H.A.L. Astronomy School

The Ones That Move:

One Current Asteroid and Two Current Planets

Asteroid Vesta:

Nearly the Size of Arizona and Currently Passing Near the *Denebola/Vindemiatrix* Line


Kanab
Page
Kayenta
Tuba City
Chinle
Window Rock
LAS VEGAS
MOHAVE
COCONINO
FLAGSTAFF
NAVAJO
Kingman
Bullhead City
Winslow
Sedona
Cottonwood
Holbrook
APACHE
YAVAPAI
Prescott
Camp Verde
St. Johns
Lake Havasu City
Payson
Show Low
Parker
LA PAZ
GILA
Blythe
PHOENIX
GREENLEE
Globe
MARICOPA
GRAHAM
Clifton
Florence
Casa Grande
PINAL
Safford
YUMA
YUMA
PIMA
TUCSON
Sells
COCHISE
SANTA CRUZ
Sierra Vista
Bisbee
Douglas
Nogales
Agua Prieta
ARIZONA
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Kanab
Page
CRUZ
Bisbee
Douglas
Nogales
Agua Prieta
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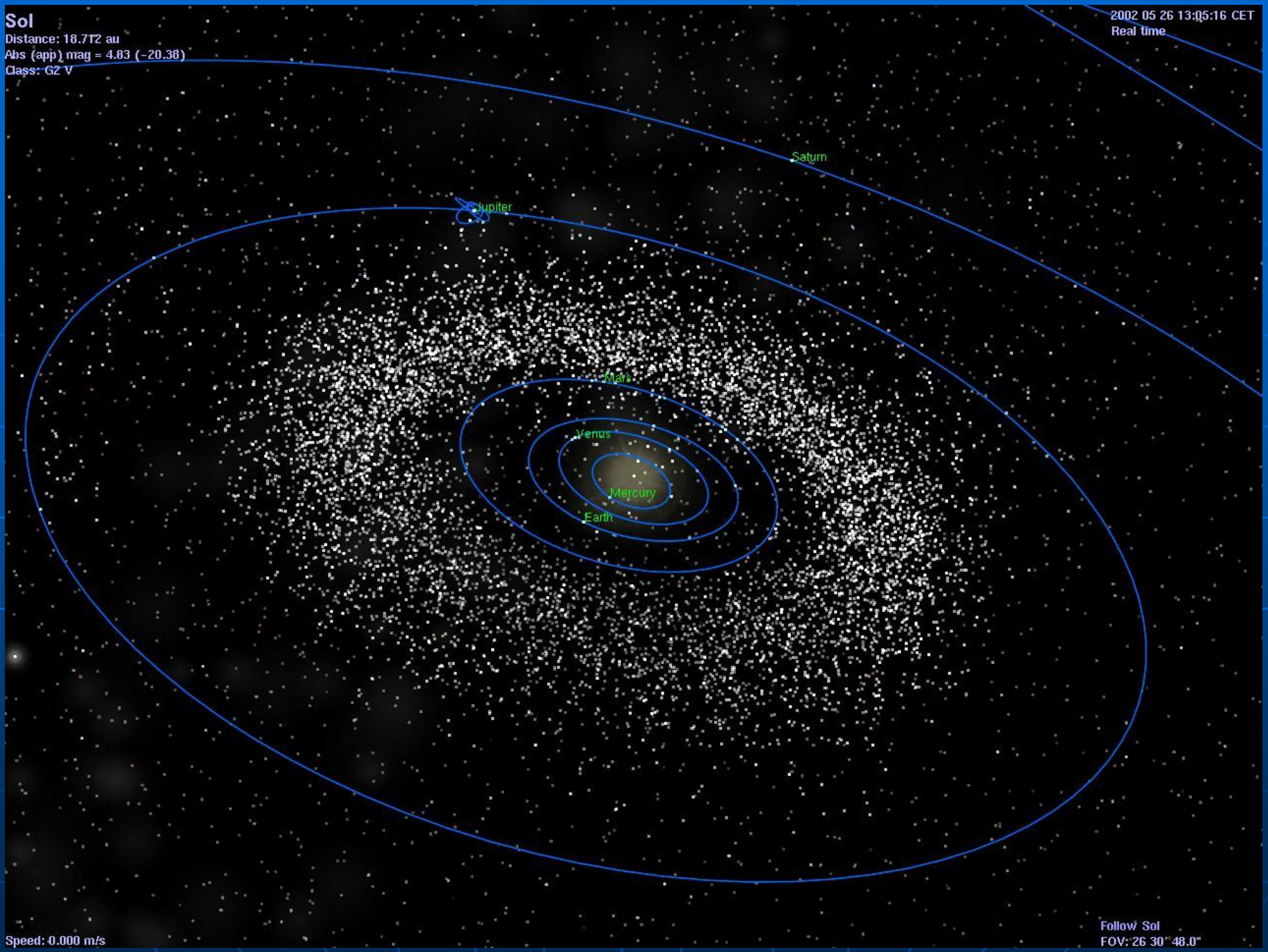
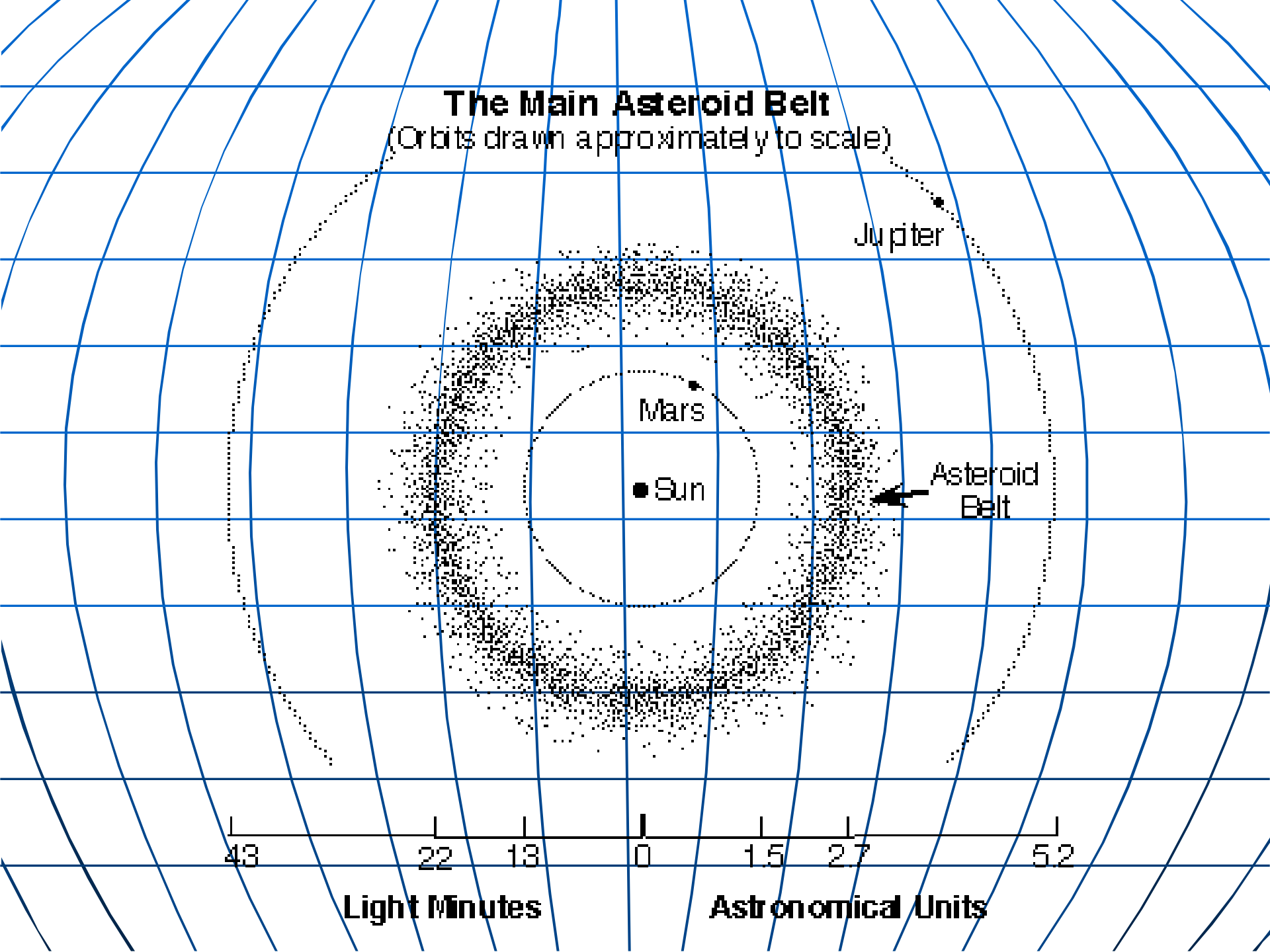
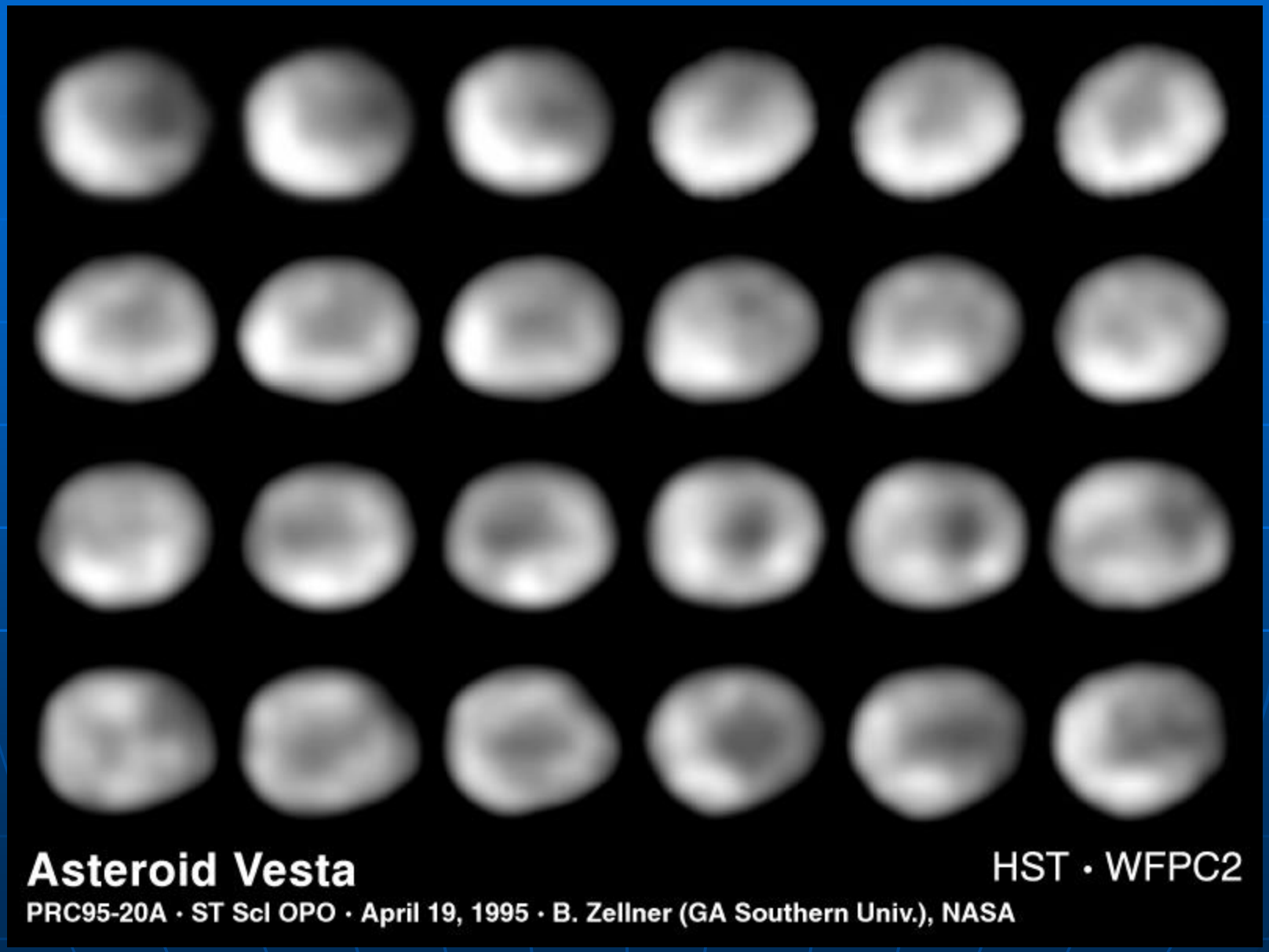
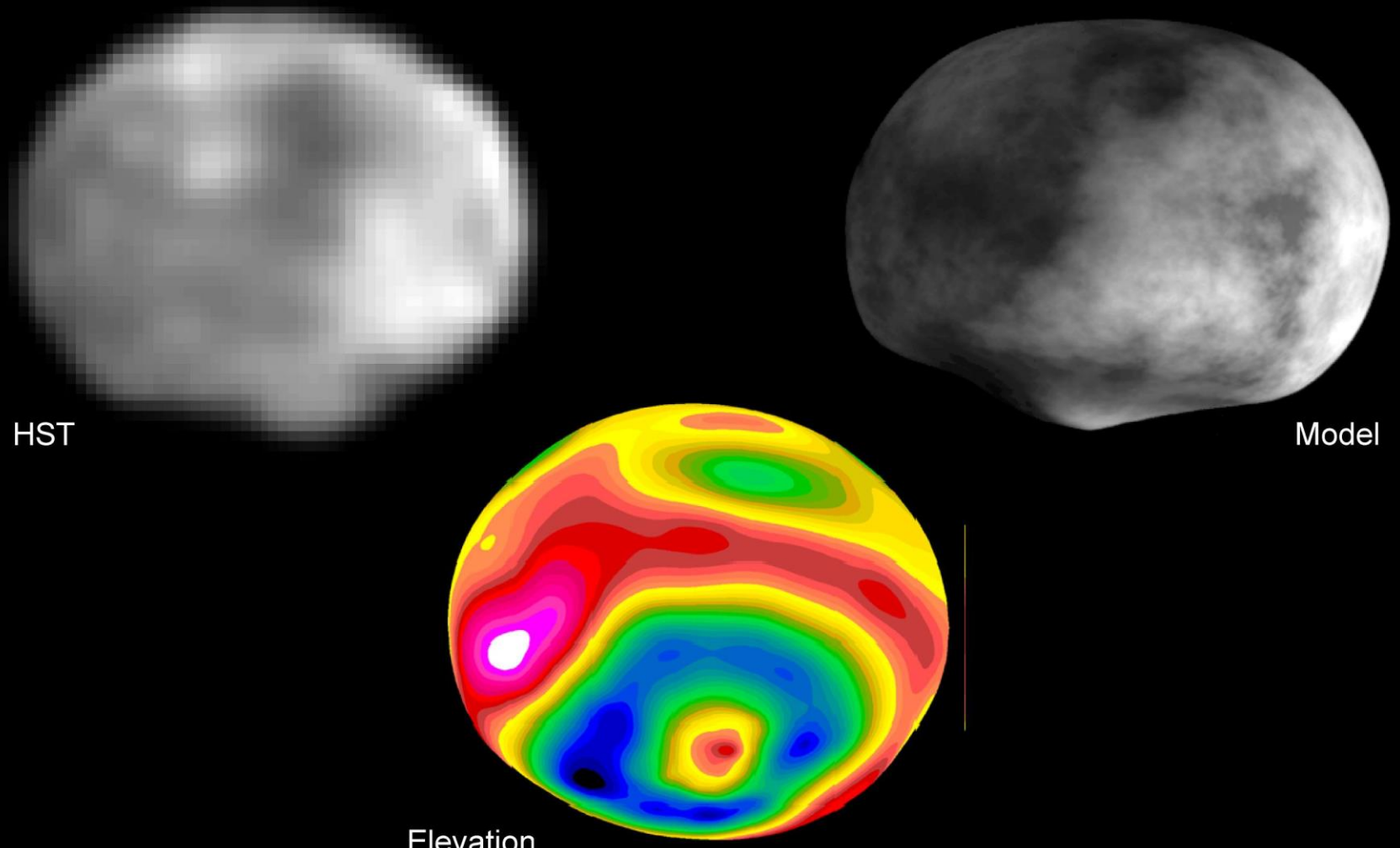

