


Star Hopping Guide

to the

Messier Marathon

(Charts)

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Rob Hawley
2/24/2009

Introduction

This book of charts is intended to supplement the text descriptions in “*Star Hopping Guide to the Messier Marathon (Text)*”. For detailed instructions on how to use the charts please consult that work.

About the Charts

All of the charts in this document were generated by SkyMap Pro version 11ⁱⁱ using my marathon notations. Some contain DSS images that were shipped with SMPⁱⁱⁱ or downloaded directly from DSS Sources.

Large circles on the charts represent a 5° field of view that corresponds to an Orion 9x50 Finder. Smaller circles represent a 1° field of view, which is the recommended eyepiece field of view for this exercise.

All charts have a scale in the lower right corner and a compass in the upper left.

Note that charts labeled “Eyepiece” are upside down to represent what would be seen from the eyepiece of a Newtonian telescope. The Captions for these charts are in Italics.

Brighter stars are represented using larger images on the charts. Each chart provides a key that identifies the symbols used.

The dimmest stars displayed are

Visual Charts	5.5
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Visual and Finder charts are displayed zenith up corrected for the time of the chart. Thus the sky will correlate to the charts either visually or using binoculars.

Finders and eyepieces will introduce rotation and/or mirroring. If you are not familiar with these then I suggest you read Star Hopping 101 in the Text portion.

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Object	Visual	Finder
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69	49	52
70	49	52
71	39	46
72	53	56
73	53	56
74	1	2
75	53	54
76	1	9
77	1	3
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79	1	11
80	39	44
81	23	24
82	23	24
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89	31	34
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Numbers in *Italics* are
Eyepiece Views

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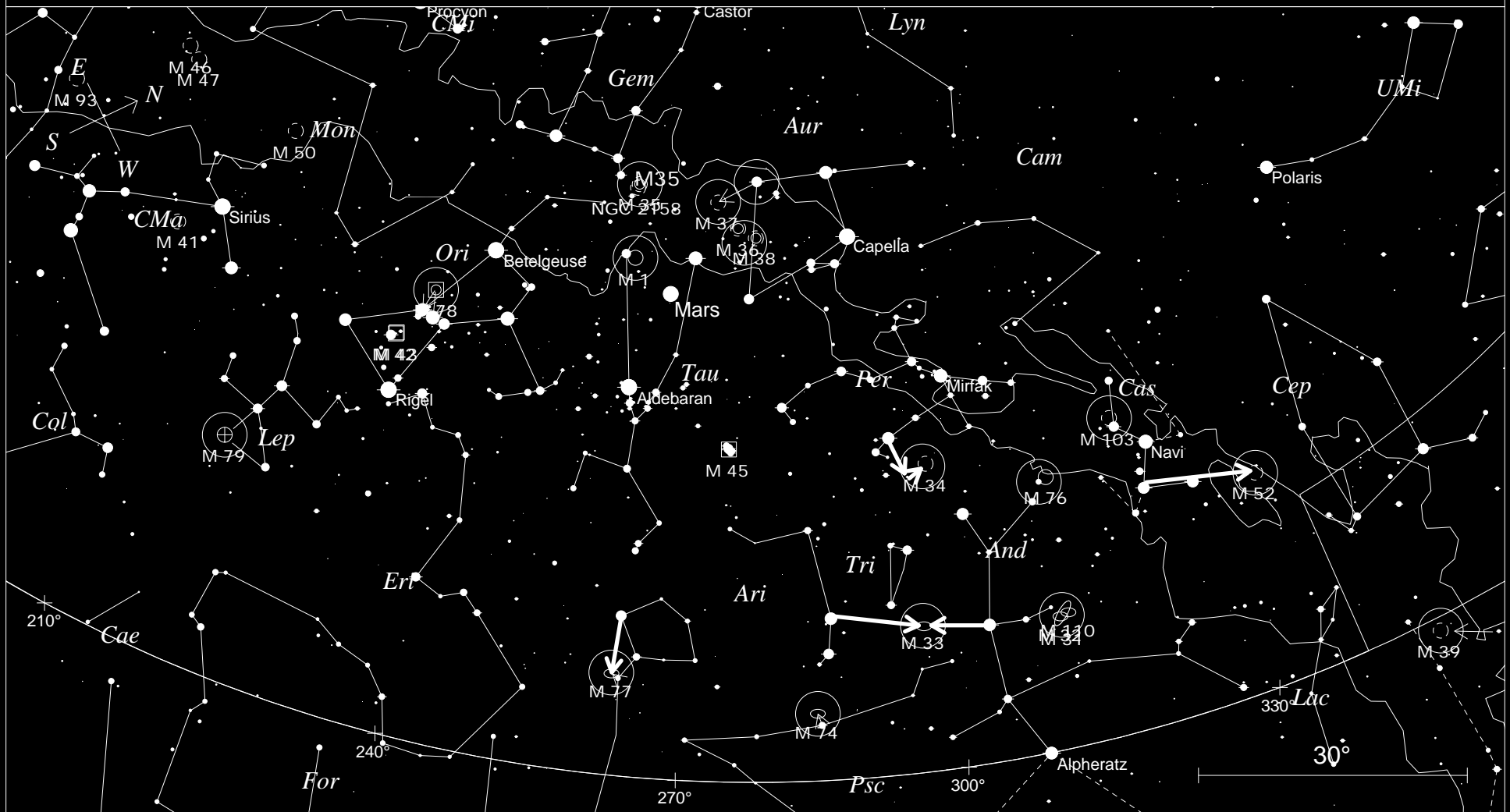
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ⁱⁱ <http://www.skymap.com/>

ⁱⁱⁱ Copyright Notice for Included DSS Images

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Figure 1 - Visual Early Evening Objects



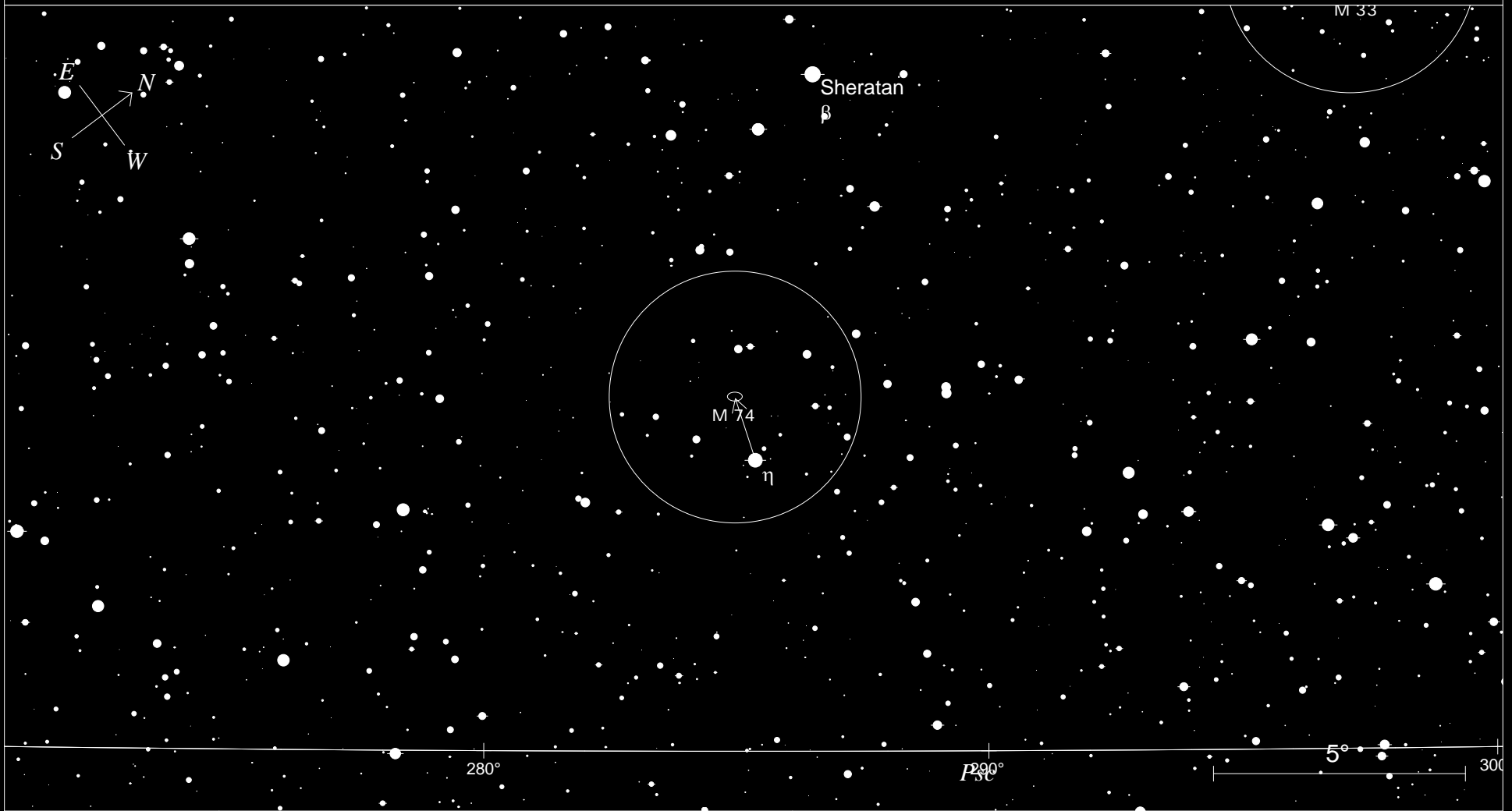
STARS		SYMBOLS		
● <math><1</math>	● >5.5	● Multiple star	☐ Dark nebula	△ Radio source
● 2	○ Variable star	⊕ Globular cluster	× X-ray source	○ Other object
● 3	☄ Comet	○ Open cluster		
● 4	☄ Galaxy	○ Planetary nebula		
● 5	☐ Bright nebula	○ Quasar		

