.0$  km, PA  $0.0^\circ$ ; Sep  $0.0172''$  at PA  $156.0^\circ$

N



1 (M)	S Deen, Simi Valley, CA
2 (M)	T Blank, Goldfield, AZ
3	T Blank, Florence, AZ
4	P Maley, Buckeye, AZ
5	W Thomas, Florence, AZ
6 (P)	Predicted Centerline w/Time
7	T Blank, Florence, AZ
8	T Blank, Florence, AZ
9 (M)	S Insana, Phoenix, AZ
10	D Eissfeldt, Waco, TX
11	R Campbell, Clifton, TX

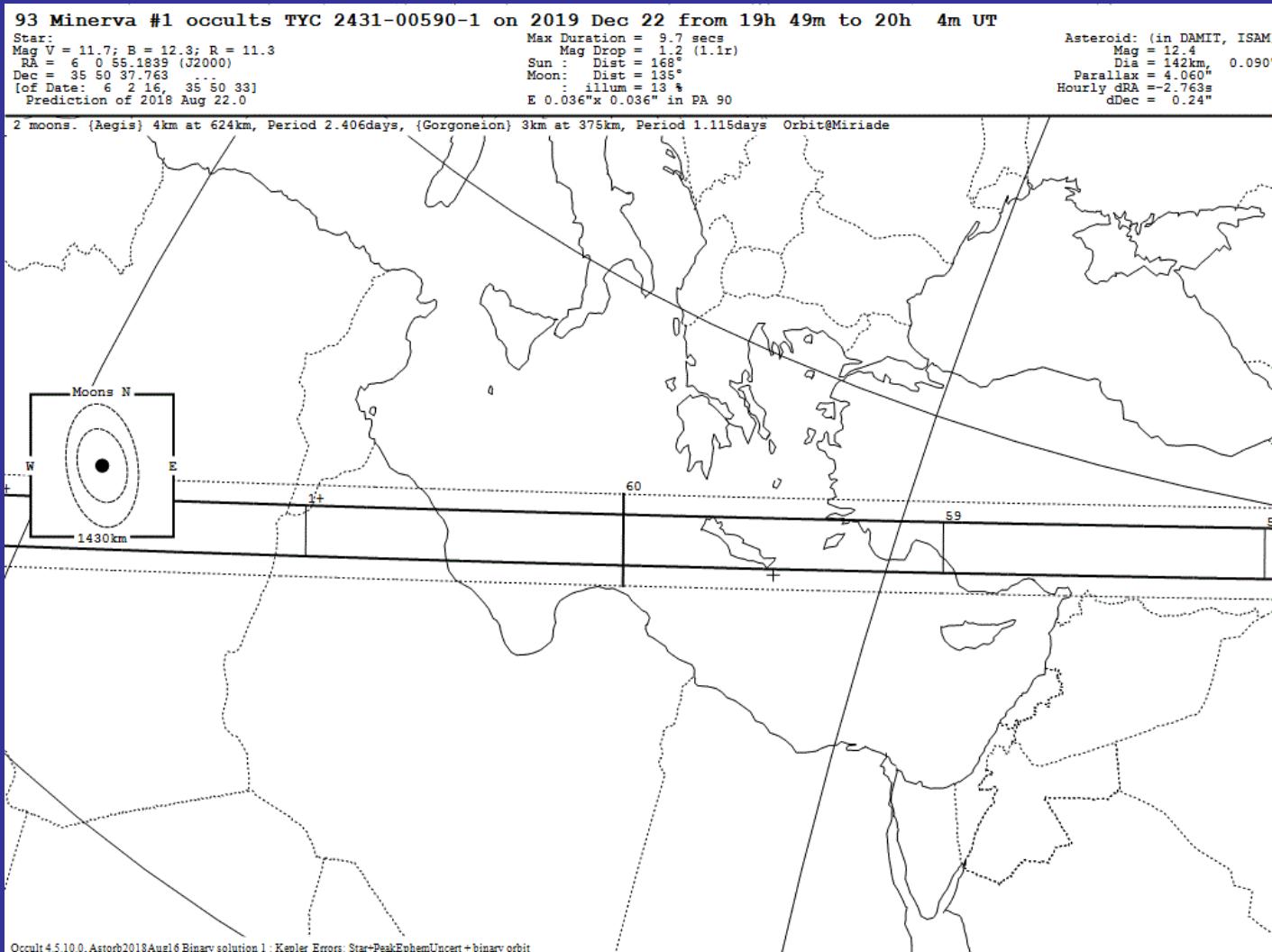
Source: OCCULT V4

# Occultations by Asteroids - Highlights for Europe in 2019

(93) **Minerva**

TYC 2431-00590-1 (11m.7)

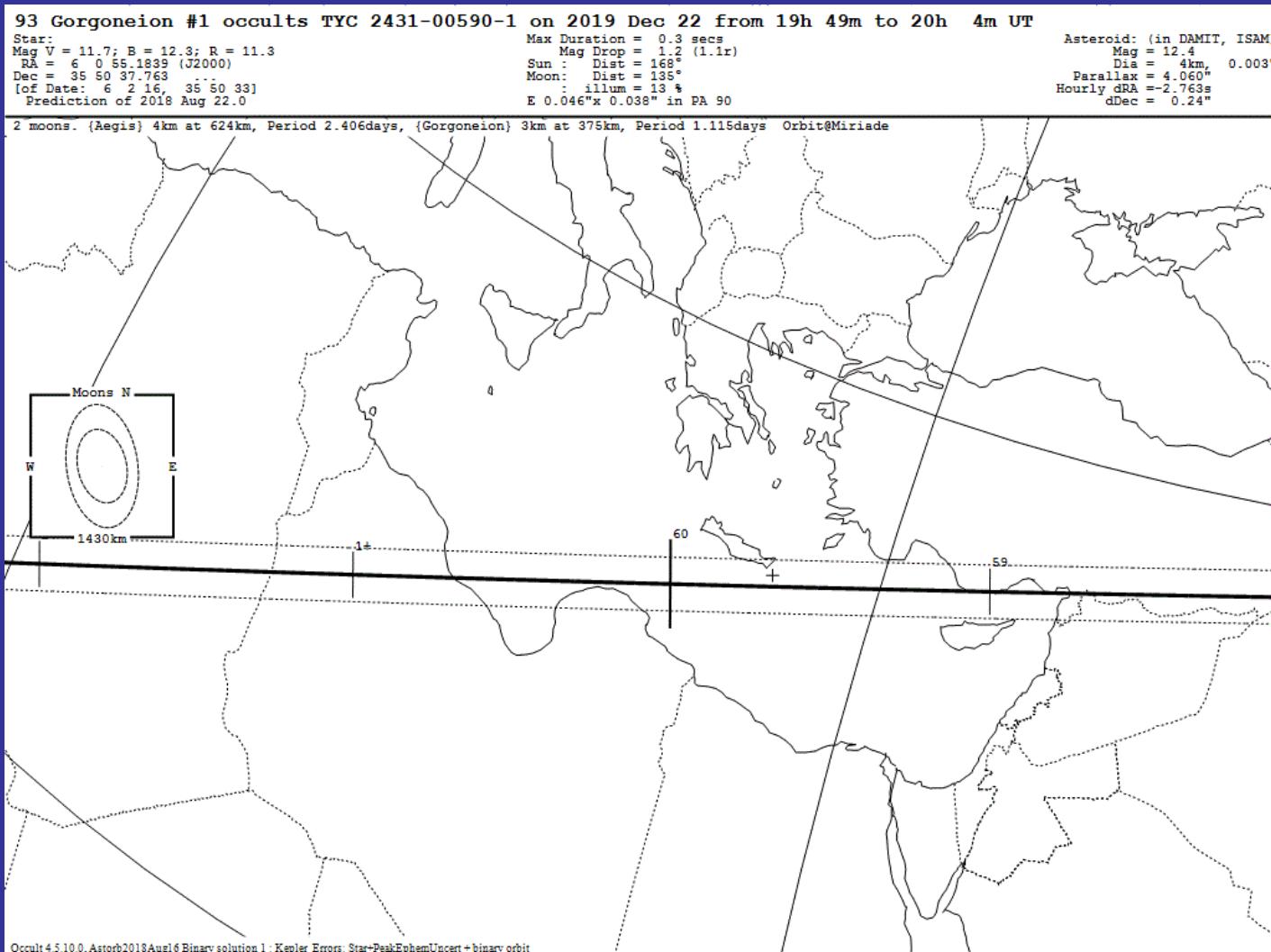
2019 Dec 22, 19:58 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