Sol
Distance: 18.712 au
Abs (app) mag = 4.83 (-20.38)
Class: G2 V
2002 05 26 13:05:16 CET
Real time
Saturn
Jupiter
Mars
Venus
Mercury
Earth
Speed: 0.000 m/s
Follow Sol
FOV: 26 30' 48.0"


The Main Asteroid Belt
(Orbits drawn approximately to scale)
Jupiter
Mars
Sun
Asteroid Belt
43
22
13
0
1.5
2.7
5.2
Light Minutes
Astronomical Units

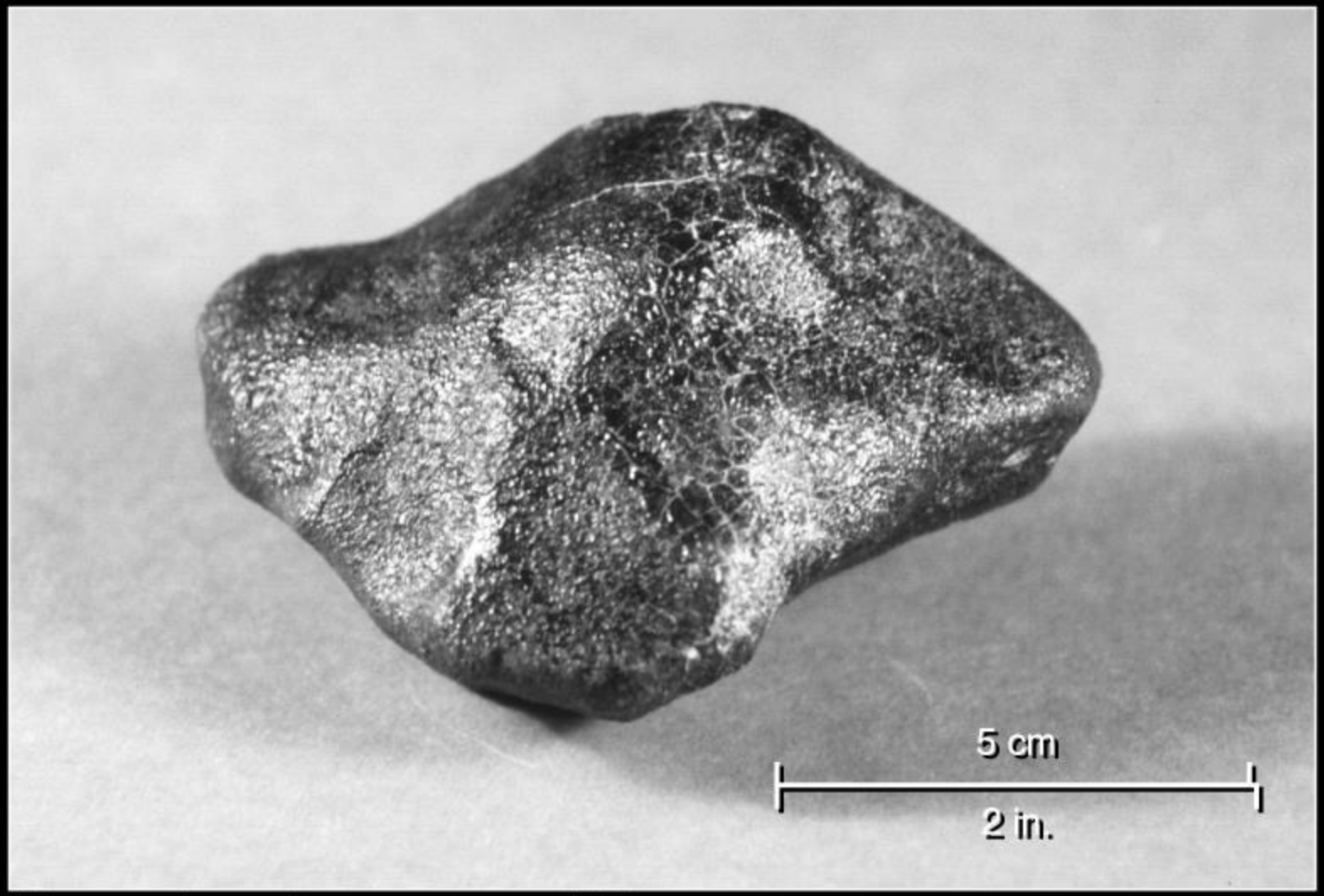

Asteroid Vesta
HST · WFPC2
PRC95-20A · ST ScI OPO · April 19, 1995 · B. Zellner (GA Southern Univ.), NASA



Asteroid Vesta

Hubble Space Telescope • Wide Field Planetary Camera 2

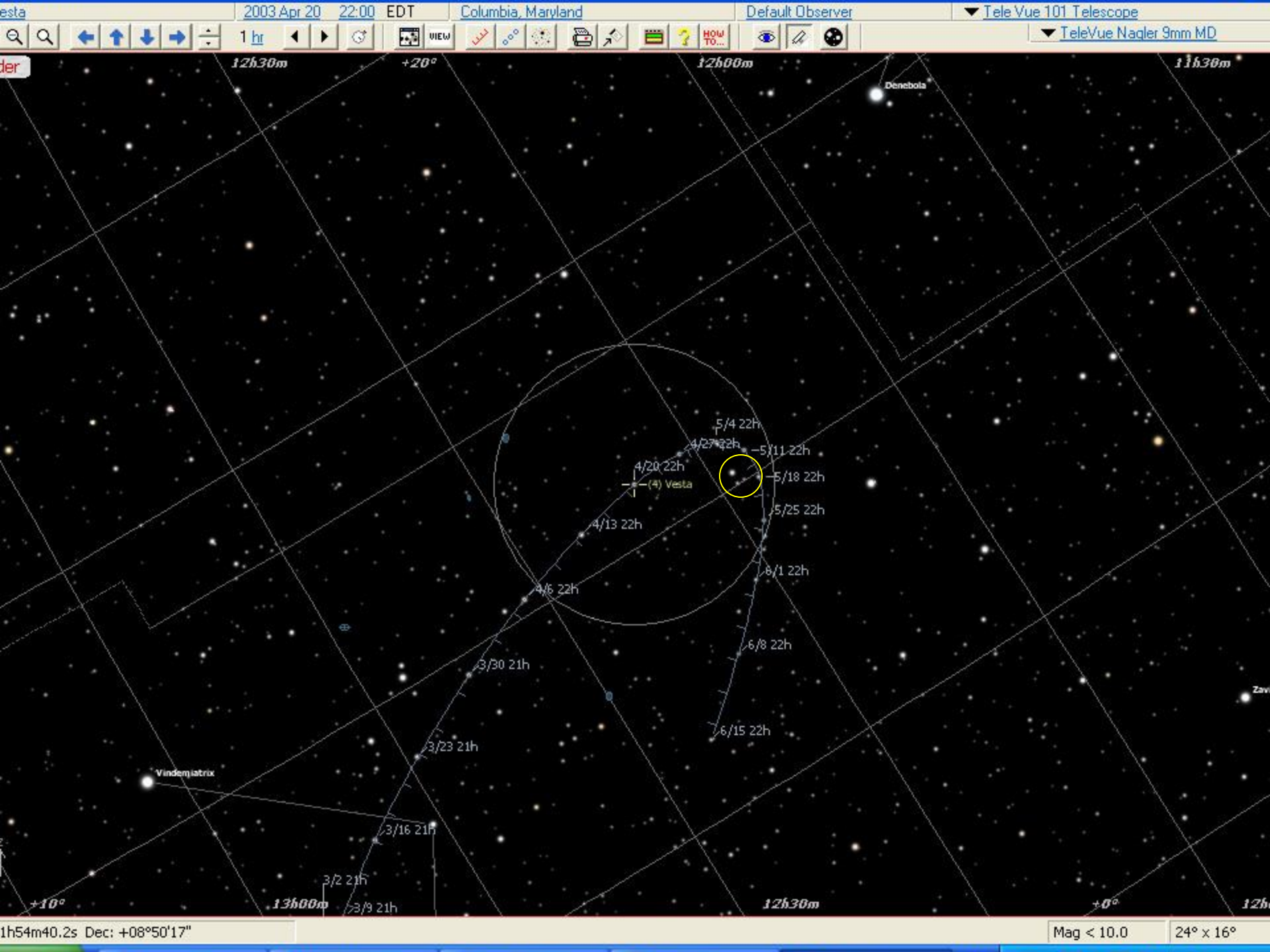
PRC97-27 • ST ScI OPO • September 4, 1997 • P. Thomas (Cornell University), B. Zellner (Georgia Southern University) and NASA