Local Time: 19:45:00 25-Mar-2006
 Location: 37° 11' 15" N 121° 33' 0" W

UTC: 03:45:00 26-Mar-2006
 RA: 4h00m00s Dec: +29° 00' Field: 90.0°

Sidereal Time: 07:52:37
 Julian Day: 2453820.6563

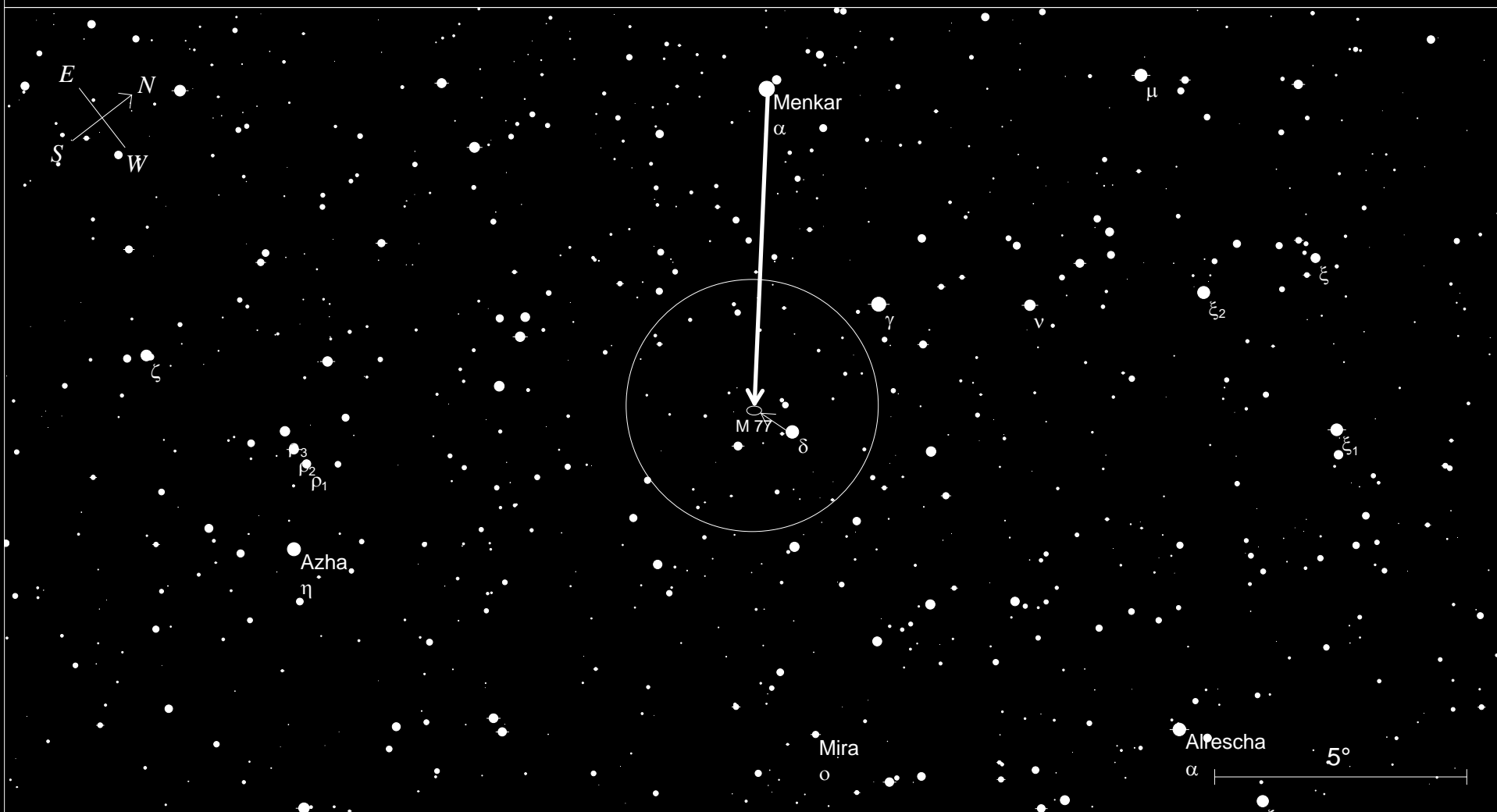
Figure 2 - Finder M74



STARS		SYMBOLS	
● <3	8	■ Dark nebula	△ Radio source
● 4	>9	⊕ Globular cluster	× X-ray source
● 5		○ Open cluster	○ Other object
● 6		☄ Comet	
● 7		○ Galaxy	○ Planetary nebula
		□ Bright nebula	⊞ Quasar

Local Time: 19:45:00 25-Mar-2006	UTC: 03:45:00 26-Mar-2006	Sidereal Time: 07:52:37
Location: 37° 11' 15" N 121° 33' 0" W	RA: 1h35m22s Dec: +15° 58' Field: 16.0°	Julian Day: 2453820.6563