(93) **Gorgoneion** TYC 2431-00590-1 (11m.7) 0.3 sec

2019 Dec 22, 19:58 U.T.

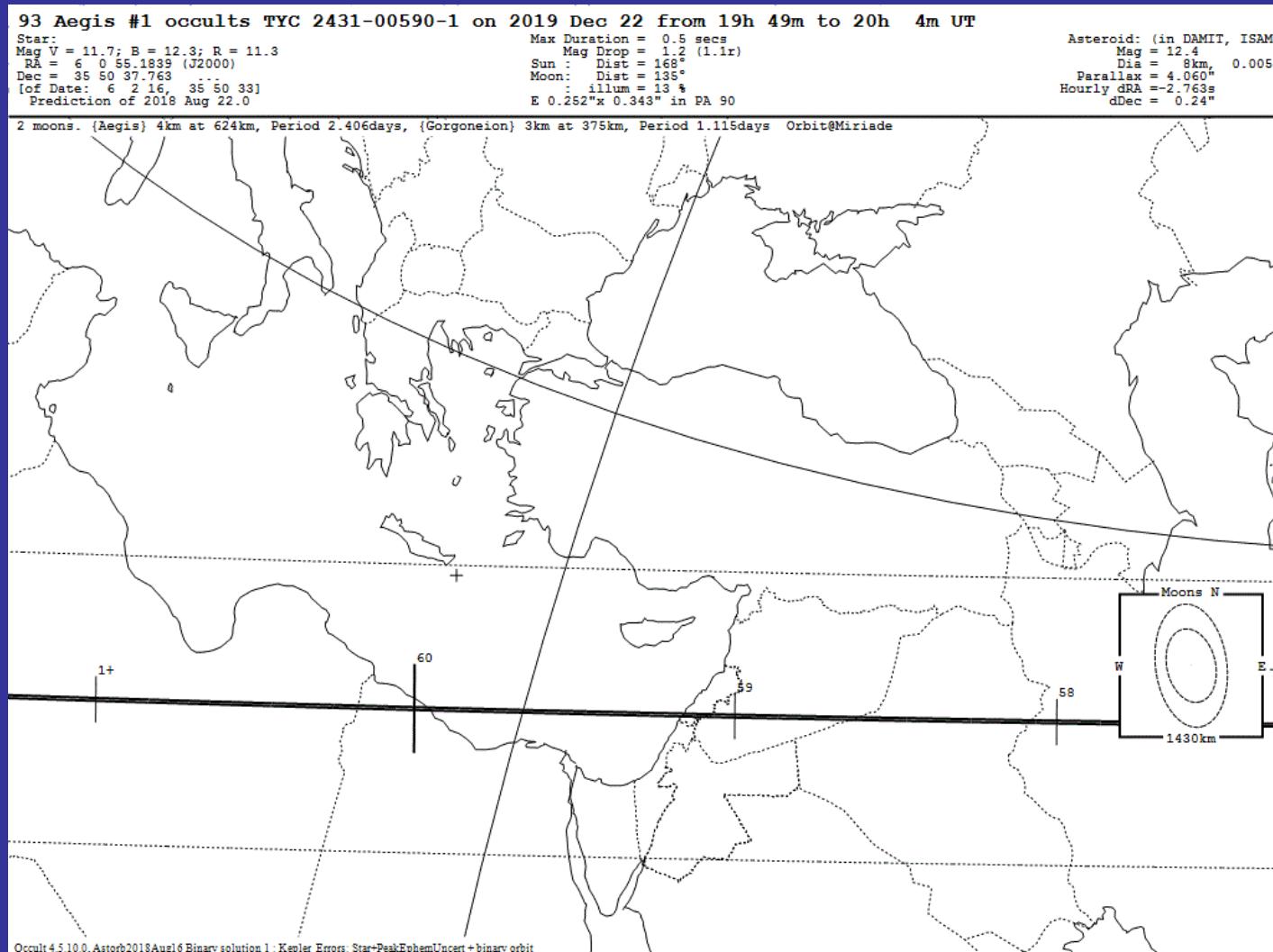


# Occultations by Asteroids - Highlights for Europe in 2019

(93) Aegis

TYC 2431-00590-1 (11m.7) 0.5 sec

2019 Dec 22, 19:58 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

(87) *Sylvia* - A Triple System

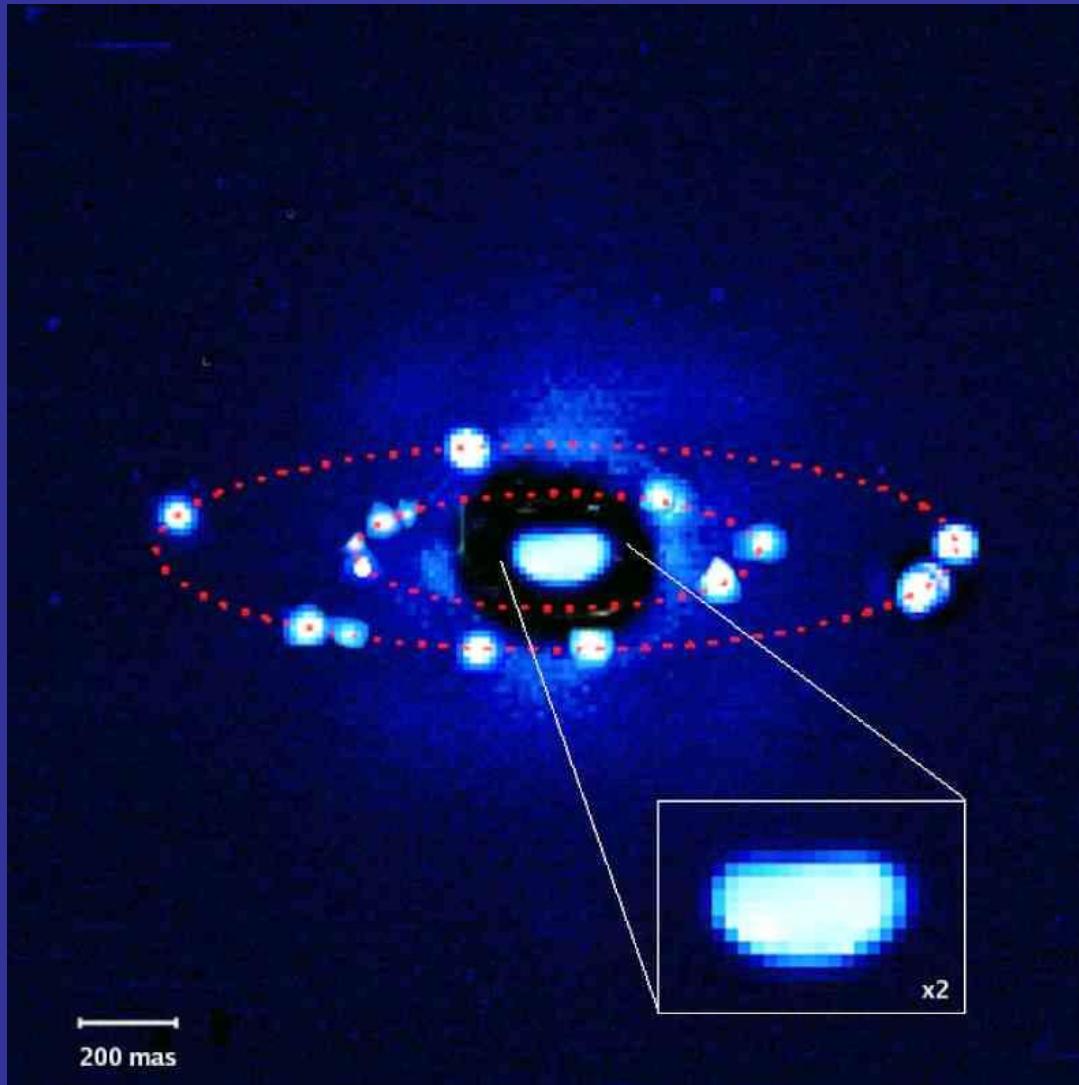


Image credit:  
ESO

# Occultations by Asteroids - Highlights for Europe in 2019

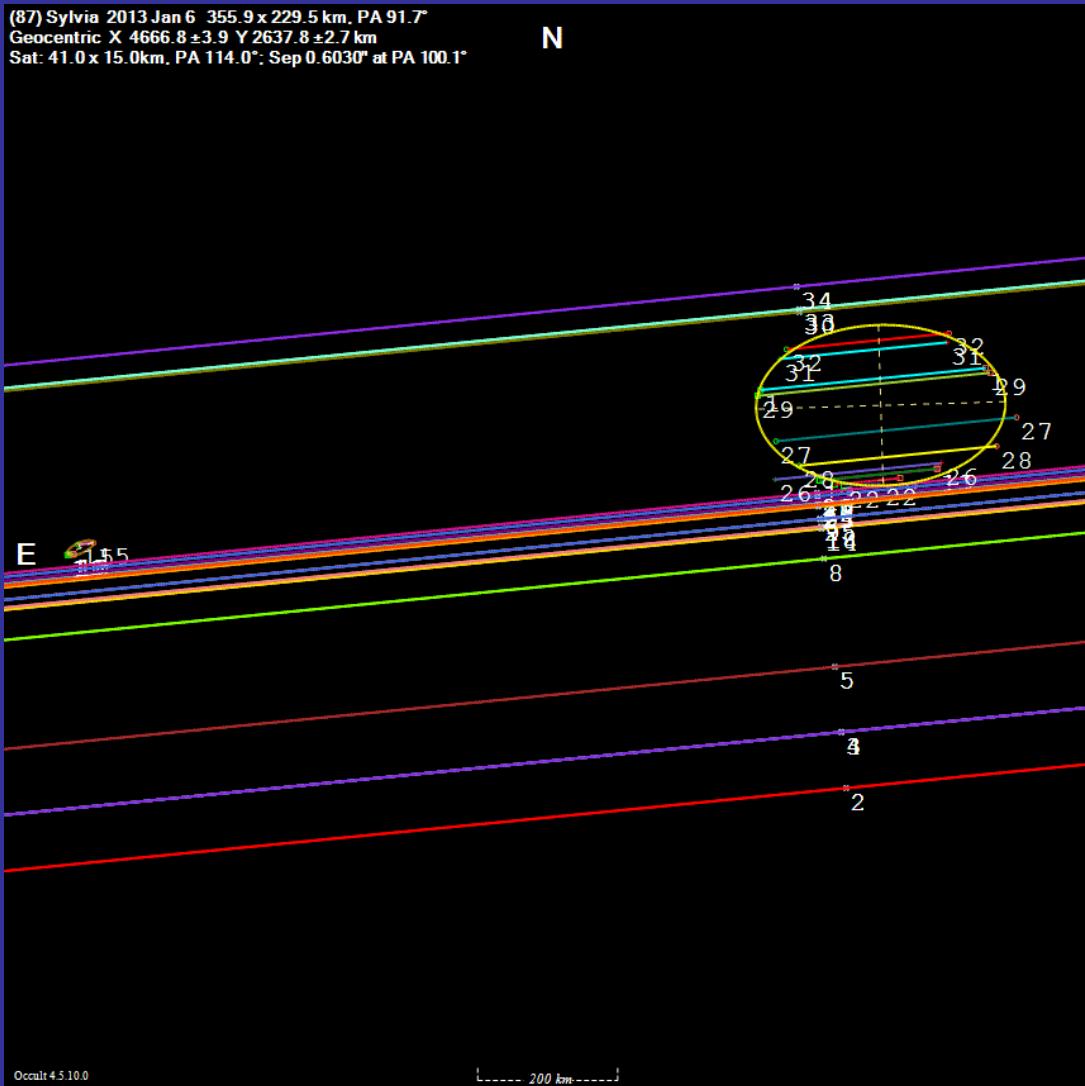
(87) *Sylvia*

*Profile*

2013 Jan 06

(87) *Sylvia* 2013 Jan 6 355.9 x 229.5 km, PA 91.7°  
 Geocentric X 4666.8 ± 3.9 Y 2637.8 ± 2.7 km  
 Sat: 41.0 x 15.0 km, PA 114.0°; Sep 0.6030° at PA 100.1°

N



1	Vasilis Metallinos, GR
2 (M)	Hilari Pallares, ES
3 (M)	Ricard Casas, ES
4 (M)	C. Perello/A. Selva, ES
5 (M)	Joan Lopez, ES
6 (M)	Dominique Albanese, FR
7	L Brunetto/JM Mari/A Lopez/C Bouteill
8 (M)	Raymond Poncy, FR
9 (M)	J Lecacheux/O Lecacheux, FR
10	E. Frappa/A. Klotz, FR
11	E. Frappa/A. Klotz, FR
12	M Devogele/P Bendjoya/L Abe/O Suarez,
13	M Devogele/P Bendjoya/L Abe/O Suarez,
14 (M)	Daniel Verilhac, FR
15	Pierre Dubreuil, FR
18 (M)	Guy Brabant, FR
19 (M)	Eric Frappa, FR
20 (M)	Luc Arnold, FR
21 (M)	E Frappa/M Lavayssiére, FR
22	J Lecacheux/S Moindrot, FR
23 (M)	Laurent Bernasconi, FR
24 (M)	Claude Peguet, FR
25 (M)	Jean-Louis Penninckx, FR
26	Marc Bretton, FR
27	Alain Figer, FR