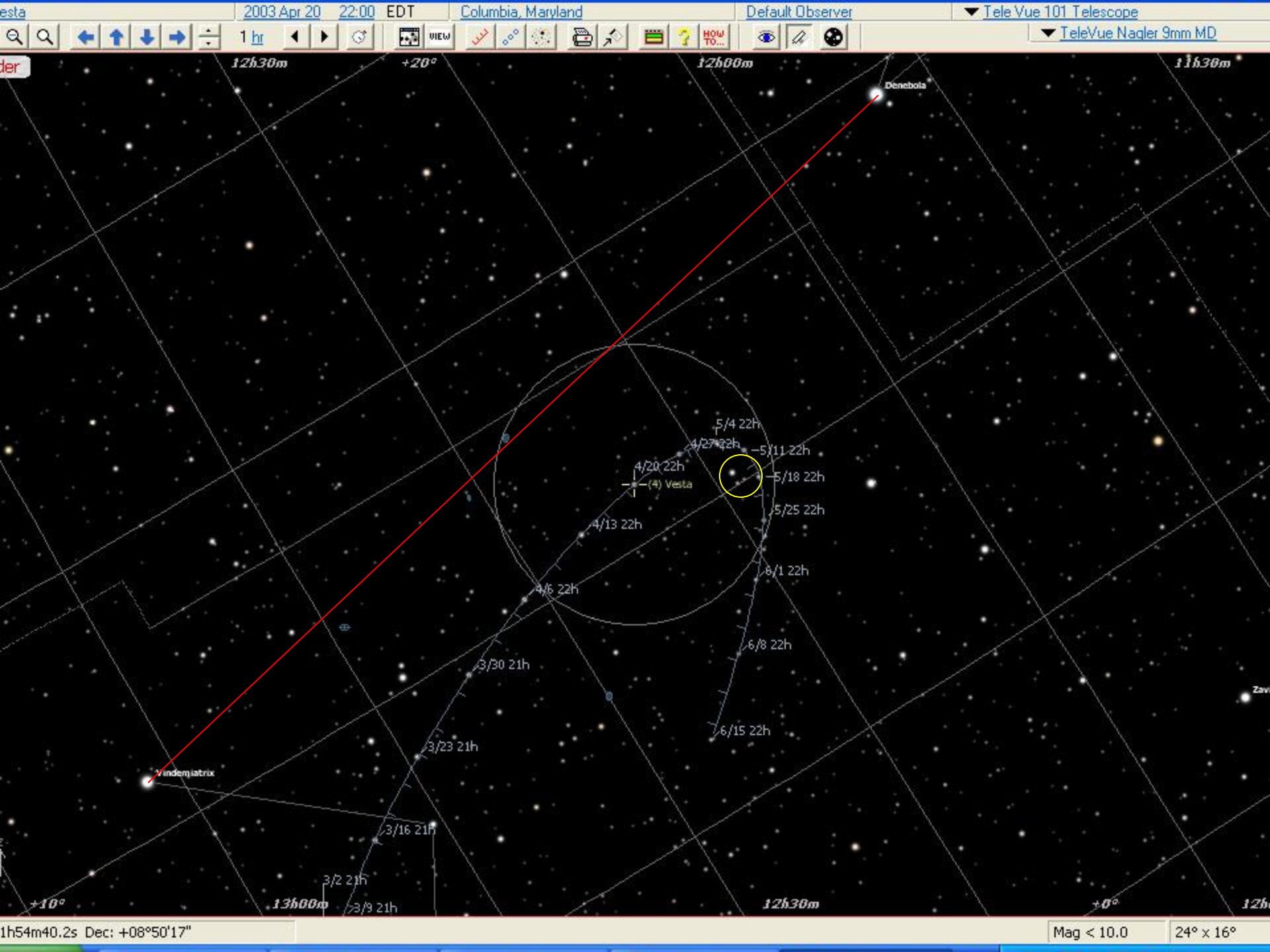


Meteroite · Fragment of Vesta

Lab Photograph · Russel Kempton, New England Meteoritical Services

PRC95-20B · ST ScI OPO · April 19, 1995 · B. Zellner (GA Southern Univ.), NASA


esta
2003 Apr 20 22:00 EDT
Columbia, Maryland
Default Observer
Tele Vue 101 Telescope
1 hr
TeleVue Nagler 9mm MD
der
12h30m
+20°
12h00m
11h30m
Denebola
5/4 22h
4/27 22h
5/11 22h
4/20 22h
5/18 22h
(4) Vesta
5/25 22h
4/13 22h
6/1 22h
4/6 22h
6/8 22h
3/30 21h
6/15 22h
3/23 21h
Vindemiatrix
3/16 21h
3/2 21h
3/9 21h
+10°
13h00m
12h30m
+0°
12h
1h54m40.2s Dec: +08°50'17"
Mag < 10.0
24° x 16°


esta
2003 Apr 20 22:00 EDT
Columbia, Maryland
Default Observer
Tele Vue 101 Telescope
1 hr
TeleVue Nagler 9mm MD
der
12h30m
+20°
12h00m
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Denebola
5/4 22h
4/27 22h
5/11 22h
4/20 22h
5/18 22h
(4) Vesta
5/25 22h
4/13 22h
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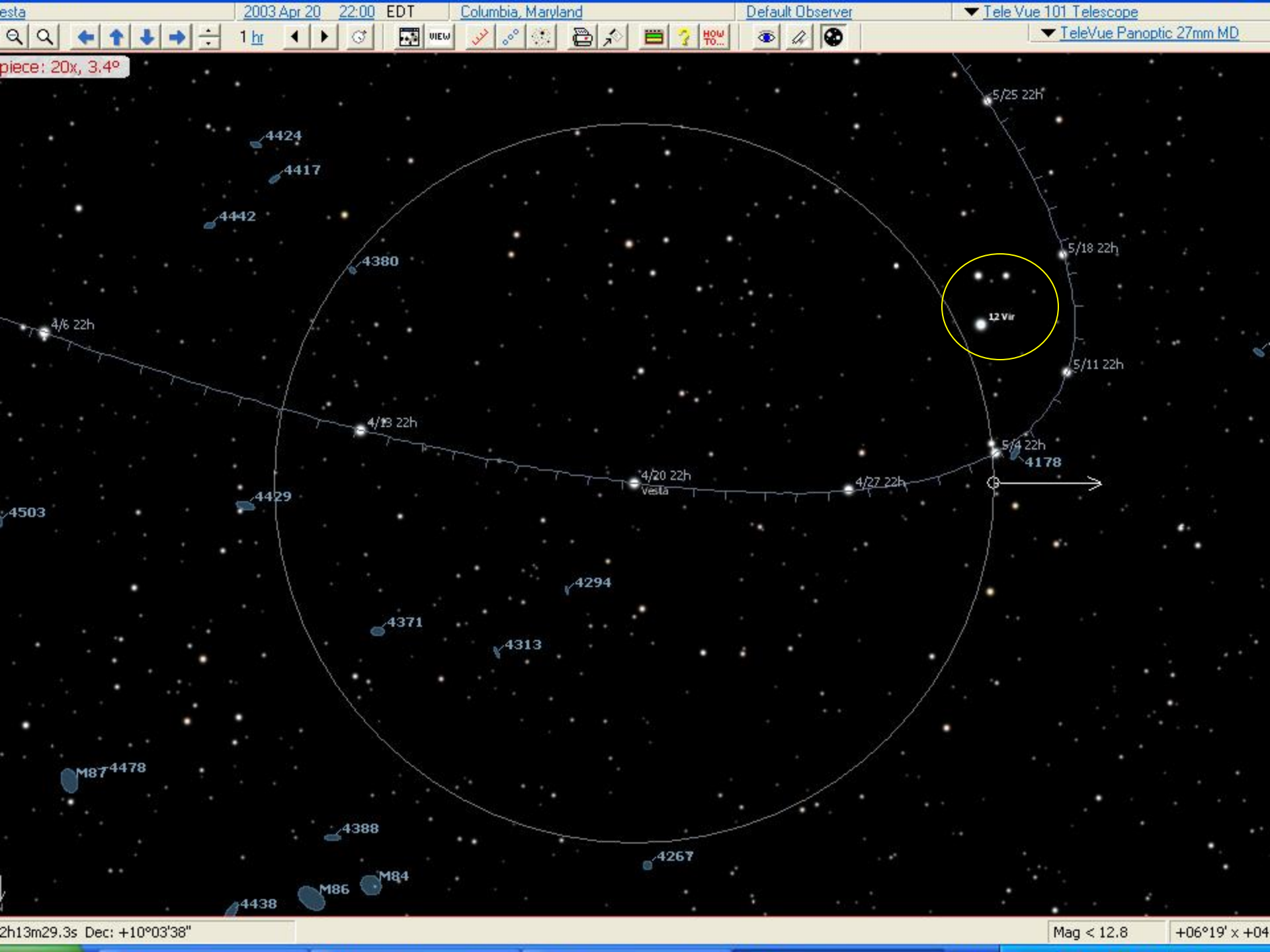
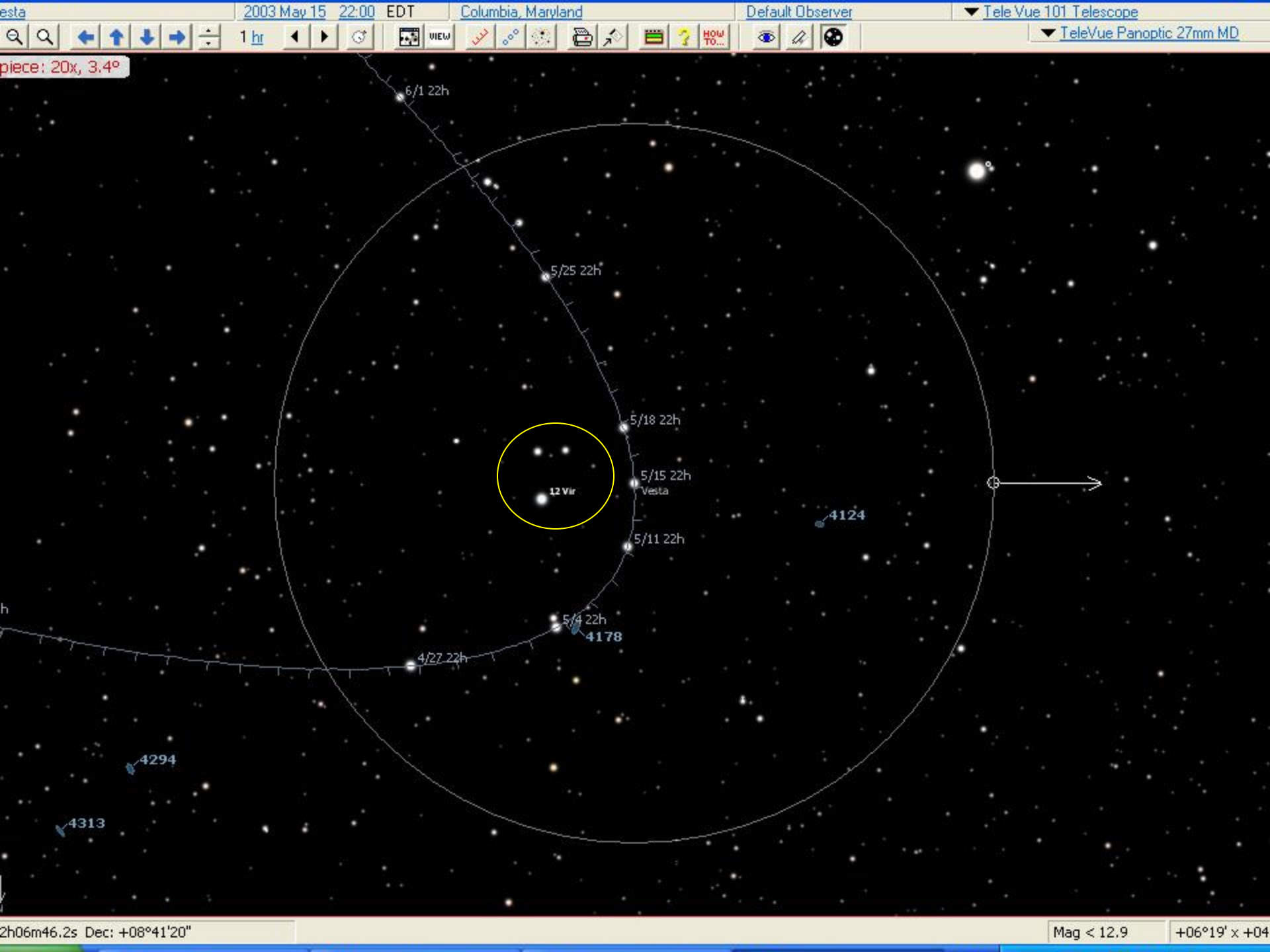
6/8 22h
3/30 21h
6/15 22h
3/23 21h
Vindemiatrix
3/16 21h
3/2 21h
3/9 21h
+10°
13h00m
12h30m
+0°
12h
1h54m40.2s Dec: +08°50'17"
Mag < 10.0
24° x 16°