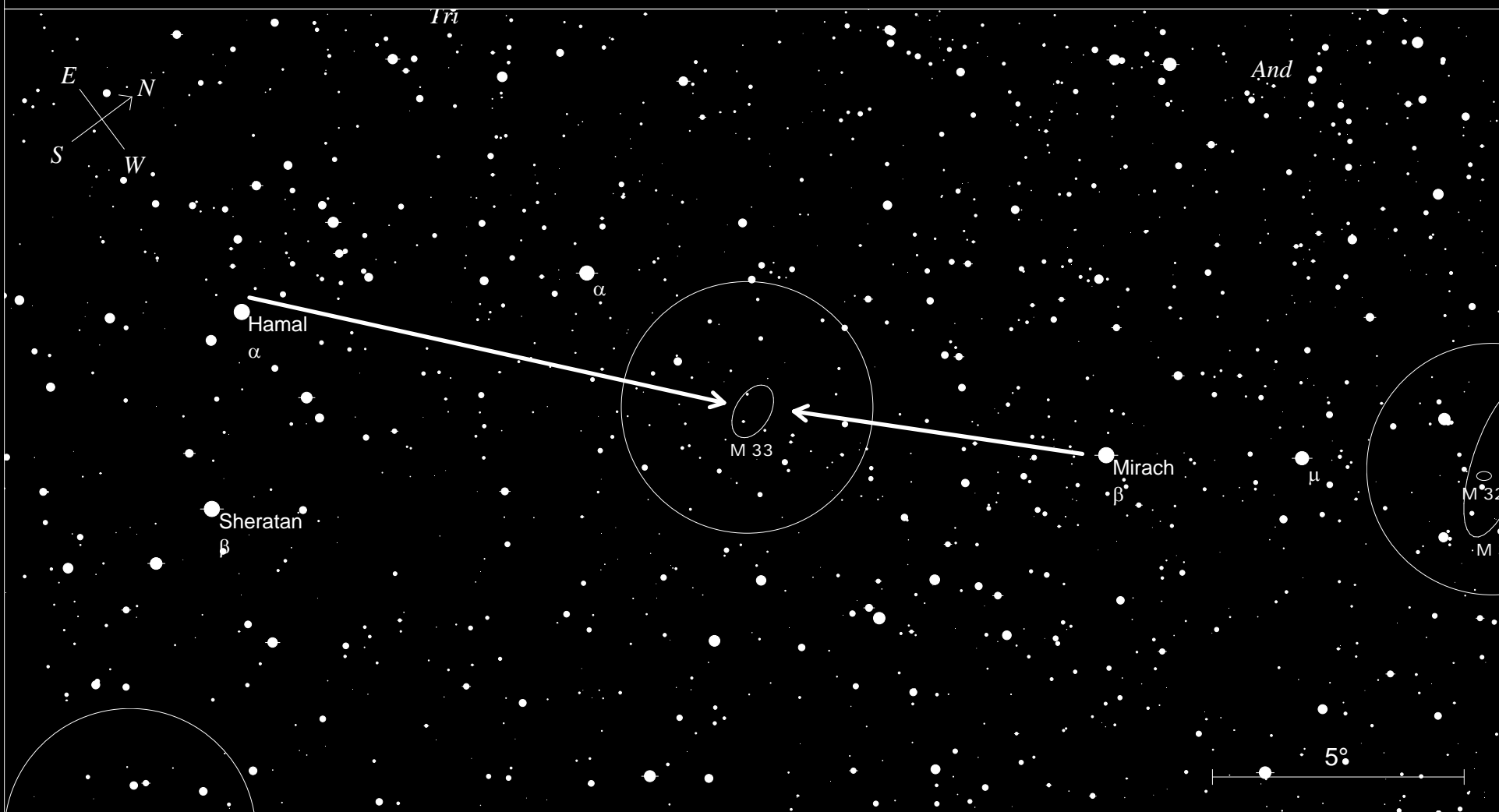
Figure 3 M77



<p>STARS</p> <p>● <3 8 ● 4 >9 ● 5 ● 6 ● 7</p>		<p>SYMBOLS</p> <p>● Multiple star □ Dark nebula △ Radio source ○ Variable star ⊕ Globular cluster × X-ray source ☄ Comet ○ Open cluster ○ Other object ○ Galaxy ○ Planetary nebula □ Bright nebula ○ Quasar</p>		<p>FOV Circle 5°</p>
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Local Time: 19:50:00 25-Mar-2006 UTC: 03:50:00 26-Mar-2006 Sidereal Time: 07:57:37
 Location: 37° 11' 15" N 121° 33' 0" W RA: 2h42m59s Dec: +0° 00' Field: 16.0° Julian Day: 2453820.6597

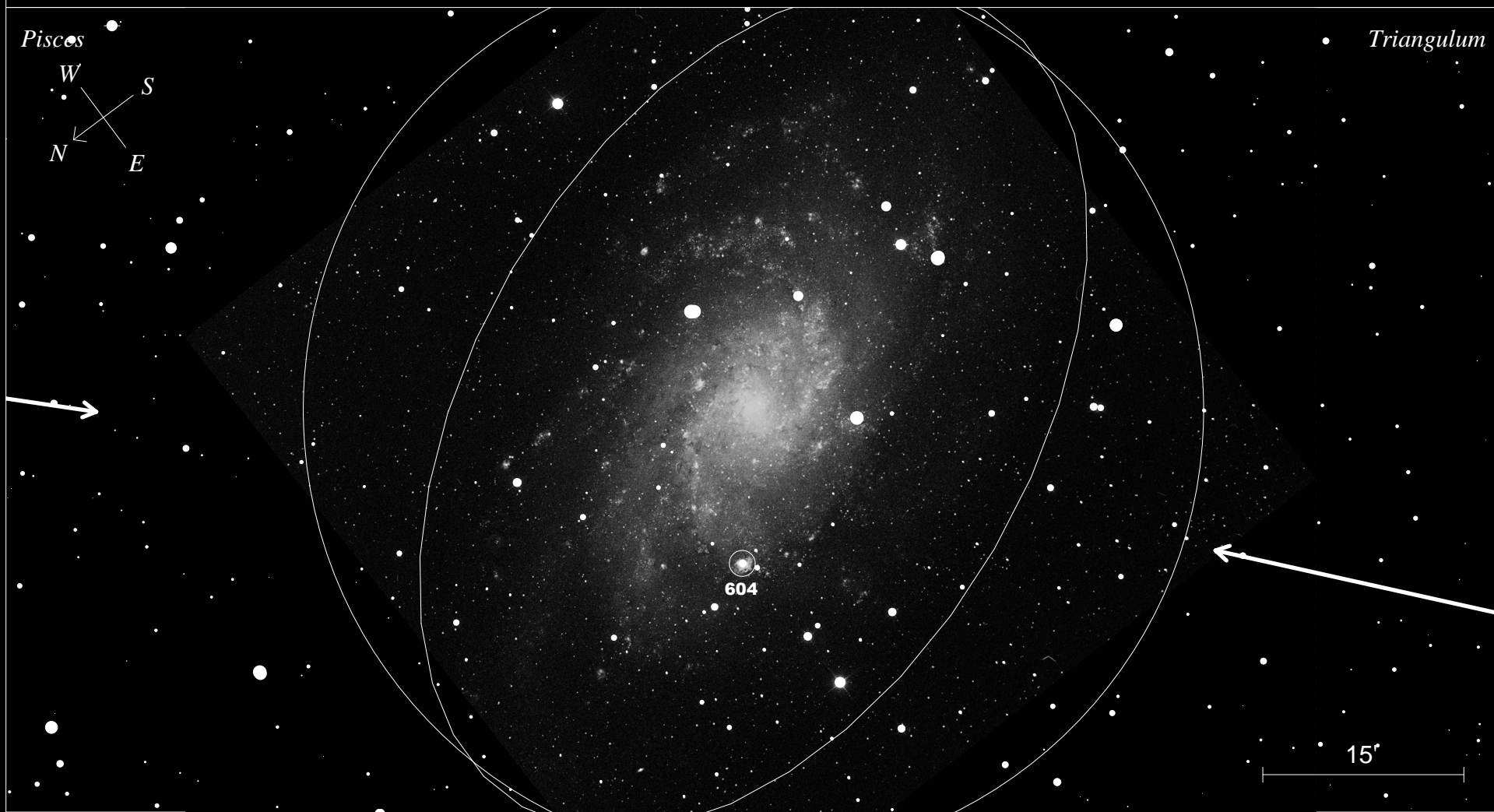
Figure 4- Finder M33



STARS		SYMBOLS	
● <3	● 8	⊠ Dark nebula	△ Radio source
● 4	● >9	⊕ Globular cluster	× X-ray source
● 5		○ Open cluster	○ Other object
● 6		☄ Comet	○ Planetary nebula
● 7		□ Galaxy	⊞ Quasar
		□ Bright nebula	

Local Time: 20:05:00 25-Mar-2006 UTC: 04:05:00 26-Mar-2006 Sidereal Time: 08:12:40
 Location: 37° 11' 15" N 121° 33' 0" W RA: 1h34m11s Dec: +30° 41' Field: 16.0° Julian Day: 2453820.6701