28	Vincent Fristot, FR
29	S. Sposetti/A. Manna, IT
30 (M)	U Quadri/L Strabala/R Girelli/A Quadri
31	Simone Bolzoni, IT
32	Albino Carbognani, IT
33 (M)	Carlo Gualdoni, IT
34 (M)	Stefano Sposetti, CH

Source: OCCULT V4

# Occultations by Asteroids - Highlights for Europe in 2019

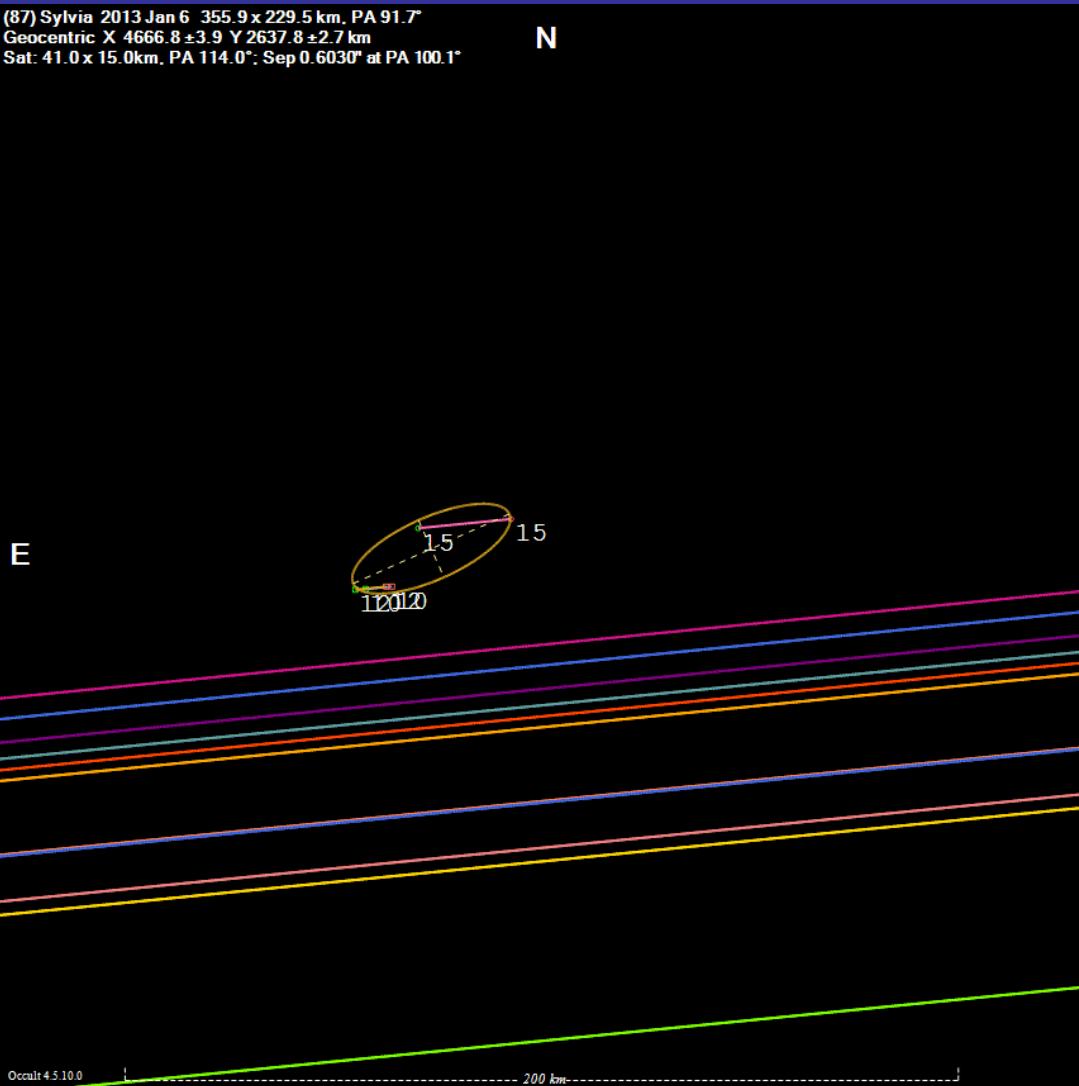
(87) *Romulus*

Profile

2013 Jan 06

(87) Sylvia 2013 Jan 6 355.9 x 229.5 km, PA 91.7°  
Geocentric X 4666.8 ± 3.9 Y 2637.8 ± 2.7 km  
Sat: 41.0 x 15.0km, PA 114.0°; Sep 0.6030° at PA 100.1°

N



1	Vasilis Metallinos, GR
2 (M)	Hilari Pallares, ES
3 (M)	Ricard Casas, ES
4 (M)	C. Perello/A. Selva, ES
5 (M)	Joan Lopez, ES
6 (M)	Dominique Albanese, FR
7	L Brunetto/JM Mari/A Lopez/C Bouteill
8 (M)	Raymond Poncy, FR
9 (M)	J Lecacheux/O Lecacheux, FR
10	E. Frappa/A. Klotz, FR
11	E. Frappa/A. Klotz, FR
12	M Devogele/P Bendjoya/L Abe/O Suarez,
13	M Devogele/P Bendjoya/L Abe/O Suarez,
14 (M)	Daniel Verilhac, FR
15	Pierre Dubreuil, FR
18 (M)	Guy Brabant, FR
19 (M)	Eric Frappa, FR
20 (M)	Luc Arnold, FR
21 (M)	E Frappa/M Lavayssiére, FR
22	J Lecacheux/S Moindrot, FR
23 (M)	Laurent Bernasconi, FR
24 (M)	Claude Peguet, FR
25 (M)	Jean-Louis Penninckx, FR
26	Marc Bretton, FR
27	Alain Figer, FR
28	Vincent Fristot, FR
29	S. Sposetti/A. Manna, IT
30 (M)	U Quadri/L Strabla/R Girelli/A Quadri
31	Simone Bolzoni, IT
32	Albino Carbognani, IT
33 (M)	Carlo Gualdoni, IT
34 (M)	Stefano Sposetti, CH