esta
2003 Apr 20 22:00 EDT
Columbia, Maryland
Default Observer
Tele Vue 101 Telescope
1 hr
TeleVue Panoptic 27mm MD
piece: 20x, 3.4°
5/25 22h
4424
4417
4442
4380
5/18 22h
12 Vir
4/6 22h
5/11 22h
4/13 22h
5/4 22h
4178
4/20 22h
Vesta
4/27 22h
4429
4503
4294
4371
4313
M87
4478
4388
4267
M84
M86
4438
2h13m29.3s Dec: +10°03'38"
Mag < 12.8
+06°19' x +04


esta
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Columbia, Maryland
Default Observer
Tele Vue 101 Telescope
1 hr
TeleVue Panoptic 27mm MD
piece: 20x, 3.4°
6/1 22h
5/25 22h
5/18 22h
5/15 22h
Vesta
12 Vir
5/11 22h
5/4 22h
4178
4/27 22h
4124
4294
4313
2h06m46.2s Dec: +08°41'20"
Mag < 12.9
+06°19' x +04

ASTEROIDS: Course Plotting

Finding and following one of the small rocky planetoids that accompany the major planets around the Sun can be a most satisfying project.

The small size of asteroids can make them a challenge to find, however. Although the largest, **Ceres**, is about 1000 kilometers (620 miles) in diameter, most range from about 100 kilometers (62 miles) to 200 k (125 miles) across, down to one kilometer (0.6 mile) or less. This means they all remain starlike even in the largest of amateur scopes.

The four largest can be found in binoculars under dark skies specially at opposition when they are the brightest. All four are magnitude 8.5 or brighter.

Since they are stellar in appearance their true nature can only be discerned by their movement compared to the background stars from one night to the next.

Each year the daily or weekly positions for these fascinating little worlds are published in the astronomical periodicals.

Using the information thus obtained, find and track an asteroid over a period of 3-5 nights.

ASTEROIDS: Measuring their Movement

Having plotted an asteroid's pathway among the background stars for at least three evenings you can now figure out its approximate hourly movement.

Using a finely graded ruler such as a millimeter rule, measure the distance from the dot representing your first observation to the dot representing your second observation.

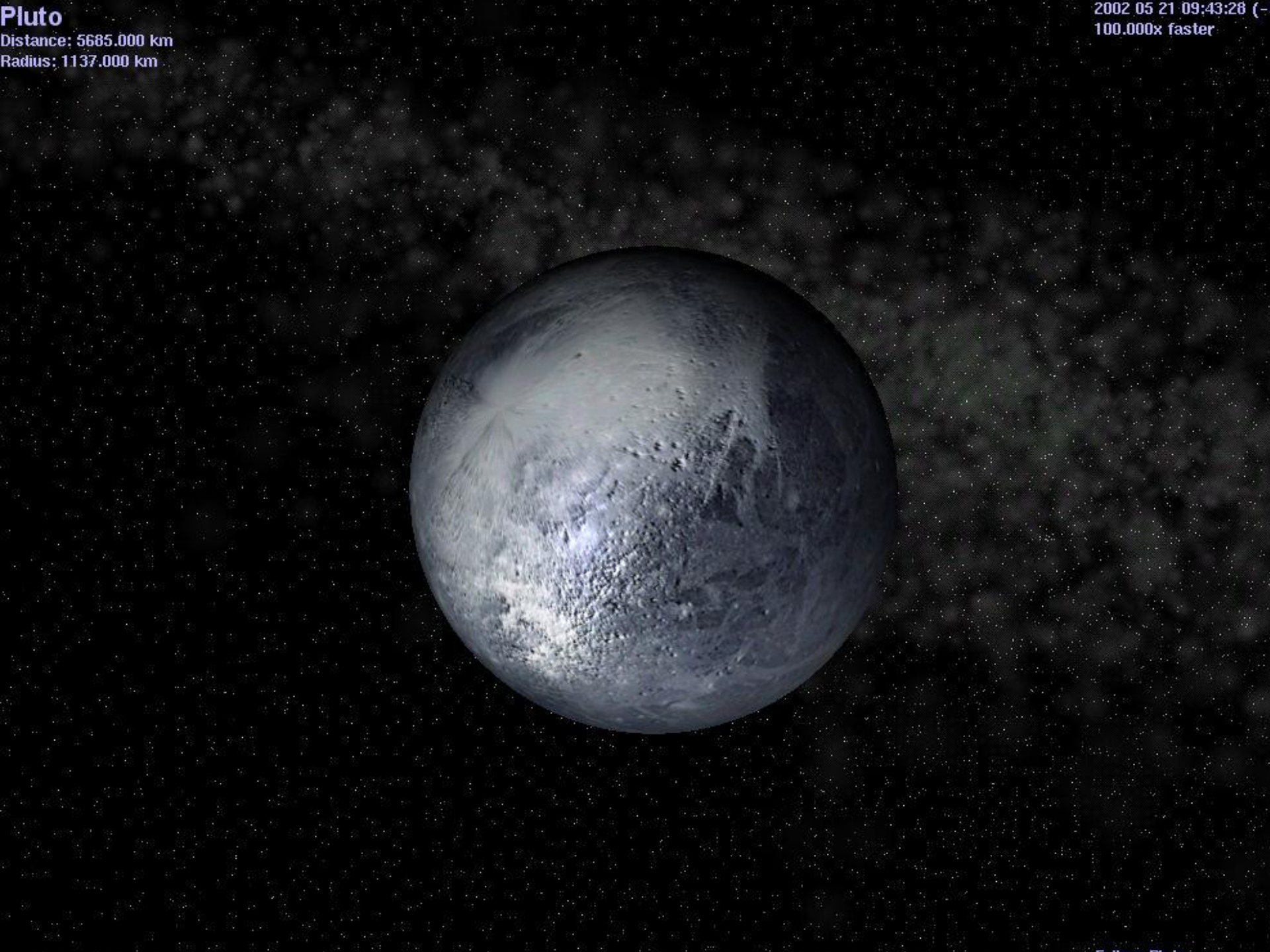
If these two observations were, for example, about 24 hours apart, divide that measurement by 24 (or whatever the time interval was in hours) to find out how far the asteroid traveled in one hour.

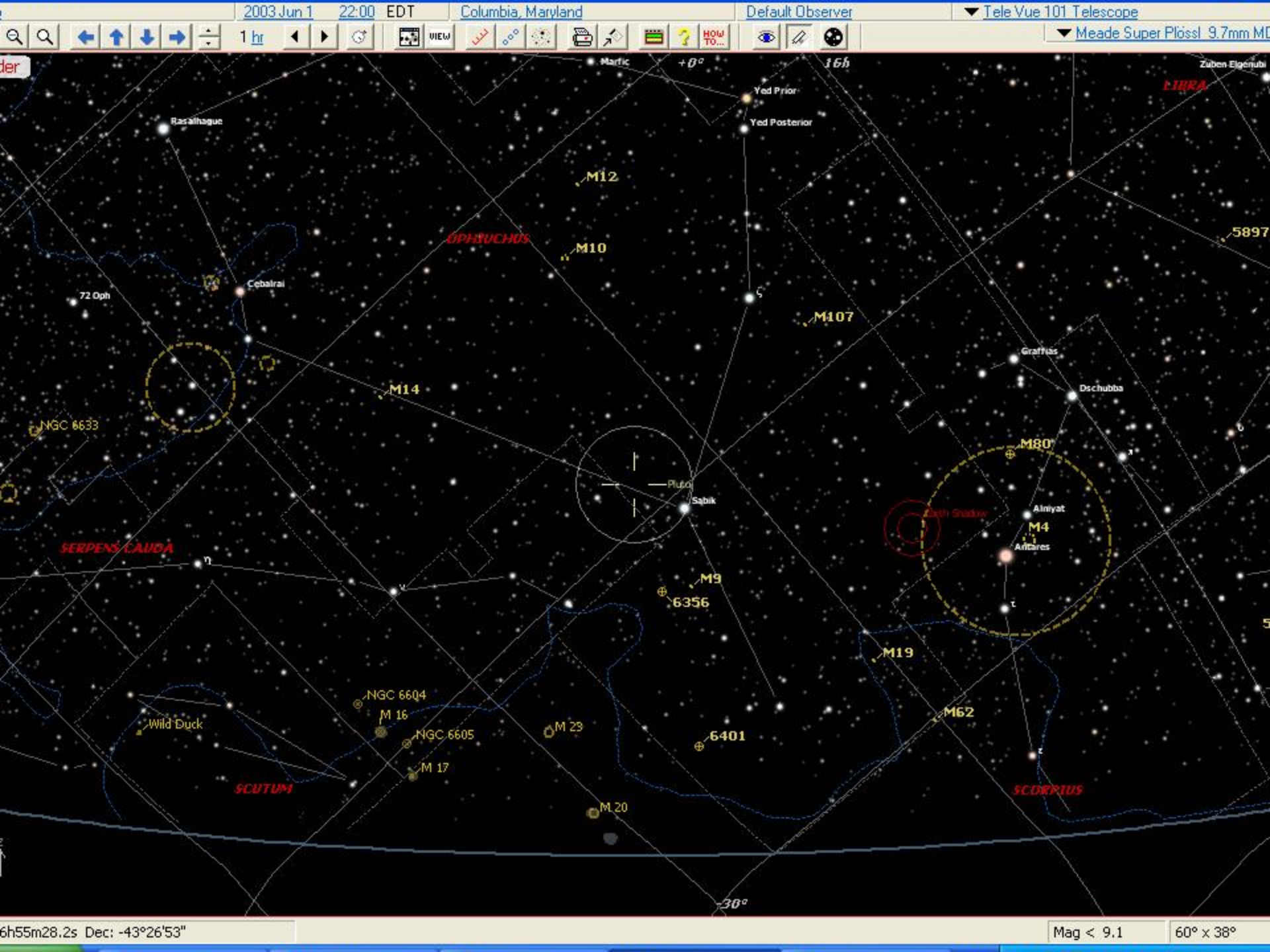
Do the same thing for each subsequent observation.