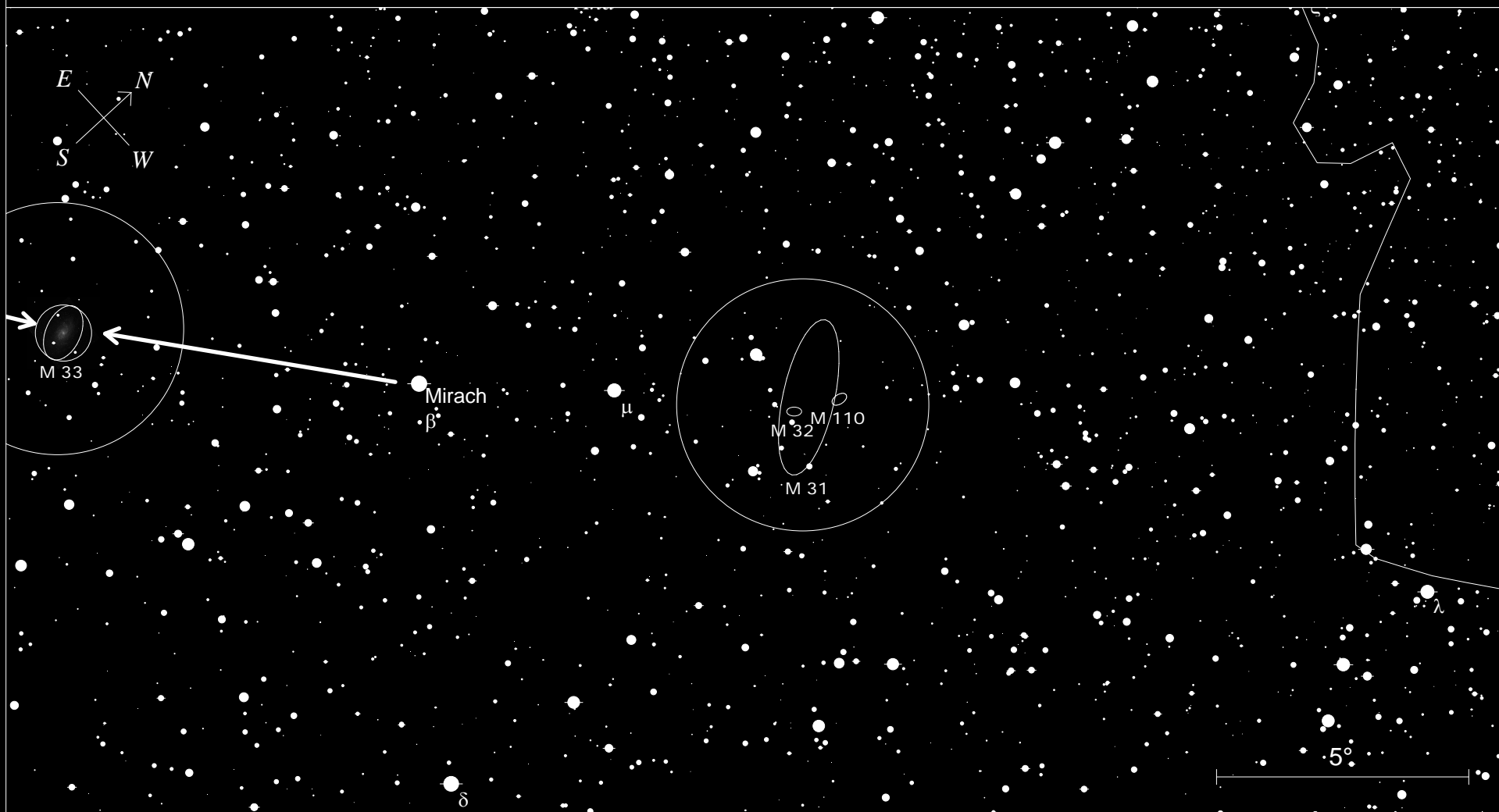
Figure 5 Eyepiece View of M33



STARS		SYMBOLS	
● <5	● 10	☐ Dark nebula	△ Radio source
● 6	● 11	⊕ Globular cluster	× X-ray source
● 7	● 12	☉ Open cluster	○ Other object
● 8	● 13	☾ Comet	
● 9	● >14	☾ Galaxy	
		☐ Bright nebula	☾ Planetary nebula
			☾ Quasar

FOV Circle 1°
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Figure 6 - Finder M 31 32 110



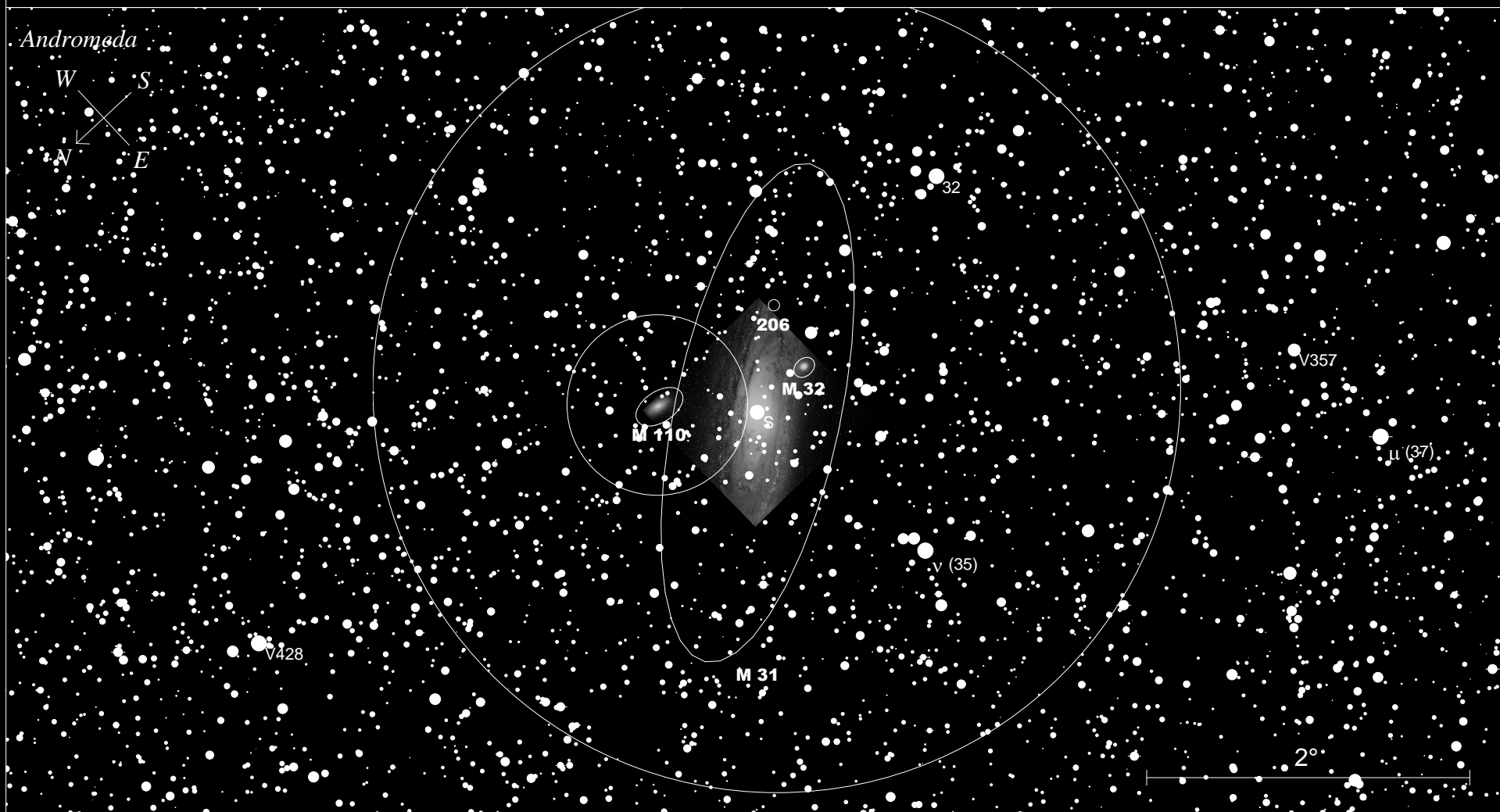
STARS		SYMBOLS	
● <3	8	■ Dark nebula	△ Radio source
● 4	>9	⊕ Globular cluster	× X-ray source
● 5		○ Open cluster	○ Other object
● 6		☄ Comet	
● 7		○ Galaxy	
		○ Planetary nebula	
		□ Bright nebula	⊞ Quasar