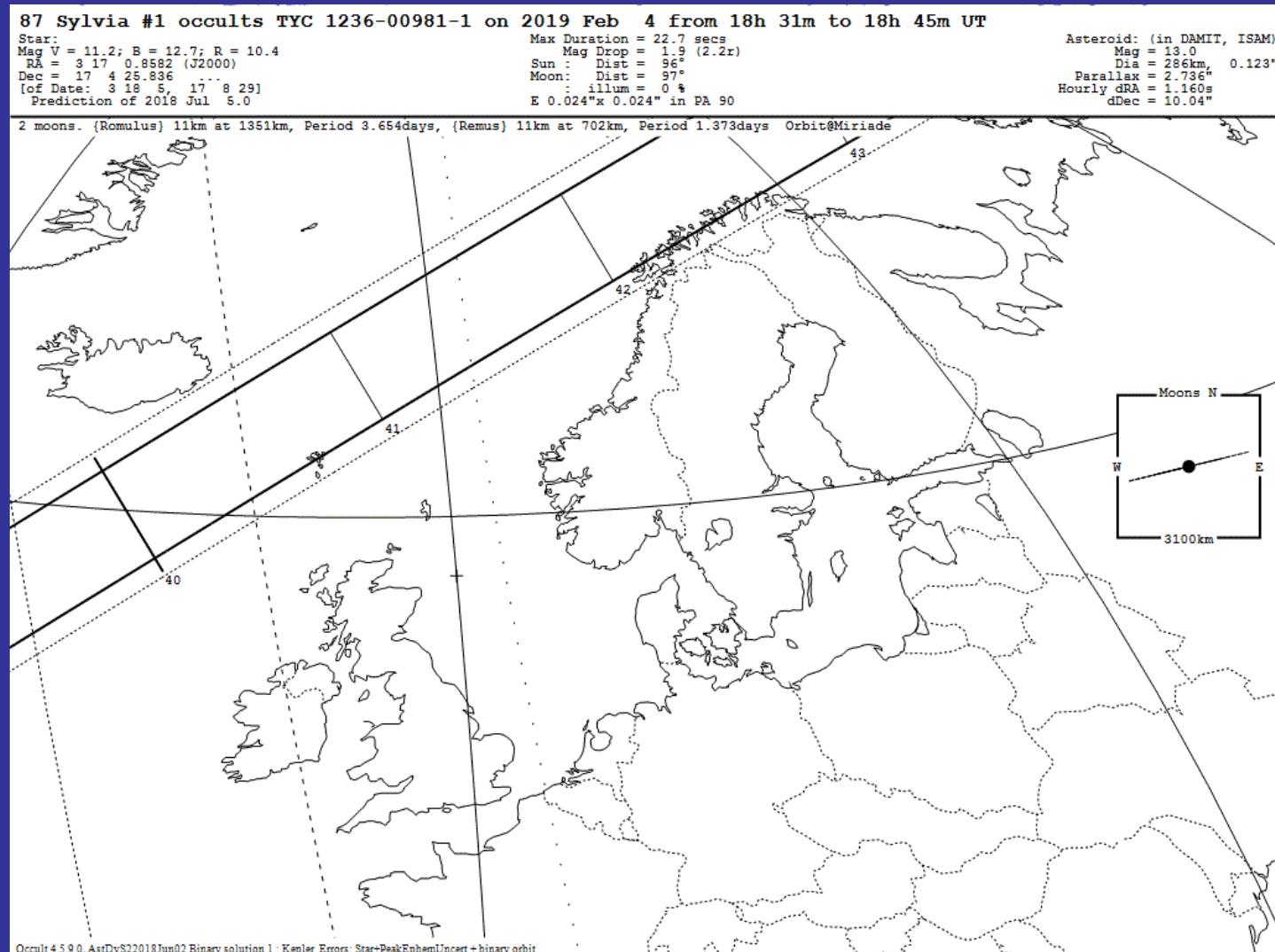
Source: OCCULT V4

# Occultations by Asteroids - Highlights for Europe in 2019

(87) **Sylvia**

TYC 1236-00981-1 (11m.2)

2019 Feb 04, 18:41 U.T.



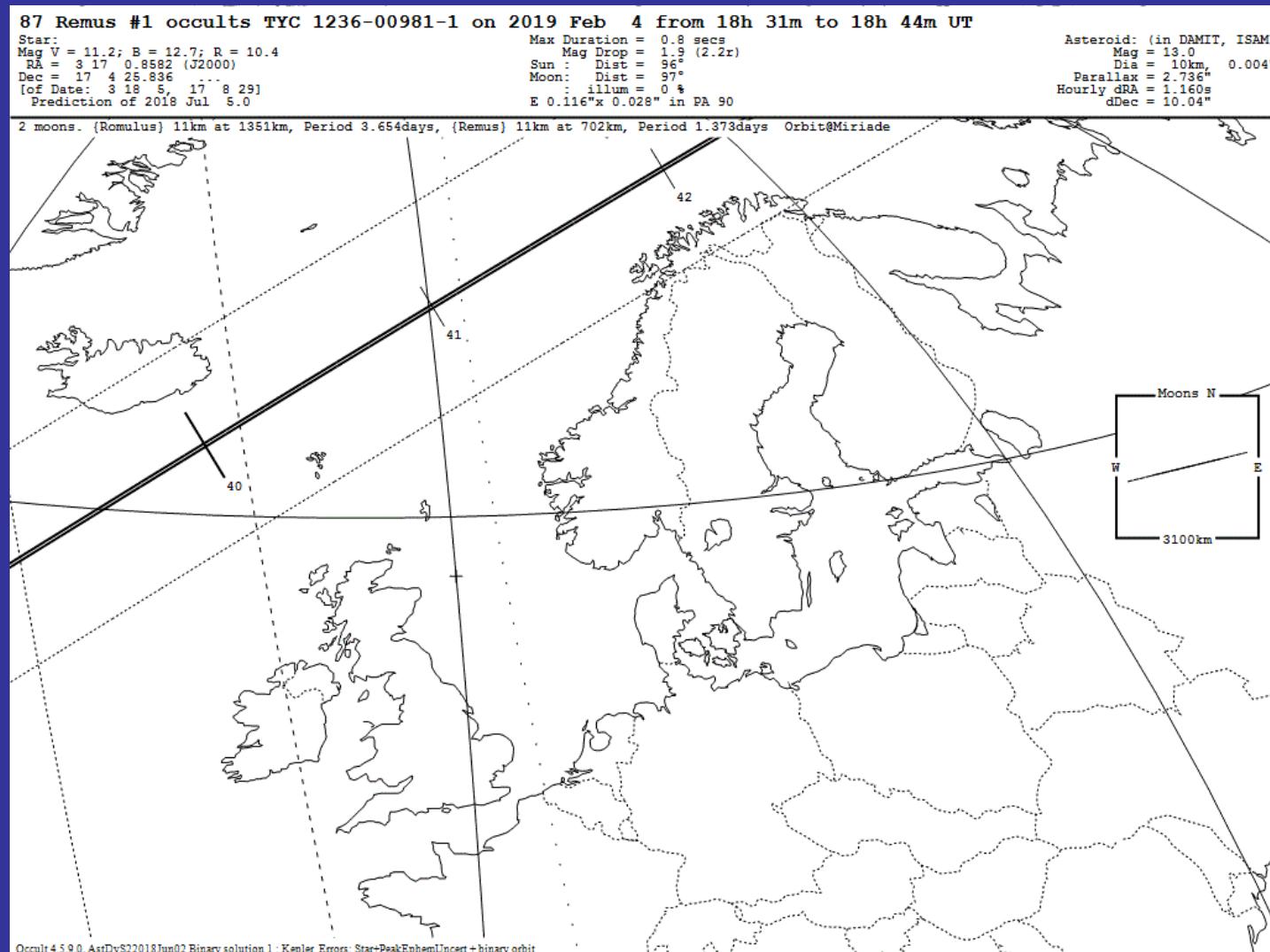
# Occultations by Asteroids - Highlights for Europe in 2019

(87) Remus

TYC 1236-00981-1 (11m.2)