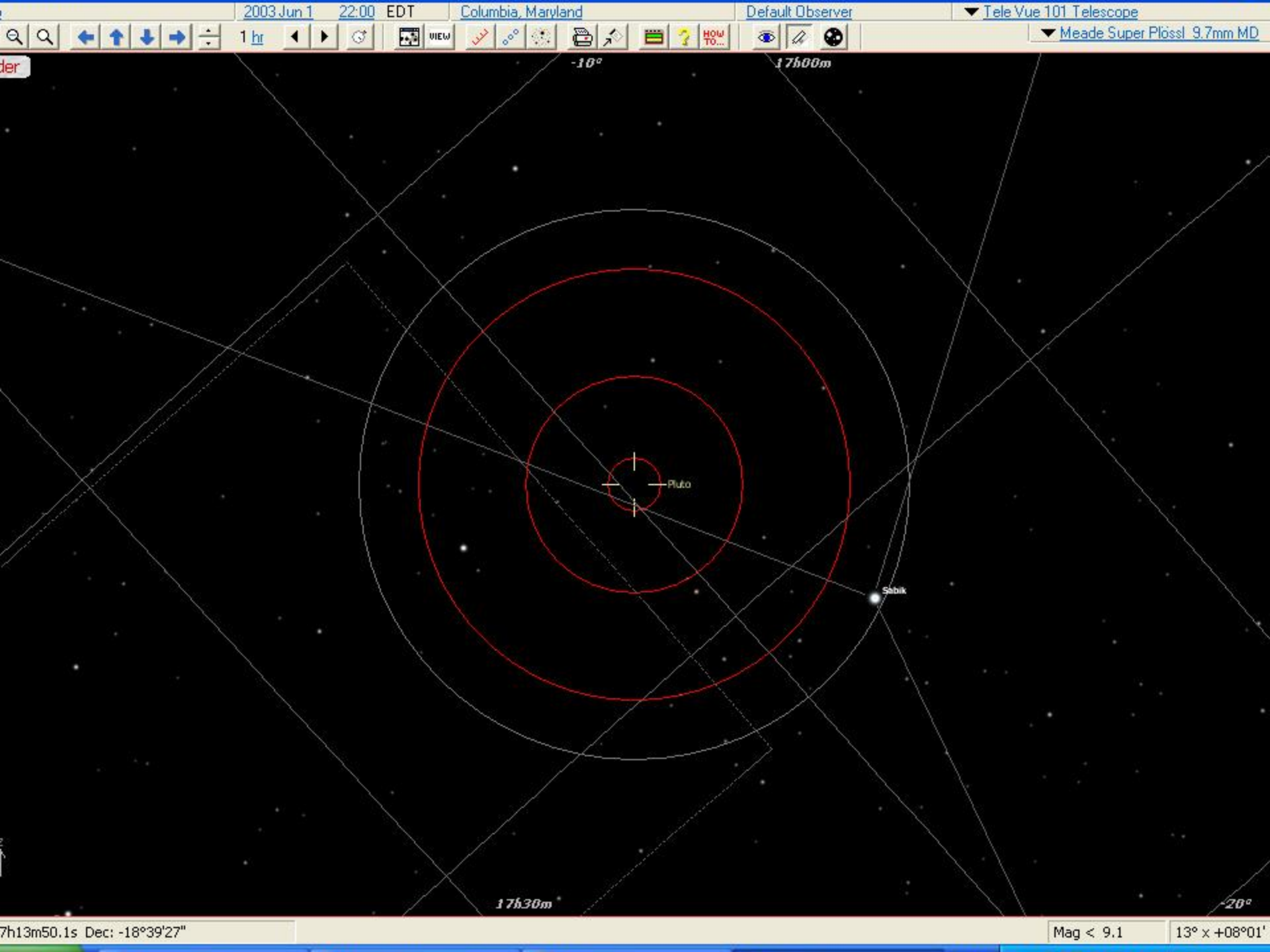
How far did the asteroid move in one hour?

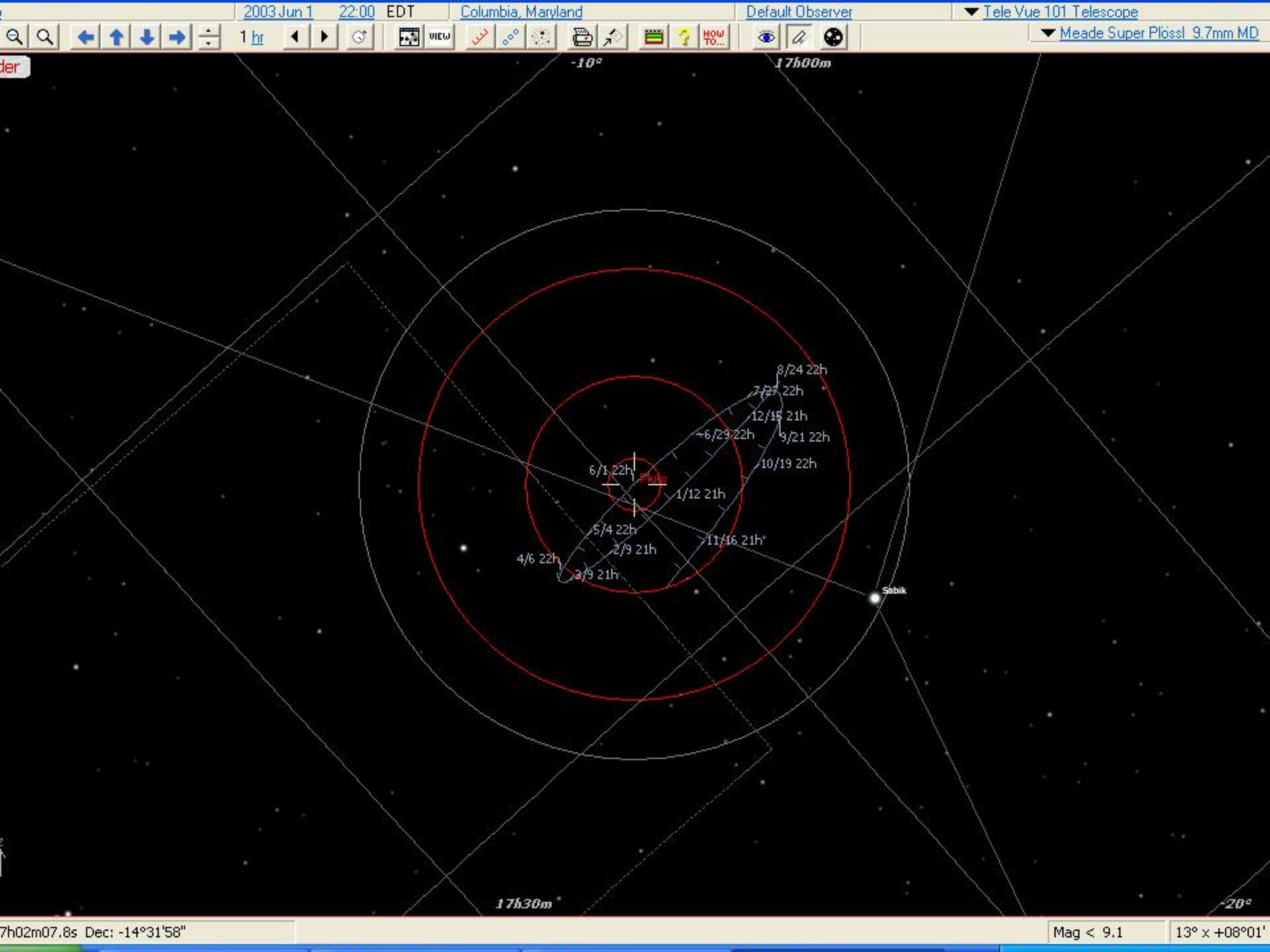
Pluto:

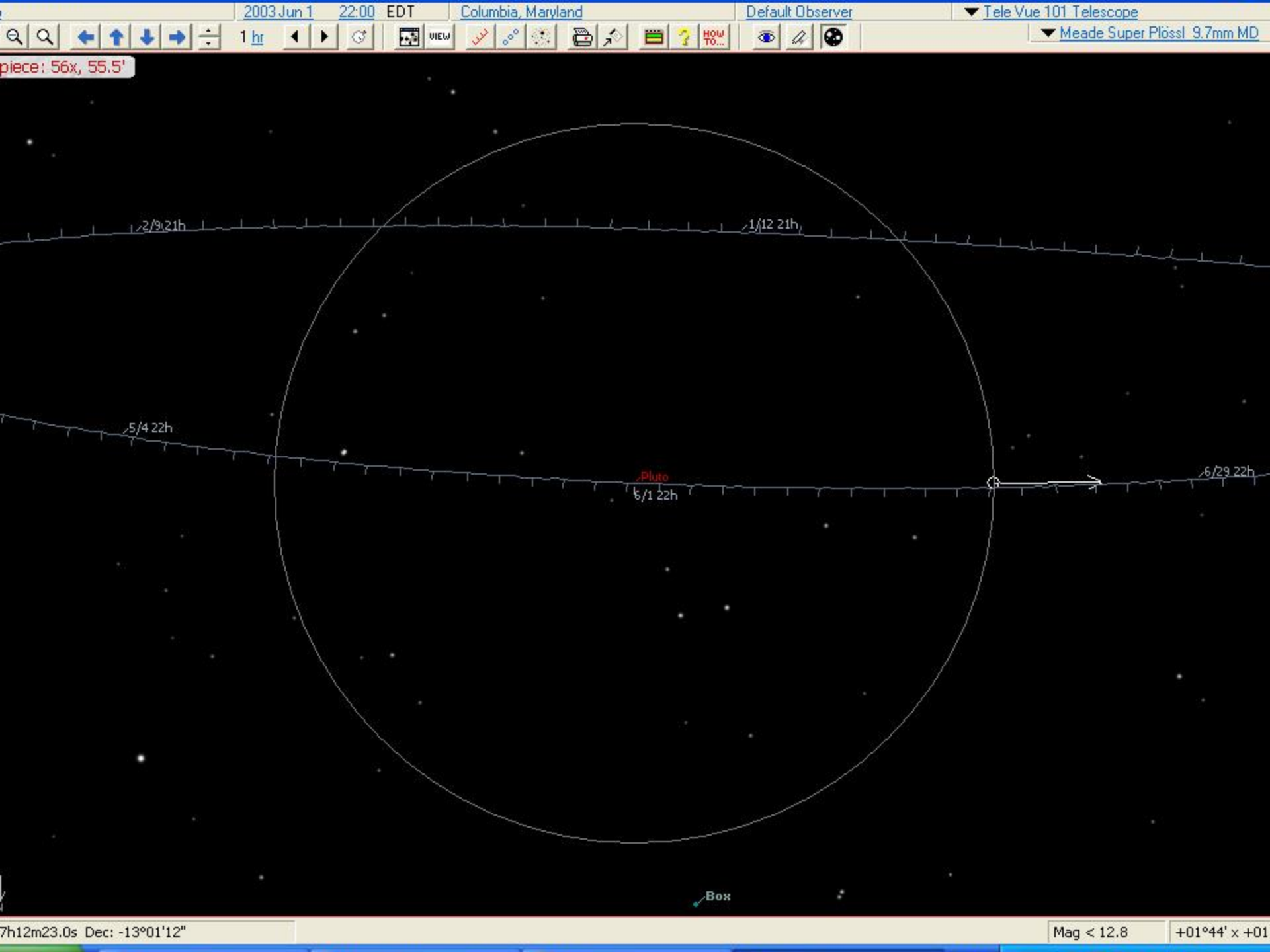
Your Summer Opportunity to Join the Nine Planets Club


Pluto
Distance: 5685.000 km
Radius: 1137.000 km
2002 05 21 09:43:28 (-
100.000x faster


2003 Jun 1
22:00 EDT
Columbia, Maryland
Default Observer
Tele Vue 101 Telescope
1 hr
Meade Super Plössl 9.7mm MD
Marfic
+0°
16h
Zuben Elgenubi
LIBRA
Yed Prior
Yed Posterior
Rasalhague
M12
OPHIUCHUS
M10
5897
72 Oph
Cebalrai
M107
Graffias
Dschubba
M14
NGC 6633
M80
Pluto
Sabik
Earth Shadow
Alniyat
M4
Antares
SERPENS CAUDA
M9
6356
M19
NGC 6604
M 16
Wild Duck
NGC 6605
M 23
6401
M62
M 17
SCUTUM
SCORPIUS
M 20
-30°
6h55m28.2s Dec: -43°26'53"
Mag < 9.1
60° x 38°


2003 Jun 1
22:00 EDT
Columbia, Maryland
Default Observer
Tele Vue 101 Telescope
1 hr
Meade Super Plössl 9.7mm MD
-10°
17h00m
Pluto
Sabik
17h30m
-20°
7h13m50.1s Dec: -18°39'27"
Mag < 9.1
13° x +08°01'


2003 Jun 1
22:00 EDT
Columbia, Maryland
Default Observer
Tele Vue 101 Telescope
1 hr
Meade Super Plössl 9.7mm MD
-10°
17h00m
8/24 22h
7/27 22h
12/15 21h
6/29 22h
9/21 22h
10/19 22h
6/1 22h
Sabik
1/12 21h
5/4 22h
11/16 21h
2/9 21h
4/6 22h
3/9 21h
Sabik
17h30m
-20°
7h02m07.8s Dec: -14°31'58"
Mag < 9.1
13° x +08°01'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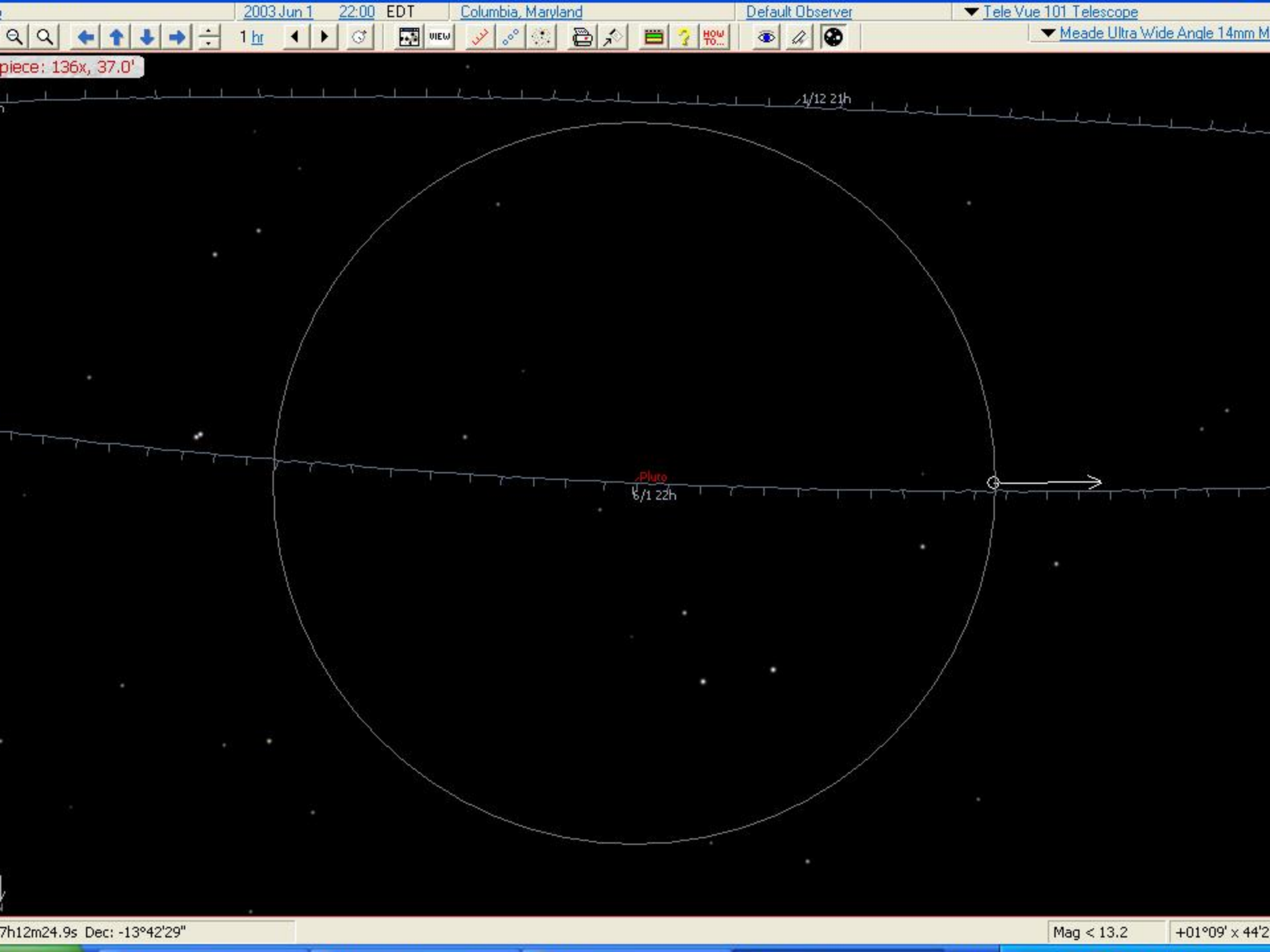
Default Observer
Tele Vue 101 Telescope
1 hr
Meade Super Plössl 9.7mm MD
piece: 56x, 55.5'
2/9 21h
1/12 21h
5/4 22h
Pluto
6/1 22h
6/29 22h
Box
7h12m23.0s Dec: -13°01'12"
Mag < 12.8
+01°44' x +01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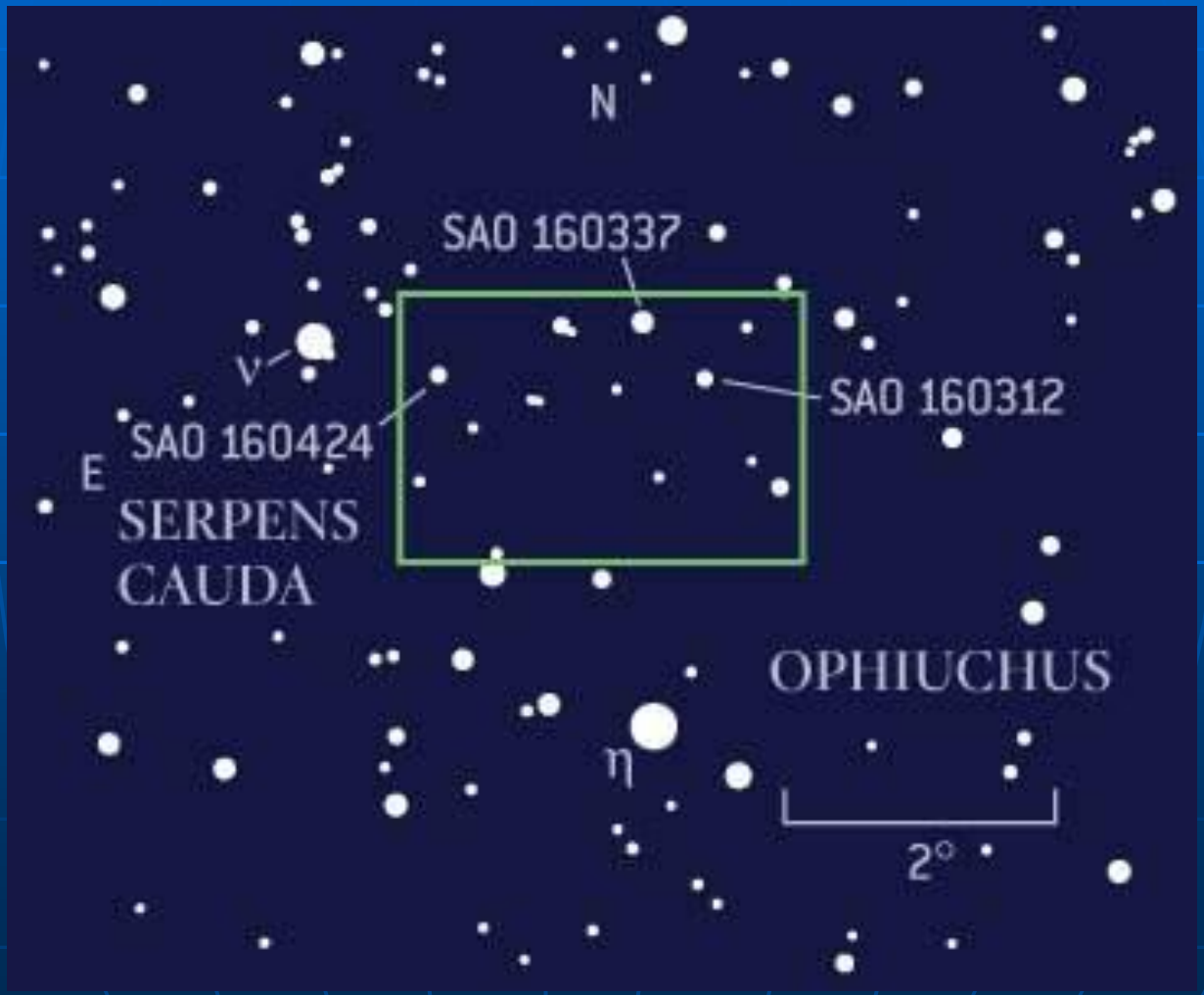
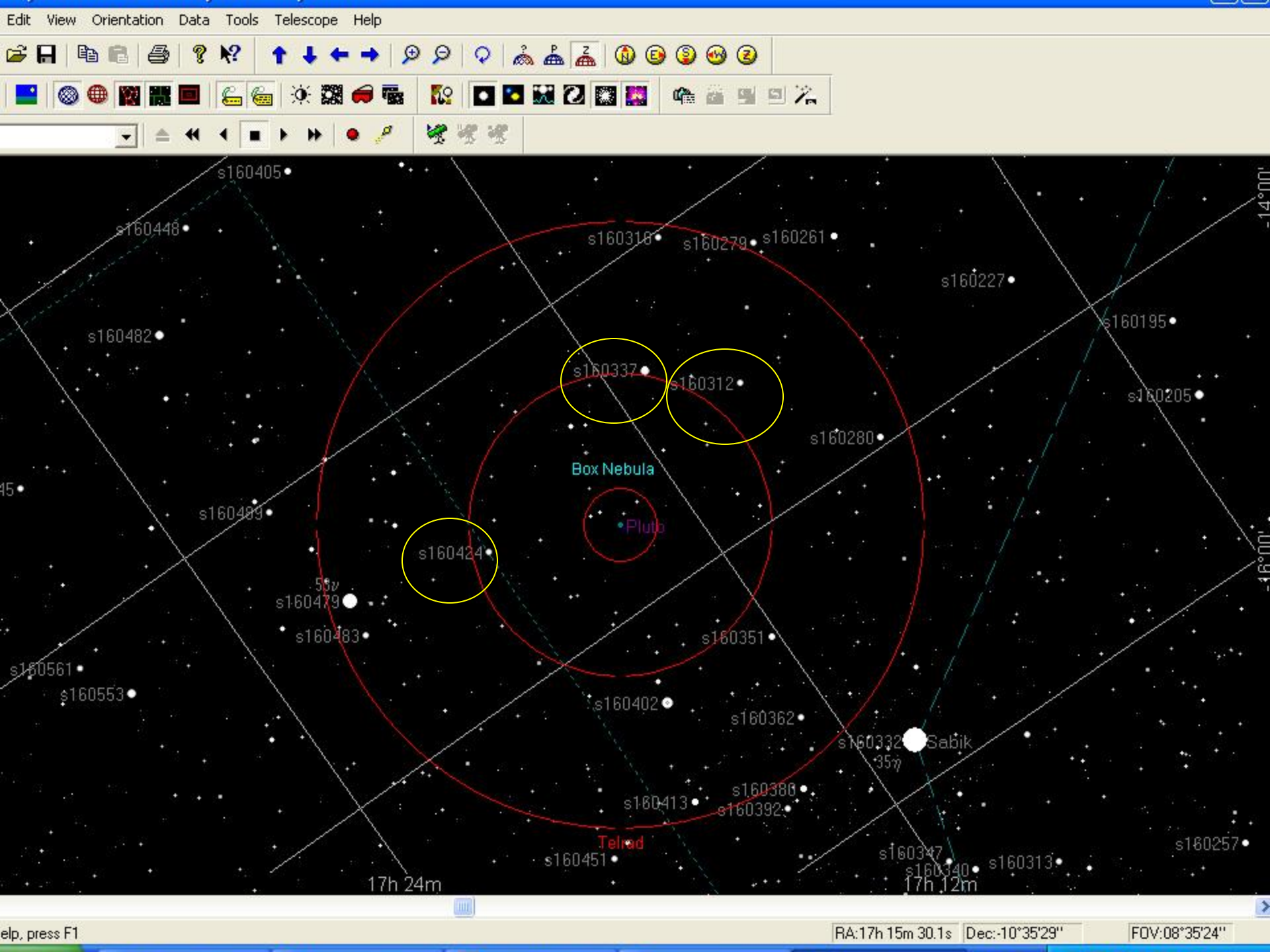
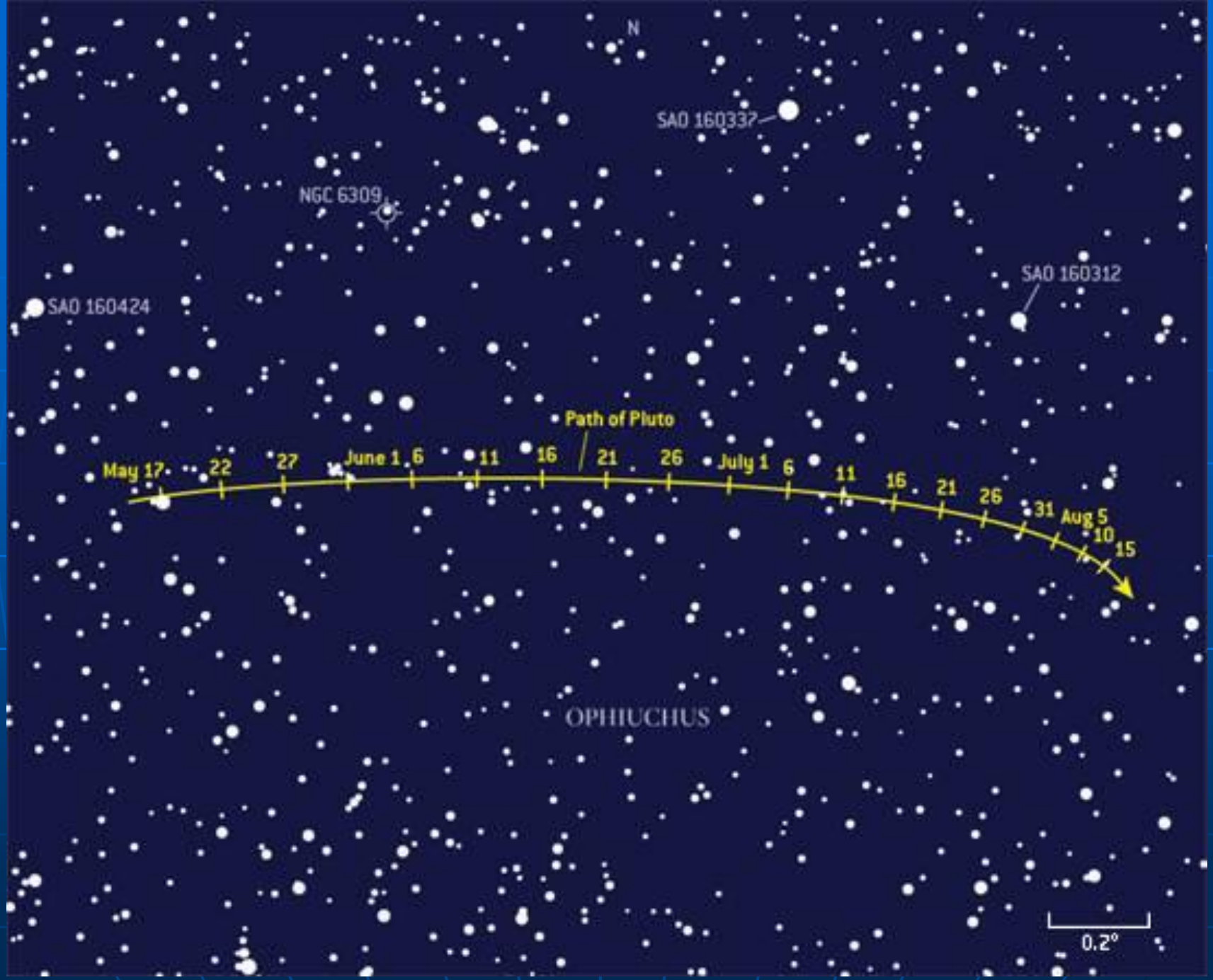
22:00 EDT
Columbia, Maryland
Default Observer
Tele Vue 101 Telescope
1 hr
Meade Ultra Wide Angle 14mm M
piece: 136x, 37.0'
1/12 21h
Pluto
6/1 22h
7h12m24.9s Dec: -13°42'29"
Mag < 13.2
+01°09' x 44'2