Local Time: 20:15:00 25-Mar-2006
 Location: 37° 11' 15" N 121° 33' 0" W

UTC: 04:15:00 26-Mar-2006
 RA: 0h45m49s Dec: +40° 21' Field: 16.0°

Sidereal Time: 08:22:42
 Julian Day: 2453820.6771

Figure 7 Eyepiece View of M31,32,110



STARS		SYMBOLS	
● <5	● 10	⊠ Dark nebula	△ Radio source
● 6	● 11	⊕ Globular cluster	× X-ray source
● 7	● 12	⊙ Open cluster	○ Other object
● 8	● >13	☄ Comet	
● 9		☉ Galaxy	
		☉ Bright nebula	
		☉ Multiple star	
		☉ Variable star	
		☉ Planetary nebula	
		☉ Quasar	

Large FOV Circle 5°
 Small FOV Circle 1°

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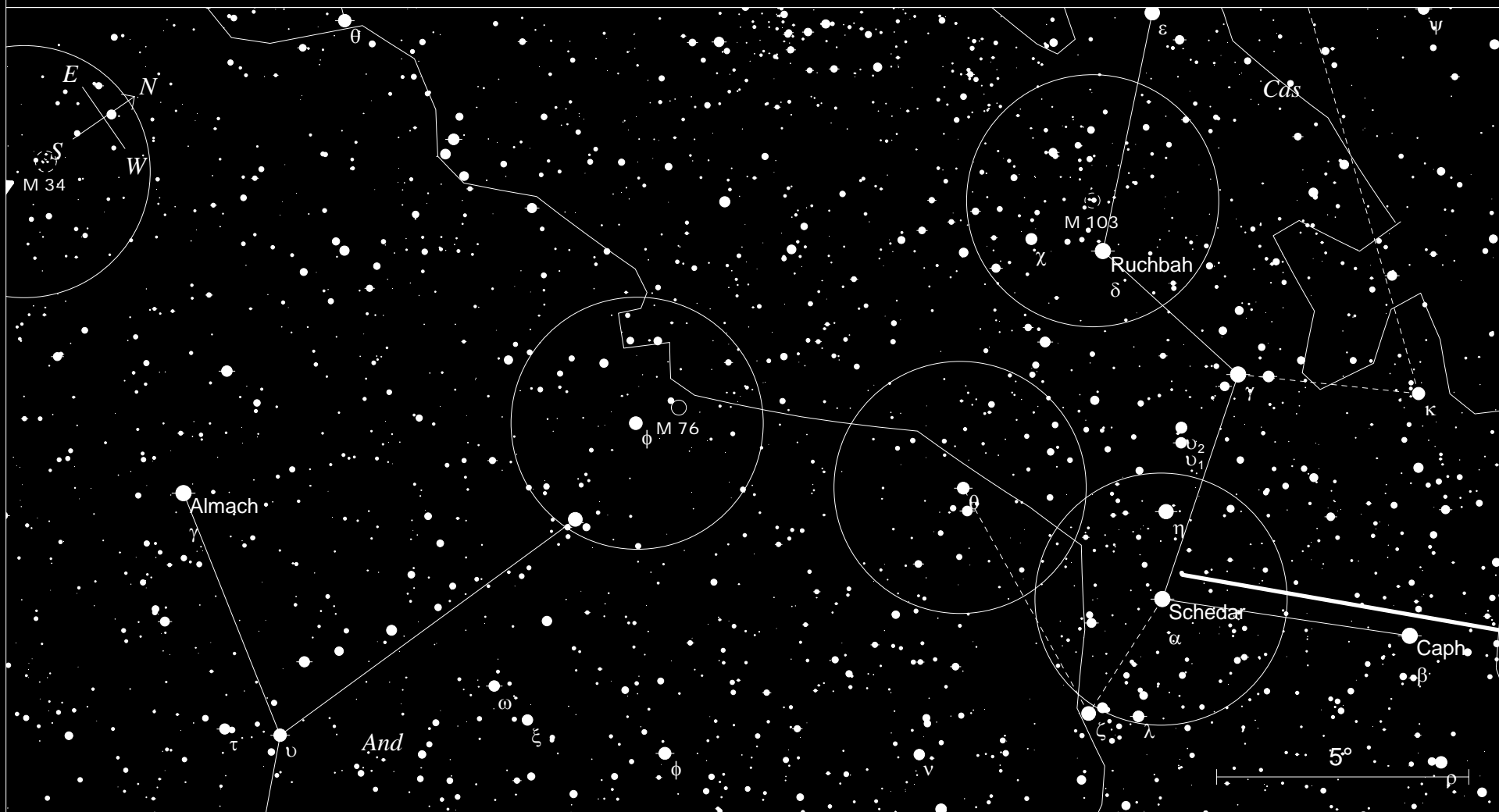
Figure 8 - Finder M52 M 103



STARS		SYMBOLS		FOV Circle 5°
● <3	● 8	⊠ Dark nebula	△ Radio source	
● 4	● >9	⊕ Globular cluster	× X-ray source	
● 5		⊙ Open cluster	○ Other object	
● 6		☄ Comet		
● 7		☉ Galaxy		
● 7		☾ Planetary nebula		
		☐ Bright nebula	☉ Quasar	

Local Time: 20:20:00 25-Mar-2006 UTC: 04:20:00 26-Mar-2006 Sidereal Time: 08:27:42
 Location: 37° 11' 15" N 121° 33' 0" W RA: 0h40m50s Dec: +61° 18' Field: 16.0° Julian Day: 2453820.6806

Figure 9- Finder M76



STARS		SYMBOLS		FOV Circle 5°
● <3	8	● Multiple star	☐ Dark nebula	△ Radio source
● 4	>9	○ Variable star	⊕ Globular cluster	× X-ray source
● 5		☄ Comet	○ Open cluster	○ Other object
● 6		☾ Galaxy	⊕ Planetary nebula	
● 7		☐ Bright nebula	☉ Quasar	

Local Time: 20:30:00 25-Mar-2006 UTC: 04:30:00 26-Mar-2006 Sidereal Time: 08:37:44
 Location: 37° 11' 15" N 121° 33' 0" W RA: 1h36m45s Dec: +52° 50' Field: 16.0° Julian Day: 2453820.6875