0.8 sec

2019 Feb 04, 18:41 U.T.

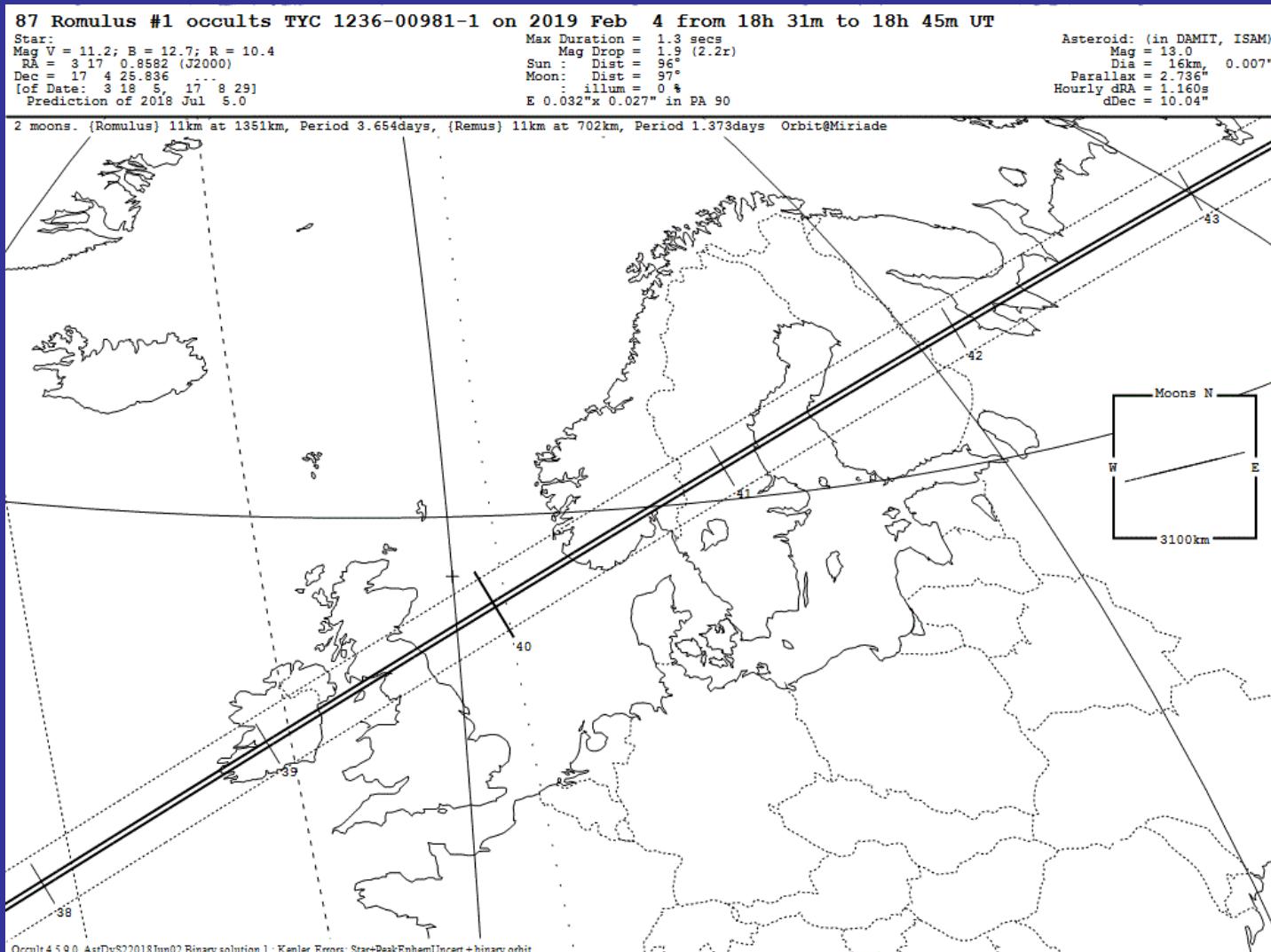


# Occultations by Asteroids - Highlights for Europe in 2019

(87) **Romulus** TYC 1236-00981-1 (11m.2)

1.3 sec

2019 Feb 04, 18:39 U.T.

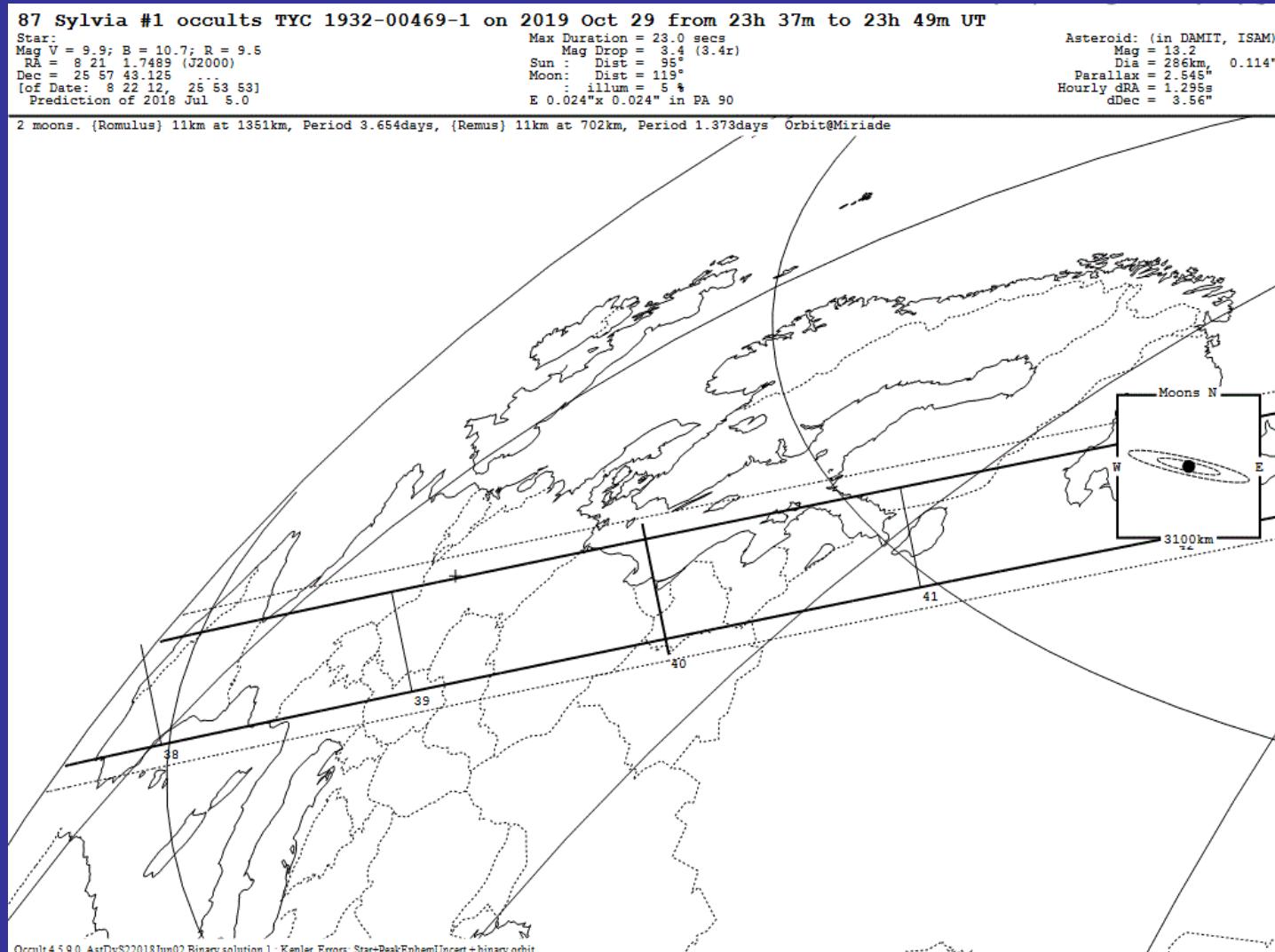


# Occultations by Asteroids - Highlights for Europe in 2019

(87) *Sylvia*

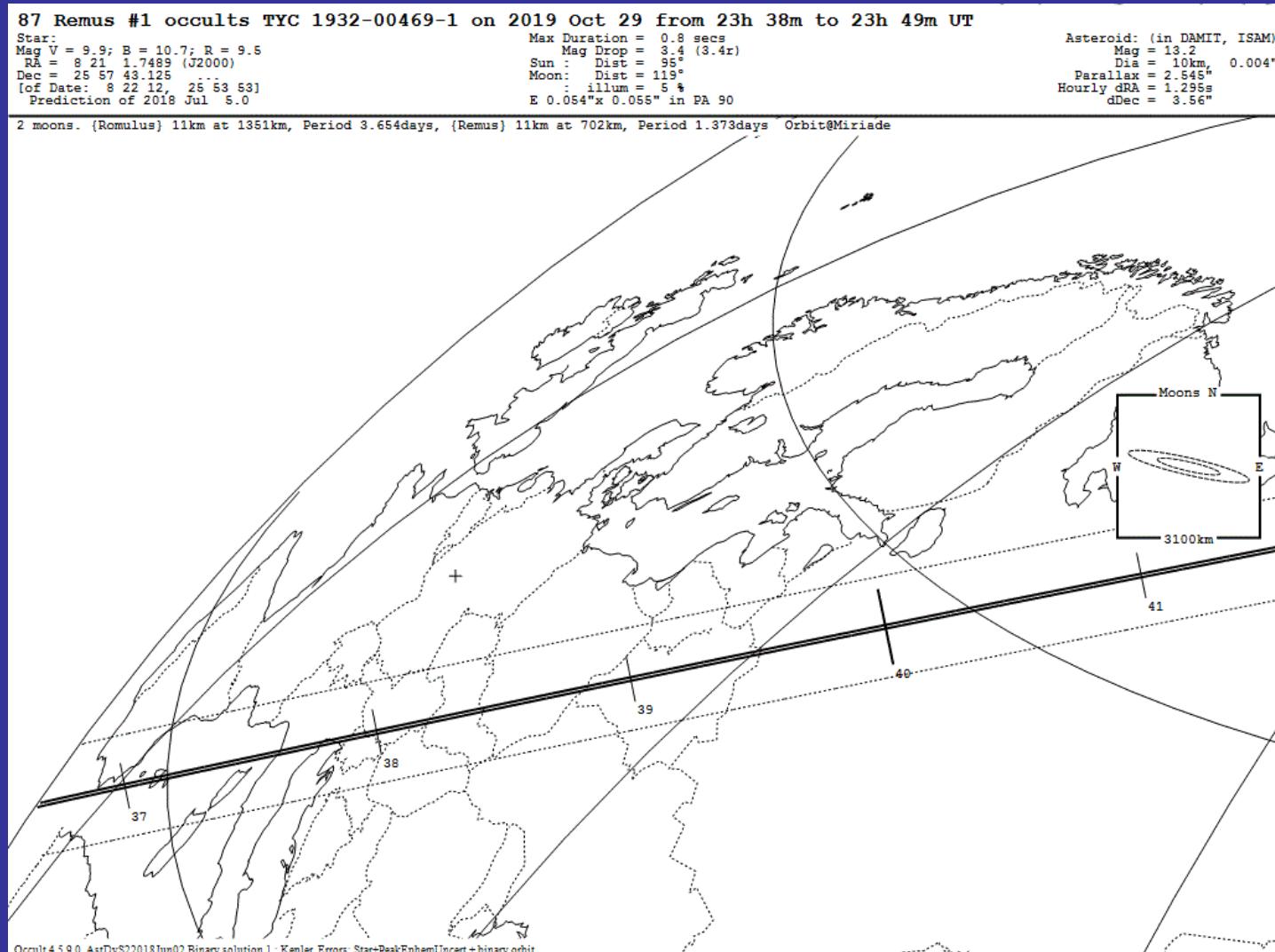
TYC 1932-00469-1 (9m.9)

2019 Oct 29, 23:37 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

(87) **Remus** TYC 1932-00469-1 (9m.9) 0.8 sec 2019 Oct 29, 23:37 U.T.