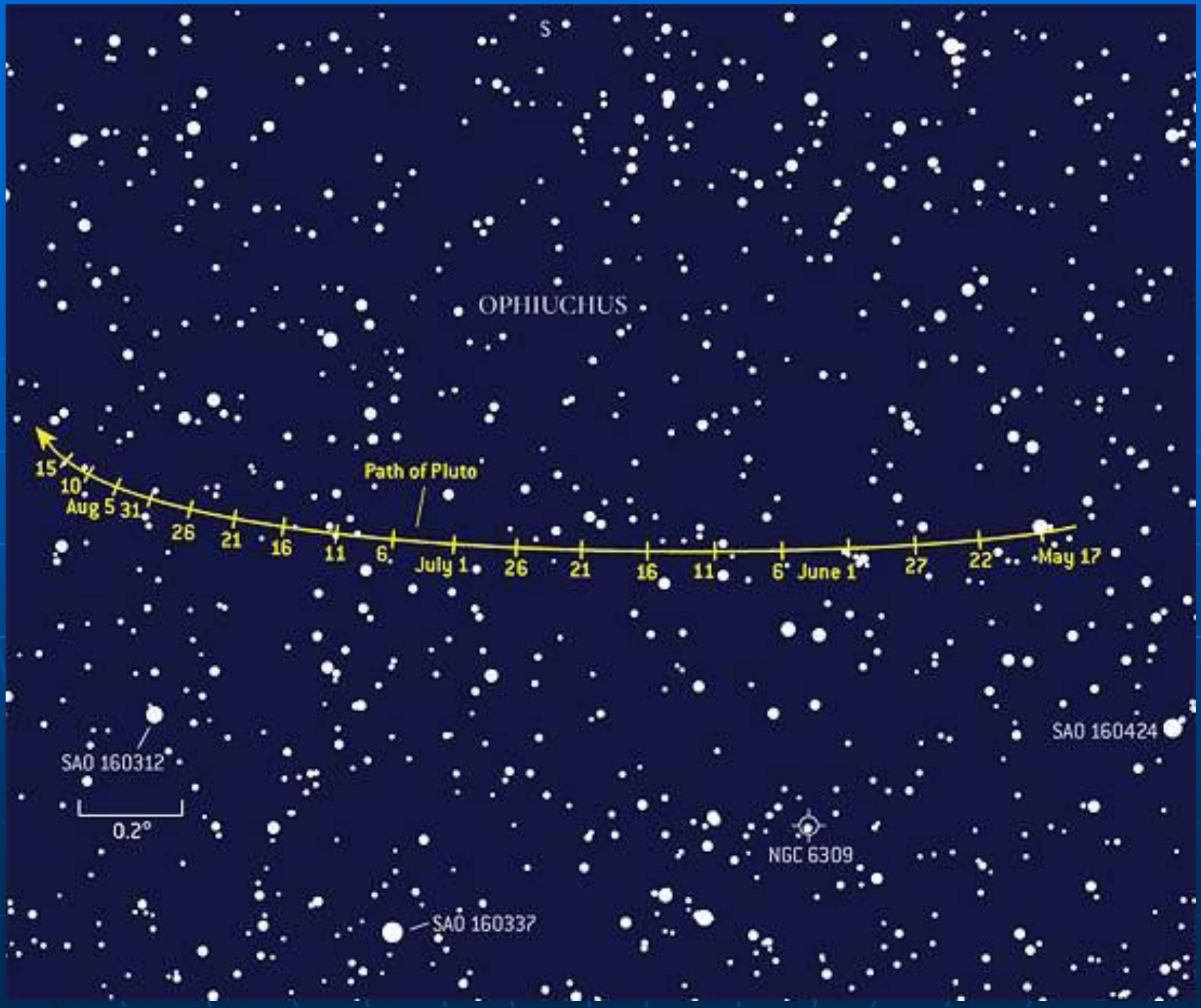

Astronomy
Why we must return to the Moon
Free-floating planets pepper our galaxy
Now's the time to view distant Pluto