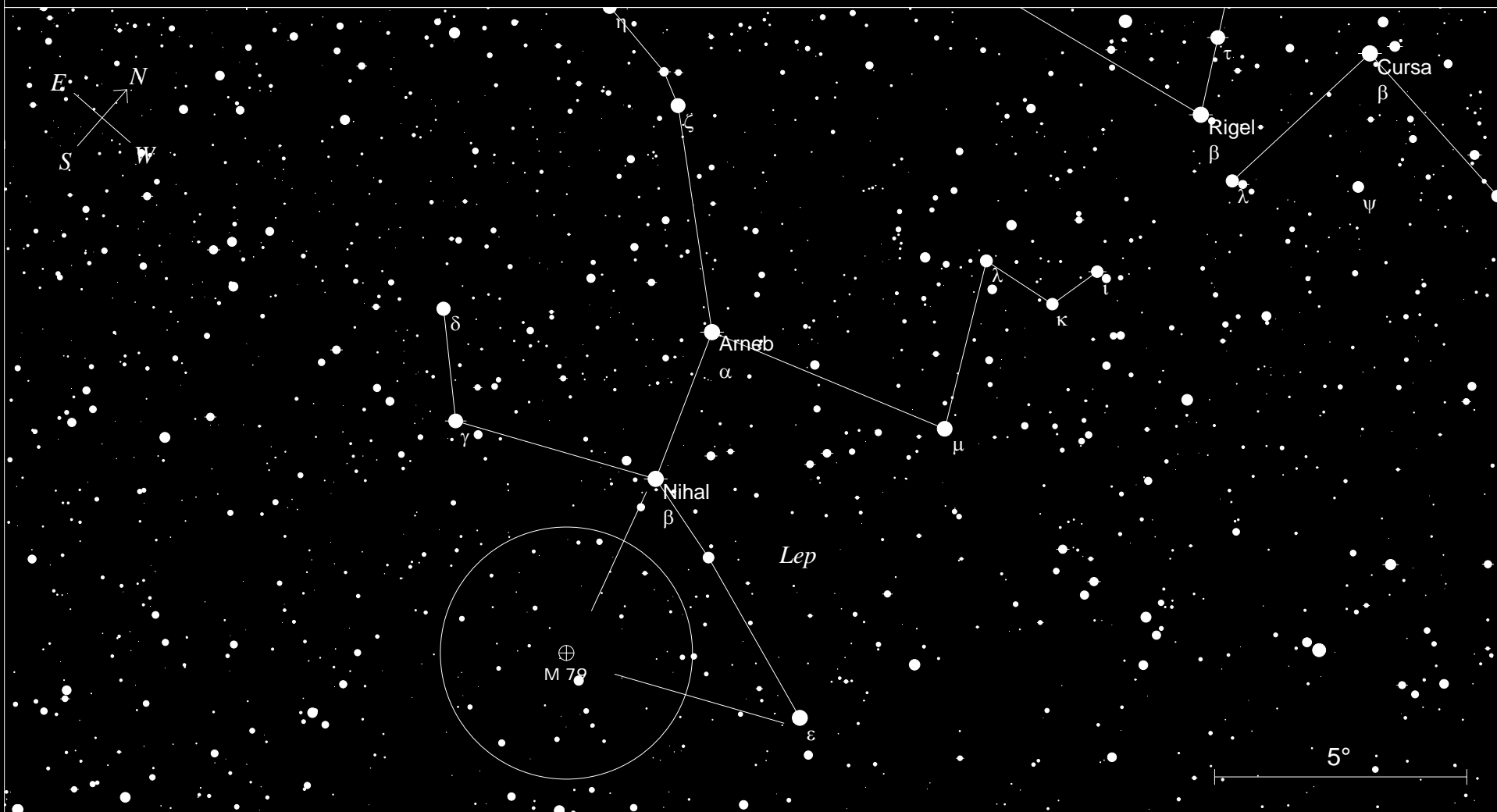
Figure 10 - Finder M 34



STARS		SYMBOLS		FOV Circle 5°
● <3	8	● Multiple star	☐ Dark nebula	
● 4	>9	○ Variable star	⊕ Globular cluster	
● 5		☄ Comet	⊙ Open cluster	
● 6		☾ Galaxy	♁ Planetary nebula	
● 7		☐ Bright nebula	☉ Quasar	
			△ Radio source	
			× X-ray source	
			○ Other object	

Local Time: 20:35:00 25-Mar-2006 UTC: 04:35:00 26-Mar-2006 Sidereal Time: 08:42:45
 Location: 37° 11' 15" N 121° 33' 0" W RA: 2h31m00s Dec: +45° 18' Field: 16.0° Julian Day: 2453820.6910

Figure 11 - Finder M 79

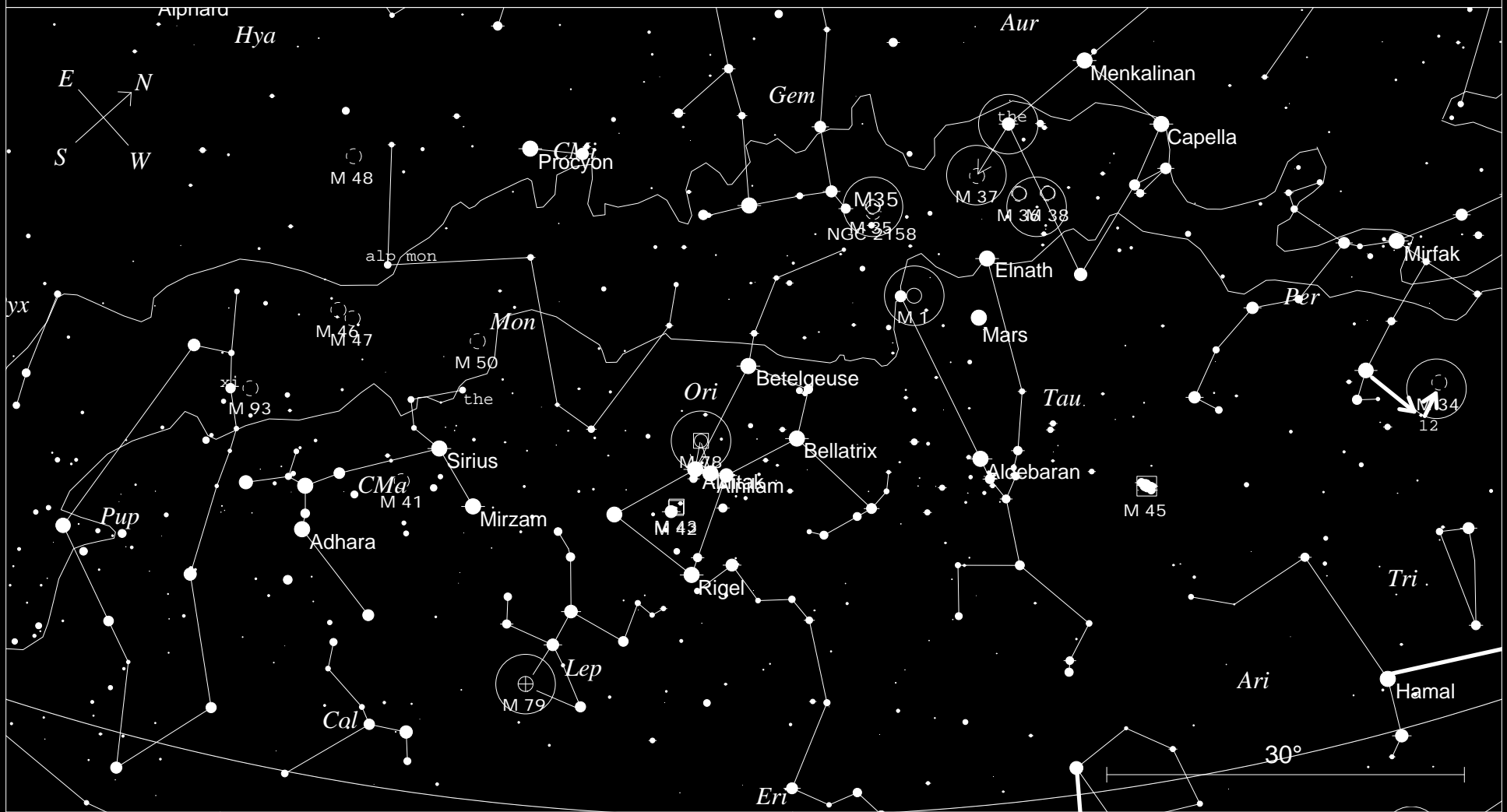


STARS		SYMBOLS		FOV Circle 5°
● <3	8	● Multiple star	☐ Dark nebula	
● 4	>9	○ Variable star	⊕ Globular cluster	
● 5		☄ Comet	⊙ Open cluster	
● 6		☾ Galaxy	♁ Planetary nebula	
● 7		☐ Bright nebula	☉ Quasar	
			△ Radio source	
			✕ X-ray source	
			○ Other object	

Local Time: 20:50:00 25-Mar-2006 UTC: 04:50:00 26-Mar-2006 Sidereal Time: 08:57:47
 Location: 37° 11' 15" N 121° 33' 0" W RA: 5h26m02s Dec: -18° 26' Field: 16.0° Julian Day: 2453820.7014