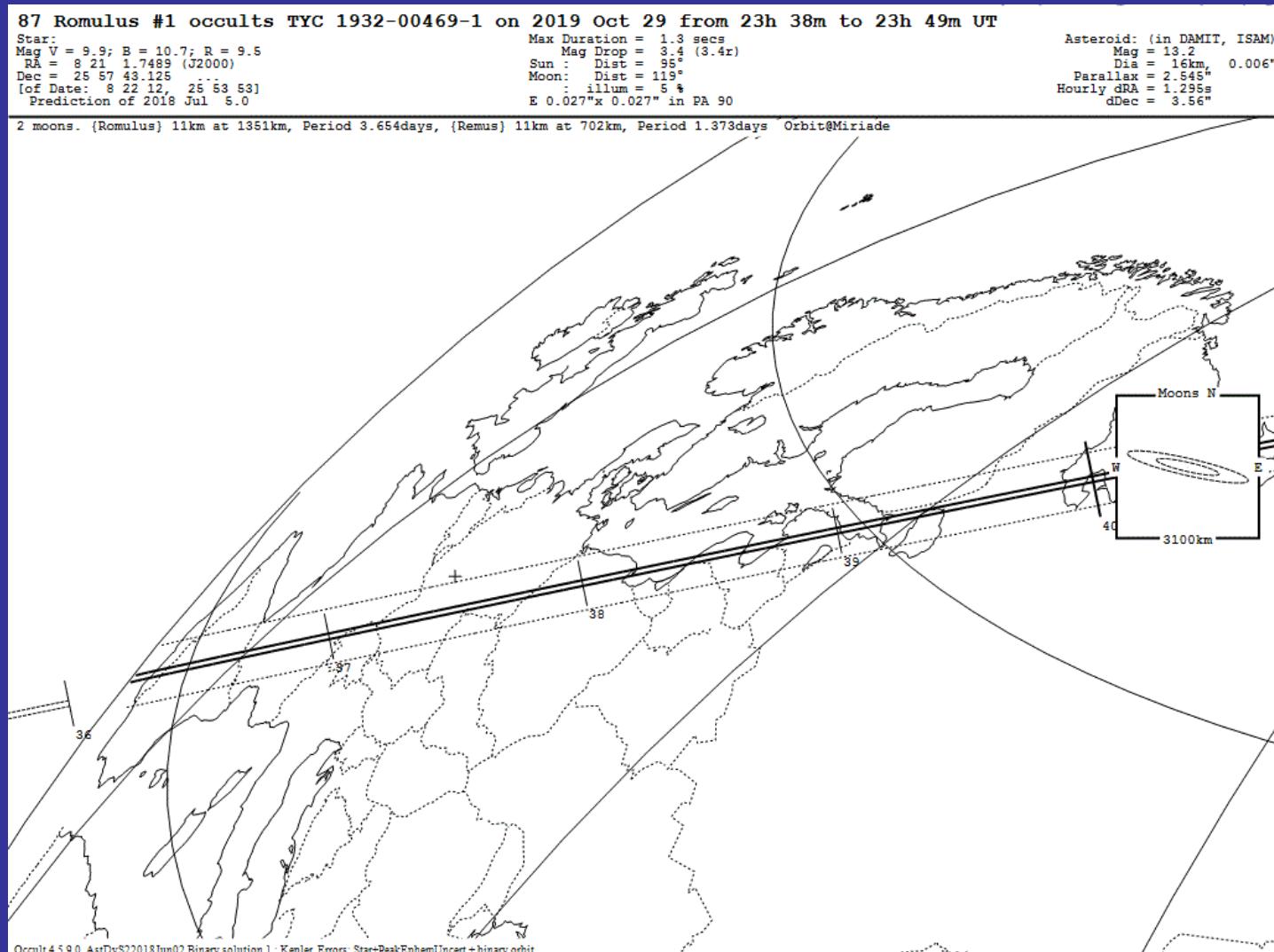


# Occultations by Asteroids - Highlights for Europe in 2019

(87) **Romulus** TYC 1932-00469-1 (9m.9)