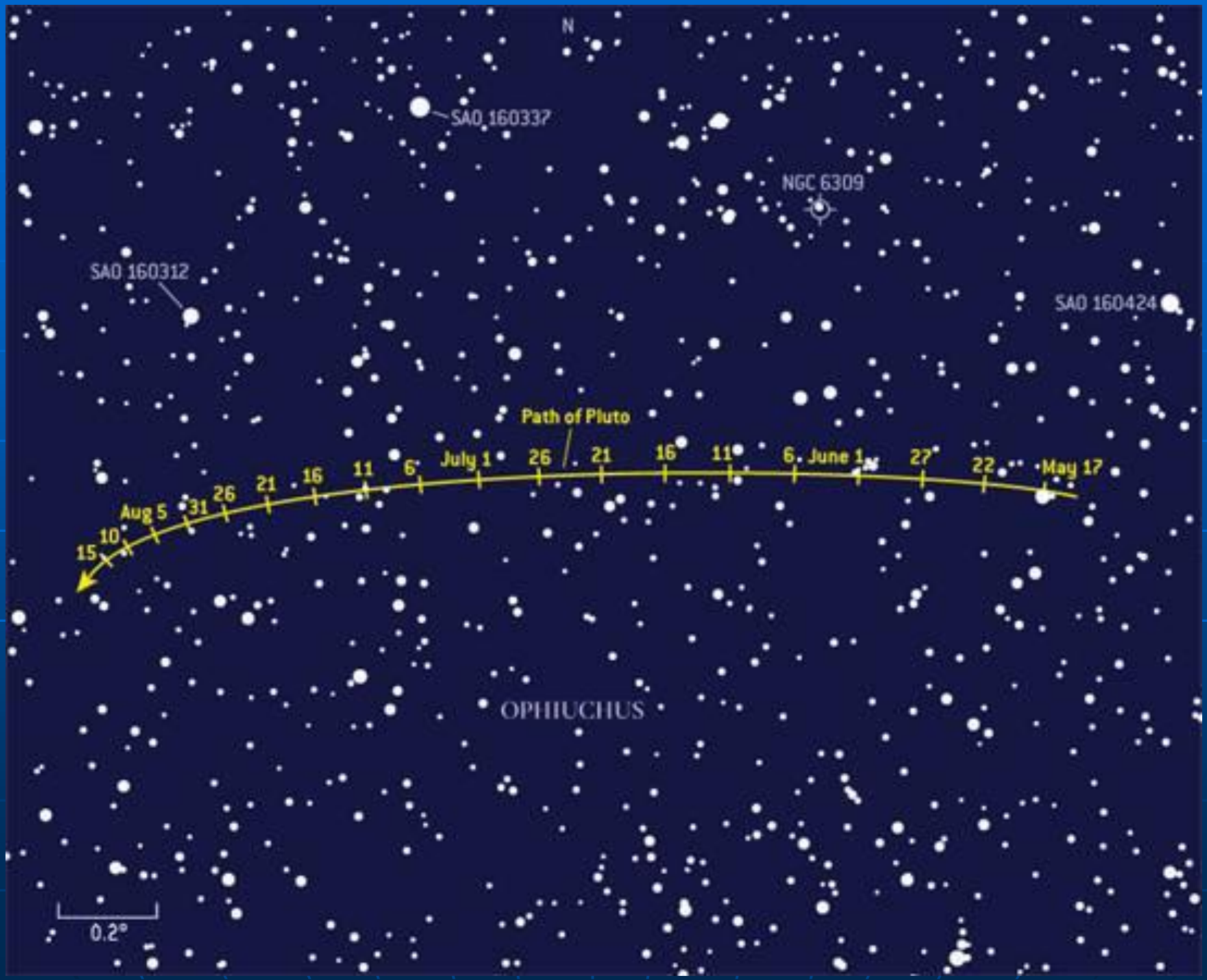
This wide-field view of the area in Ophiuchus where Pluto is located will help you get your bearings. The images following expand on the area contained in the green box.




Edit View Orientation Data Tools Telescope Help
s160405
s160448
s160318
s160279
s160261
s160227
s160482
s160195
s160337
s160312
s160205
s160280
Box Nebula
Pluto
s160489
s160424
56υ
s160479
s160483
s160351
s160561
s160553
s160402
s160362
s160332
Sabik
35η
s160380
s160413
s160392
Teiled
s160451
s160347
s160340
s160313
s160257
17h 24m
17h 12m
-14°00'
-16°00'
elp, press F1
RA:17h 15m 30.1s
Dec:-10°35'29"
FOV:08°35'24"

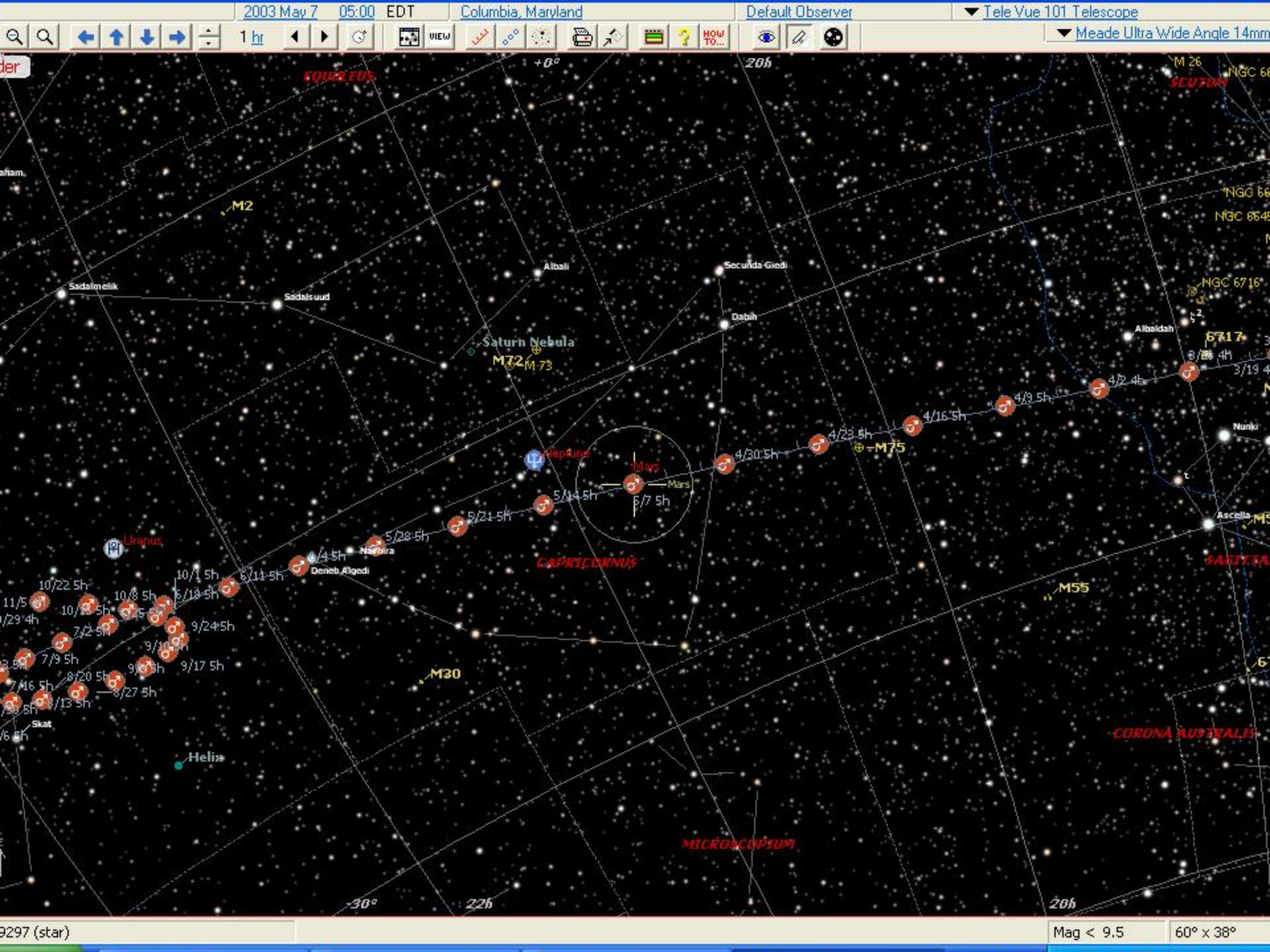

N
SAO 160337
NGC 6309
SAO 160312
SAO 160424
Path of Pluto
May 17
22
27
June 1
6
11
16
21
26
July 1
6
11
16
21
26
31
Aug 5
10
15
OPHIUCHUS
0.2°


S
OPHIUCHUS
Path of Pluto
15
10
Aug 5
31
26
21
16
11
6
July 1
26
21
16
11
6
June 1
27
22
May 17
SAO 160312
0.2°
SAO 160424
NGC 6309
SAO 160337


N
SAO 160337
NGC 6309
SAO 160312
SAO 160424
Path of Pluto
May 17
22
27
June 1
6
11
16
21
26
July 1
6
11
16
21
26
31
Aug 5
10
15
OPHIUCHUS
0.2°

Mars:

Heading for Retrogade


2003 May 7 05:00 EDT
Columbia, Maryland
Default Observer
Tele Vue 101 Telescope
1 hr
Meade Ultra Wide Angle 14mm
EQUULEUS
+8°
20h
M2
Sadalmelik
Sadalsuud
Albali
Secunda Giedi
Dabih
Saturn Nebula
M72
M73
Albaldah
NGC 6717
Nunki
Ascella
M75
Neptune
Mars
Uranus
Deneb Algedi
Nashira
CAPRICORNUS
M55
M30
Skat
Helio
CORONA AUSTRALIS
MICROSCOPIUM
-30°
22h
20h
9297 (star)
Mag < 9.5
60° x 38°

The Projects for the Inner Solar System

MARS: Retrograde Motion

Early naked eye observers had a problem. The planet Mars, slowly drifting west to east from night to night, when seen against the background stars, would once a year act very strangely. As Mars approached opposition it would suddenly slow down, reverse itself, drift westward for a while (**retrograde motion**), before again reversing to assume its normal (**prograde**) eastward motion.

We now know that this is an illusion caused by the motion of the Earth catching up to and passing the slower Red Planet, causing Mars to appear to be moving backward.

You are to plot the apparent motion of Mars through this **retrograde** loop.

Determine what constellation Mars will be in at the time of opposition. This can be done by consulting the astronomy periodicals. Make a copy of that area out of a star atlas. For example, Will Tirion's Star Atlas 2000.0.

Then watch Mars beginning about a month before opposition until a month after opposition. Plot the planet's daily position on your copy by comparing its position to the fixed stars of the constellation.

After these two months you should be able to trace out Mars' **retrograde** motion.

Fortunately for us, the Copernican Revolution solved nicely the odd behavior of Mars, and also the behavior of Jupiter and Saturn, the other classical outer planets which exhibit a lesser amount of retrograde motion.