Figure 12 blank

Figure 13 - Visual Winter Objects



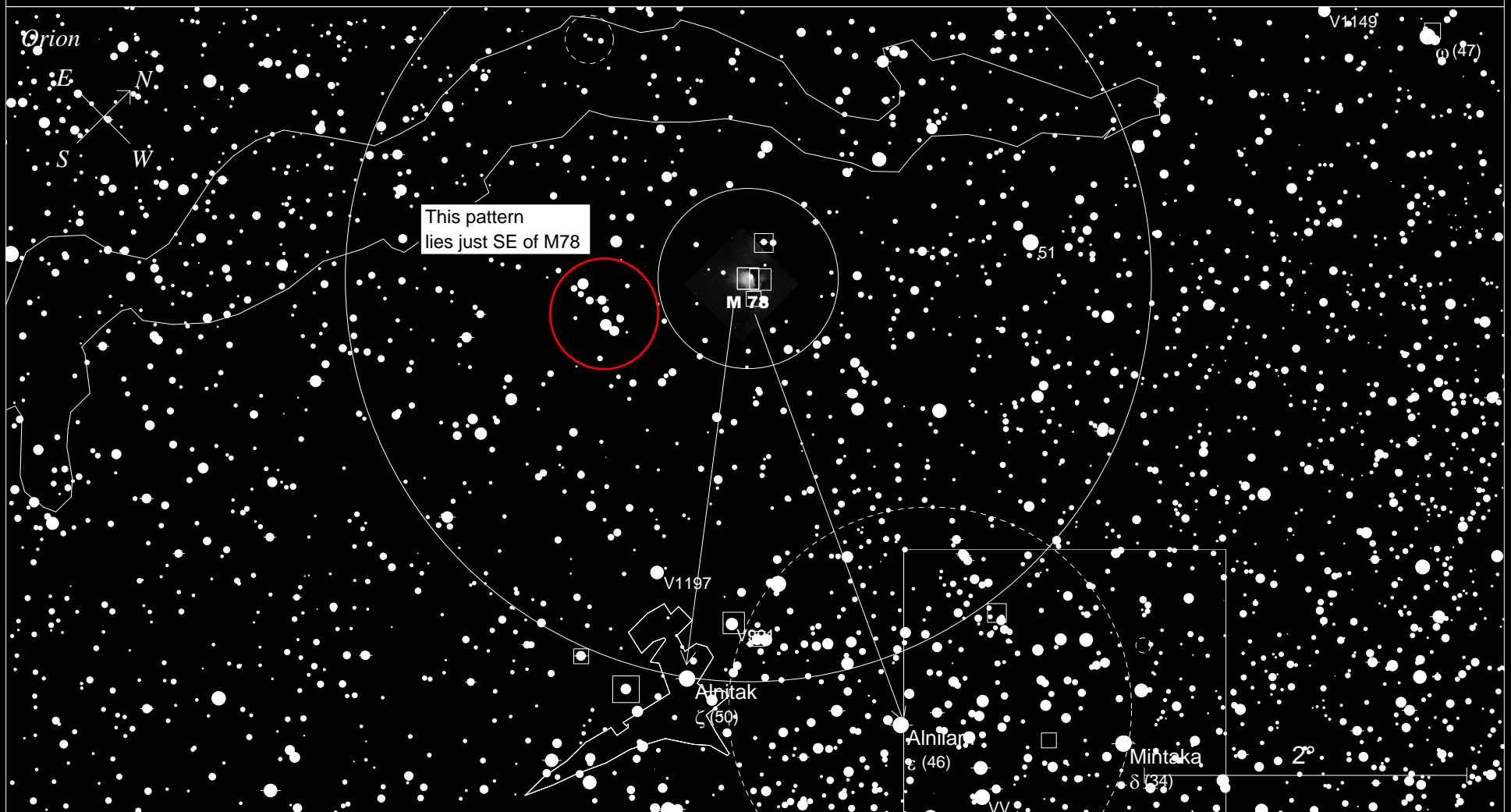
STARS		SYMBOLS		FOV Circle 5°
● <2	● 4.5	● Multiple star	☐ Dark nebula	△ Radio source
● 2.5	● 5	○ Variable star	⊕ Globular cluster	× X-ray source
● 3	● >5.5	☄ Comet	○ Open cluster	○ Other object
● 3.5		☄ Galaxy	○ Planetary nebula	
● 4		☐ Bright nebula	⊗ Quasar	

Local Time: 21:00:00 25-Mar-2006
 Location: 37° 11' 15" N 121° 33' 0" W

UTC: 05:00:00 26-Mar-2006
 RA: 5h42m58s Dec: +5° 15' Field: 67.5°

Sidereal Time: 09:07:49
 Julian Day: 2453820.7083

Figure 14 Detailed Finder view of M78



STARS		SYMBOLS		
● <5	● 10	● Multiple star	◻ Dark nebula	△ Radio source
● 6	● 11	○ Variable star	⊕ Globular cluster	× X-ray source
● 7	● 12	☄ Comet	⊕ Open cluster	○ Other object
● 8	● >13	☾ Galaxy	⊕ Planetary nebula	
● 9		◻ Bright nebula	⊕ Quasar	

Large FOV Circle 5°
Small FOV Circle 1°

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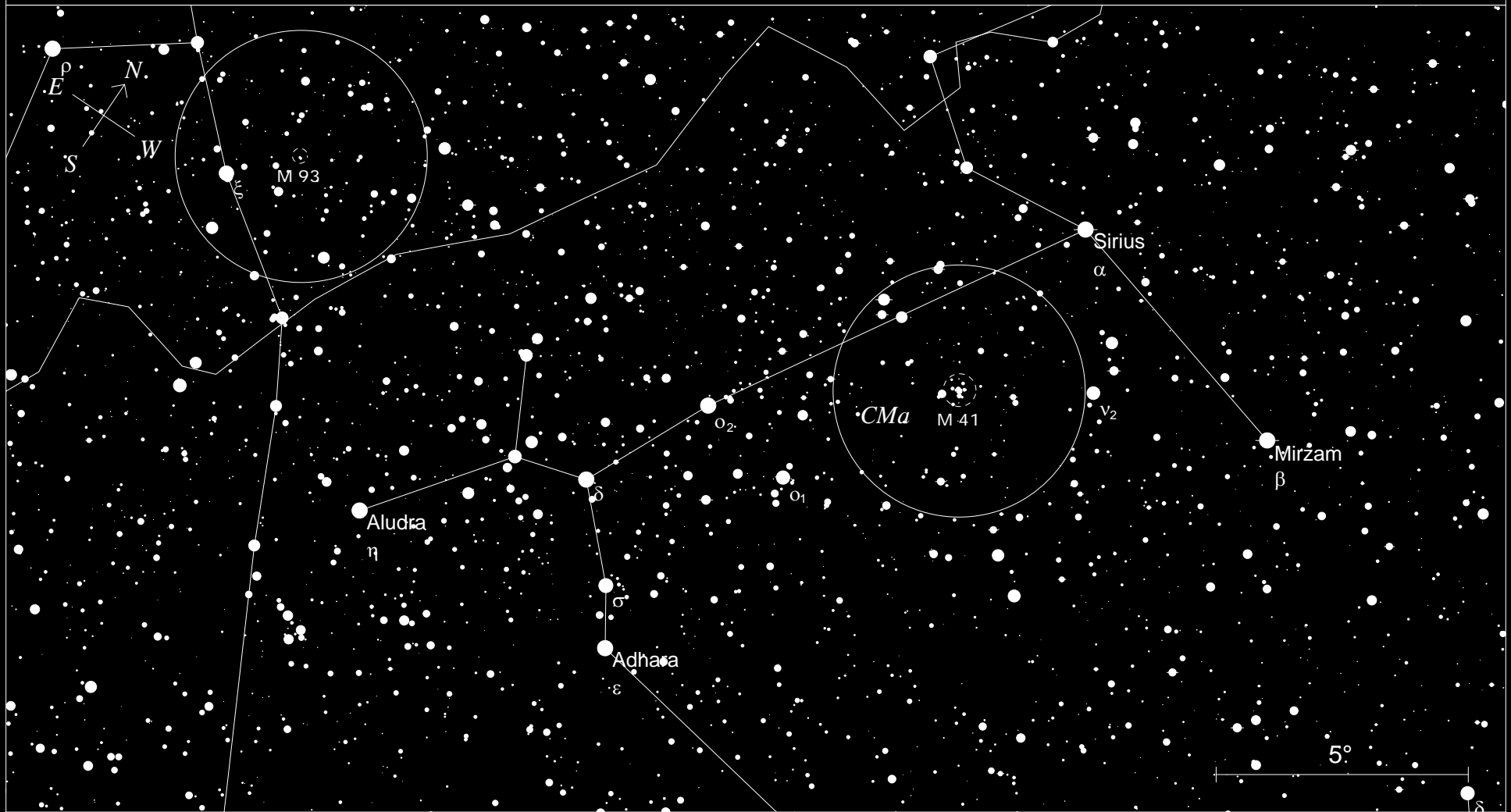
Figure 15 - Finder M 1 35 37 36 38