1.3.sec

2019 Oct 29, 23:37 U.T.

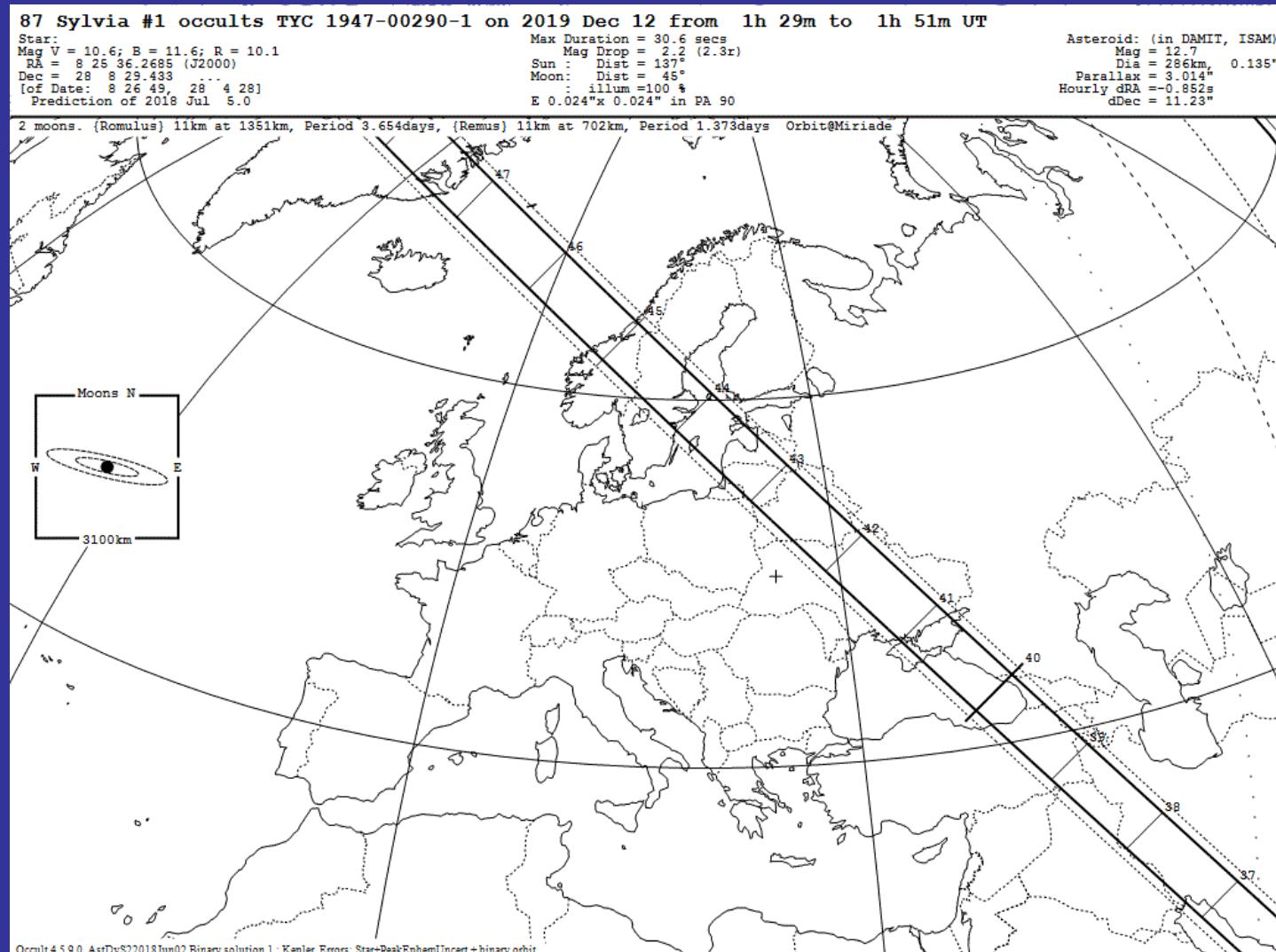


# Occultations by Asteroids - Highlights for Europe in 2019

(87) *Sylvia*

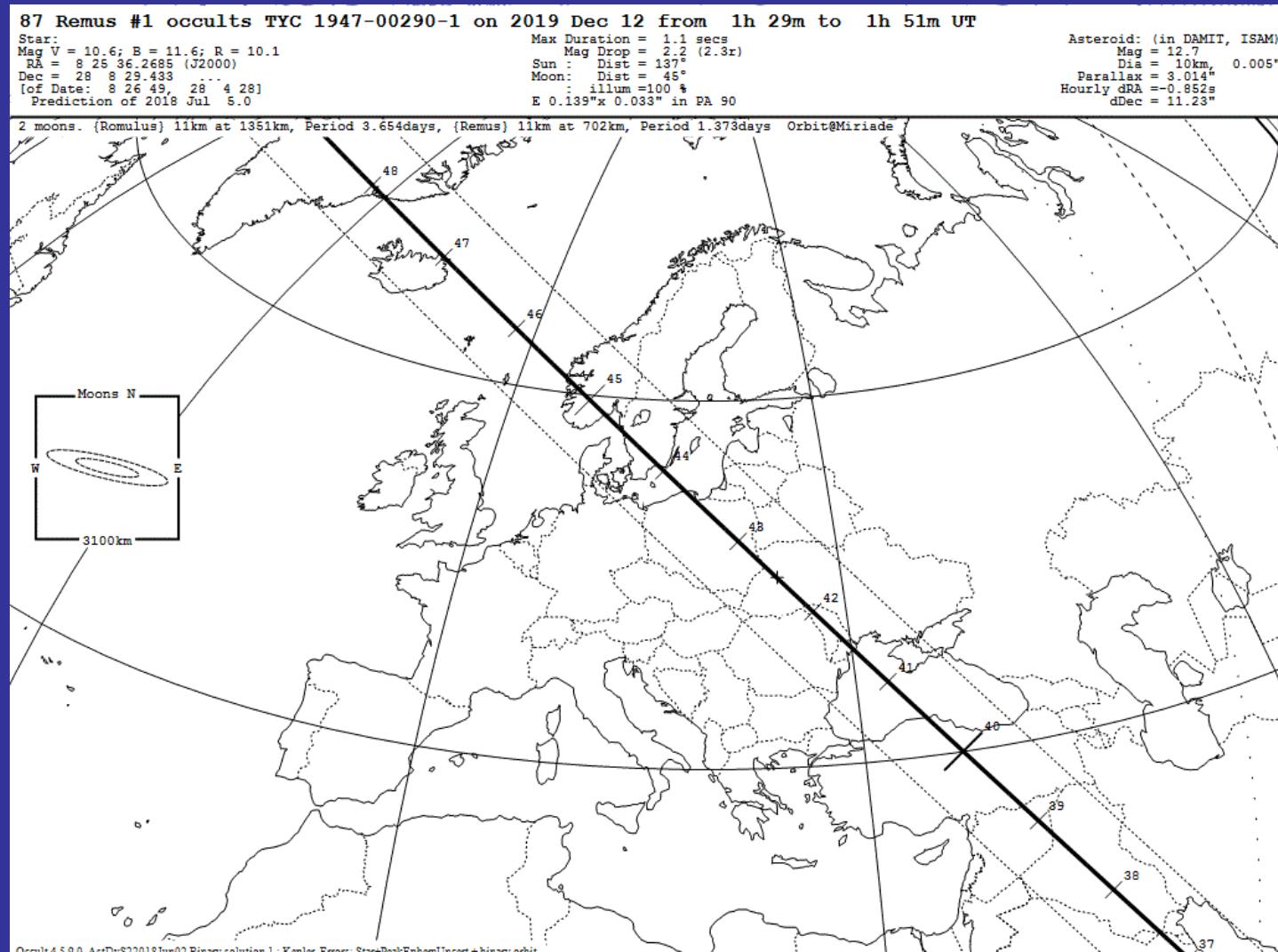
TYC 1947-00290-1 (10m.6)

2019 Dec 12, 01:38 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

(87) **Remus** TYC 1947-00290-1 (10m.6) 1.1 sec 2019 Dec 12, 01:39 U.T.

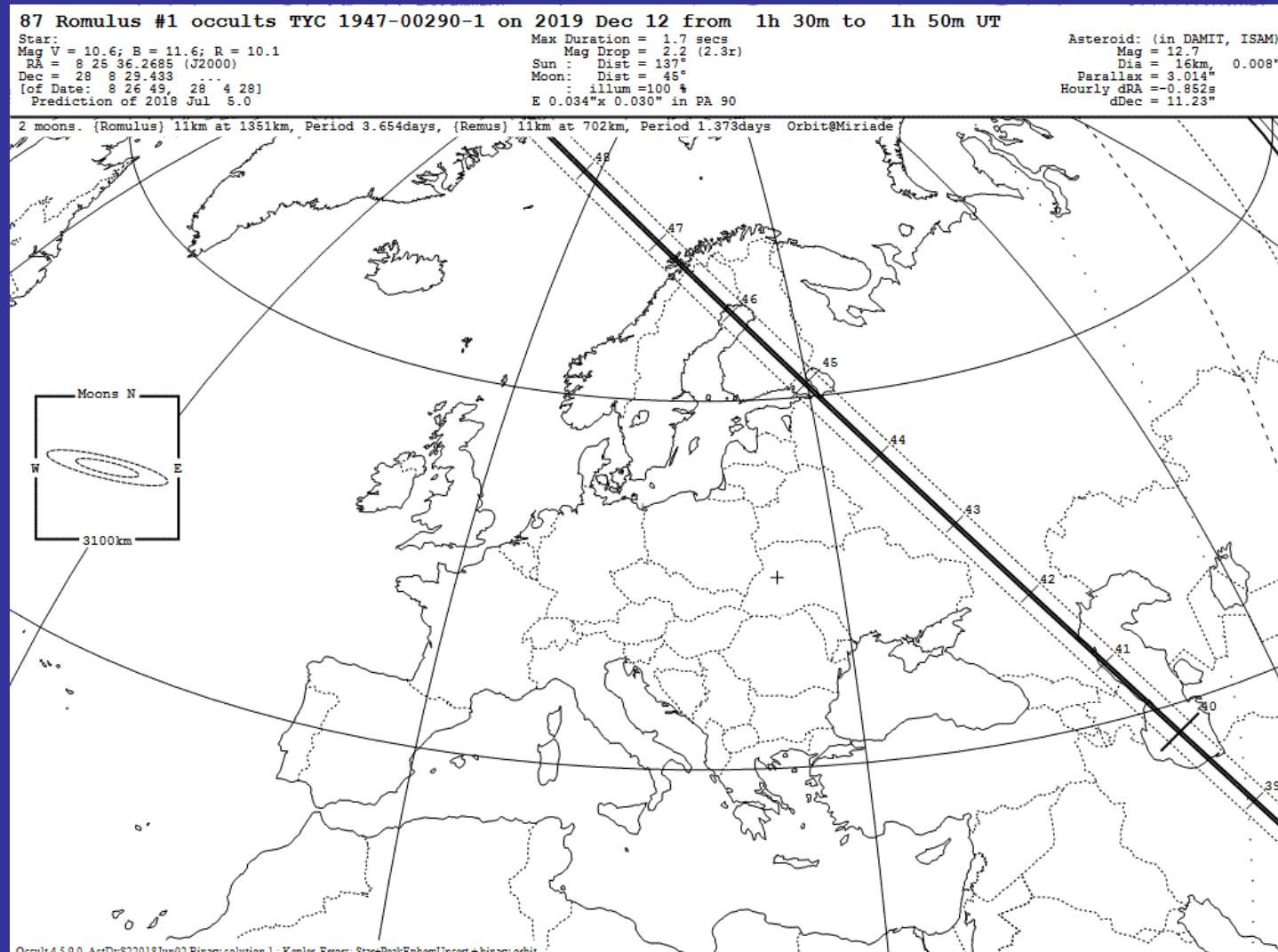


# Occultations by Asteroids - Highlights for Europe in 2019

(87) **Romulus** TYC 1947-00290-1 (10m.6)

1.7 sec

2019 Dec 12, 01:45 U.T.

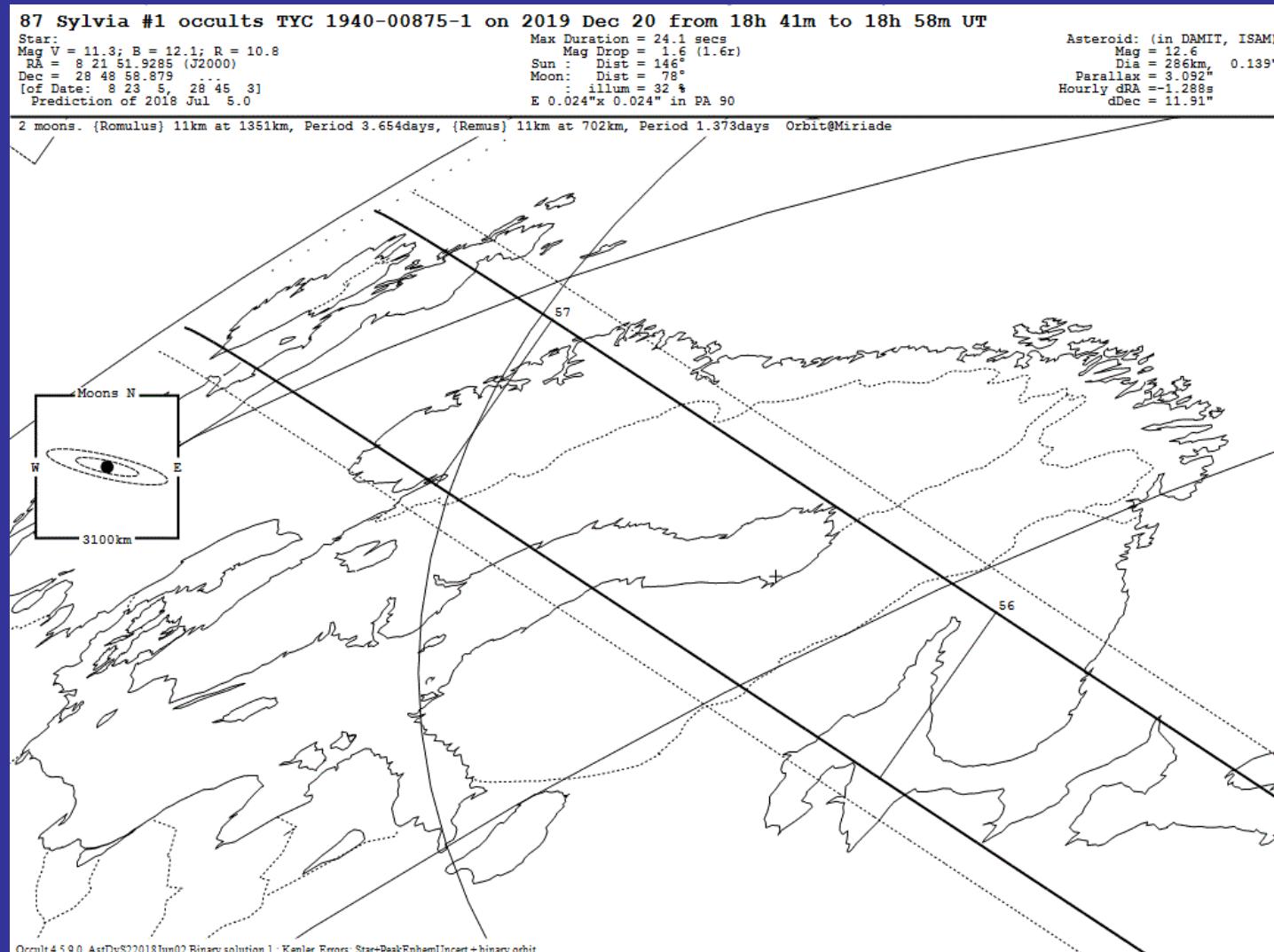


# Occultations by Asteroids - Highlights for Europe in 2019

(87) **Sylvia**

TYC 1940-00875-1 (11m.3)

2019 Dec 20, 18:56 U.T.

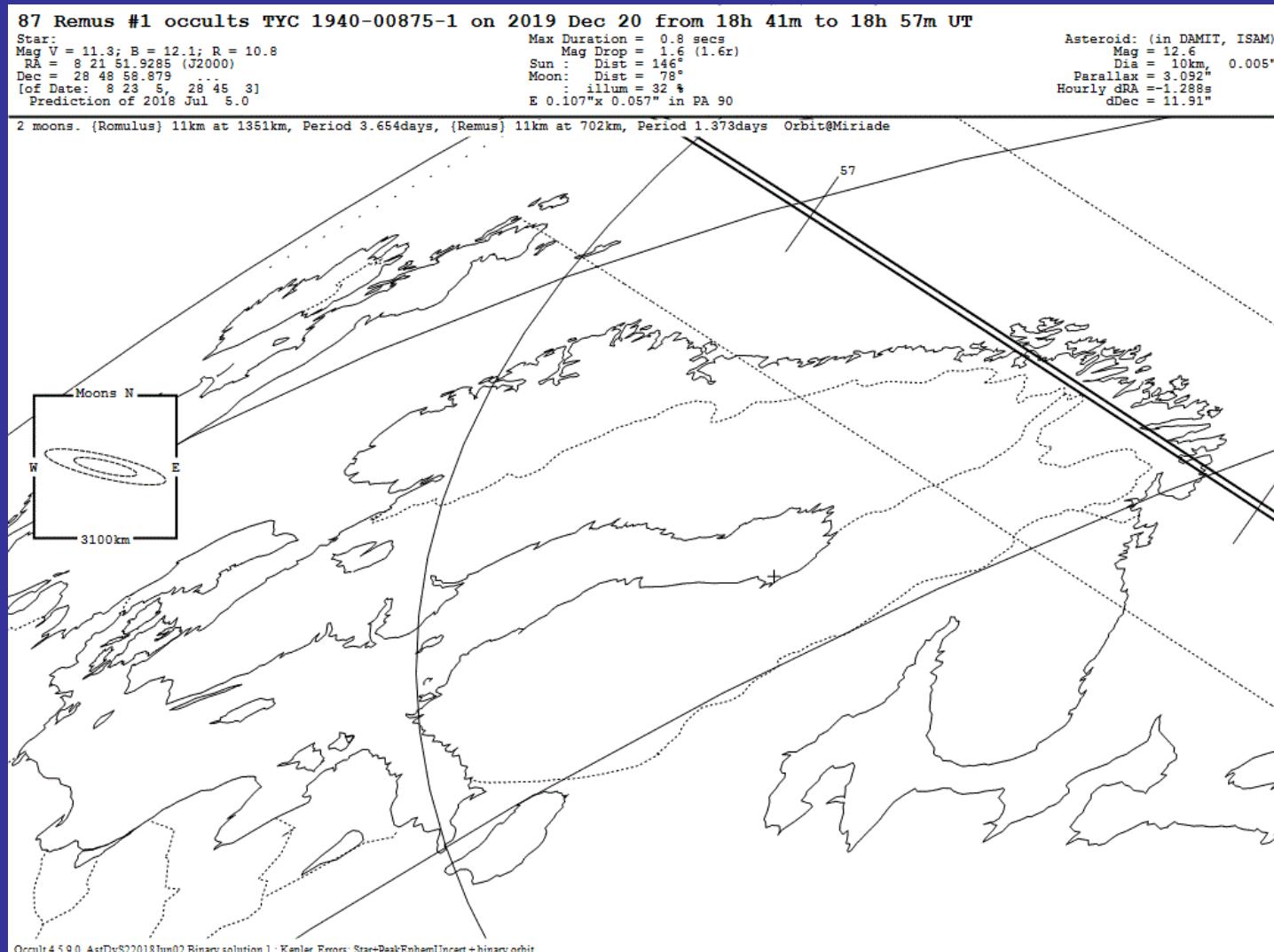


# Occultations by Asteroids - Highlights for Europe in 2019

(87) **Remus** TYC 1940-00875-1 (11m.3)

0.8 sec

2019 Dec 20, 18:56 U.T.

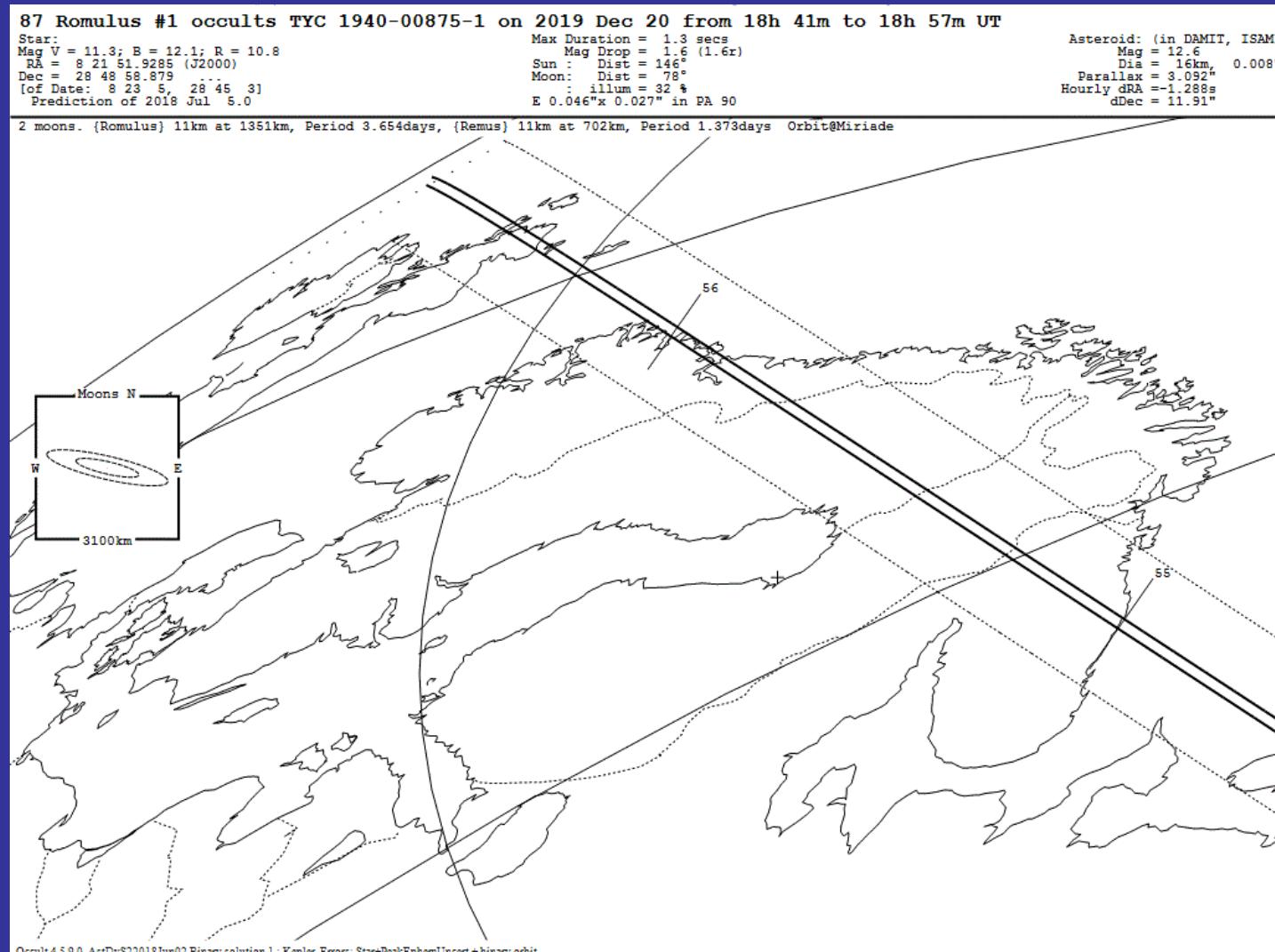


# Occultations by Asteroids - Highlights for Europe in 2019

(87) **Romulus** TYC 1940-00875-1 (11m.3)

1.3 sec

2019 Dec 20, 18:55 U.T.



# Occultations by Asteroids - Highlights for Europe in 2019

Thanks to:

Steve Preston  
Dave Herald  
IMCCE

Highlights of Asteroid Occultations in Europe  
<http://call4obs.iota-es.de/>