<p>STARS</p> <p>● <3 8 ● 4 >9 ● 5 ● 6 ● 7</p>		<p>SYMBOLS</p> <p>● Multiple star □ Dark nebula △ Radio source ○ Variable star ⊕ Globular cluster × X-ray source ☄ Comet ○ Open cluster ○ Other object ☾ Galaxy ☉ Planetary nebula □ Bright nebula ⊞ Quasar</p>		<p>Large FOV Circle 5° Small FOV Circle 1°</p>
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Local Time: 21:15:00 25-Mar-2006 UTC: 05:15:00 26-Mar-2006 Sidereal Time: 09:22:51
 Location: 37° 11' 15" N 121° 33' 0" W RA: 5h50m01s Dec: +28° 45' Field: 16.0° Julian Day: 2453820.7188

Figure 16 - Finder M 41 93



STARS		SYMBOLS	
● <3	8	● Multiple star	⊠ Dark nebula
● 4	>9	○ Variable star	⊕ Globular cluster
● 5		☄ Comet	⊙ Open cluster
● 6		☾ Galaxy	♁ Planetary nebula
● 7		□ Bright nebula	☉ Quasar
			△ Radio source
			× X-ray source
			○ Other object

FOV Circle 5°

Figure 17 - Finder M46 47 50



STARS		SYMBOLS		FOV Circle 5°
● <3	8	● Multiple star	☐ Dark nebula	
● 4	>9	○ Variable star	⊕ Globular cluster	
● 5		☄ Comet	⊙ Open cluster	
● 6		☾ Galaxy	♁ Planetary nebula	
● 7		☐ Bright nebula	☉ Quasar	
			△ Radio source	
			× X-ray source	
			○ Other object	

Local Time: 21:45:00 25-Mar-2006
 Location: 37° 11' 15" N 121° 33' 0" W

UTC: 05:45:00 26-Mar-2006
 RA: 7h14m09s Dec: -12° 51' Field: 16.0°

Sidereal Time: 09:52:56
 Julian Day: 2453820.7396

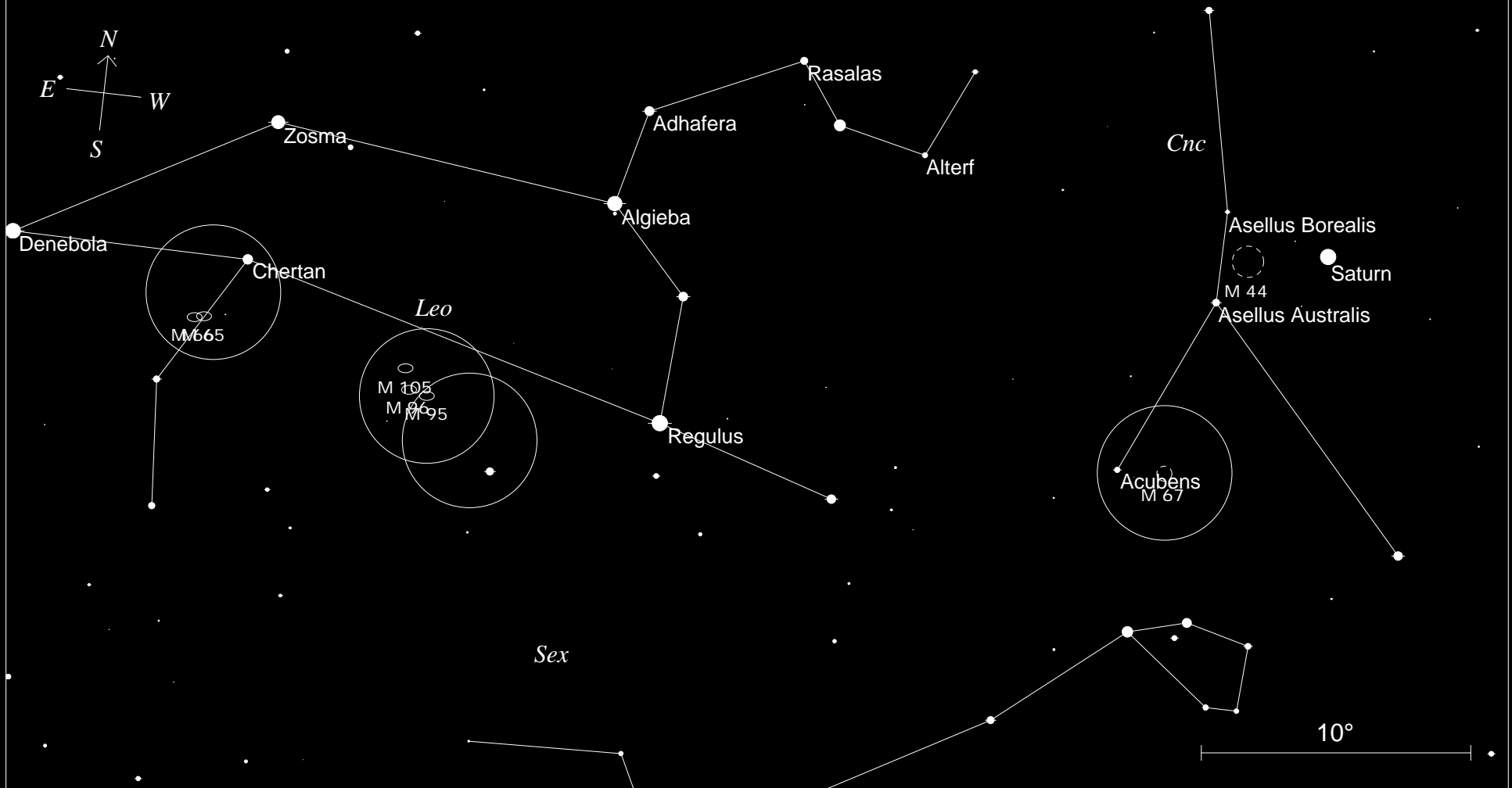
Figure 18 - Finder M48



<p>STARS</p> <p>● <3 8 ● 4 >9 ● 5 ● 6 ● 7</p>		<p>SYMBOLS</p> <p>● Multiple star □ Dark nebula △ Radio source ○ Variable star ⊕ Globular cluster × X-ray source ☄ Comet ○ Open cluster ○ Other object ○ Galaxy ○ Planetary nebula □ Bright nebula ○ Quasar</p>		<p>FOV Circle 5°</p>
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Local Time: 21:55:00 25-Mar-2006 UTC: 05:55:00 26-Mar-2006 Sidereal Time: 10:02:58
 Location: 37° 11' 15" N 121° 33' 0" W RA: 7h48m02s Dec: -3° 52' Field: 16.0° Julian Day: 2453820.7465

Figure 19 - Visual Leo and Cancer



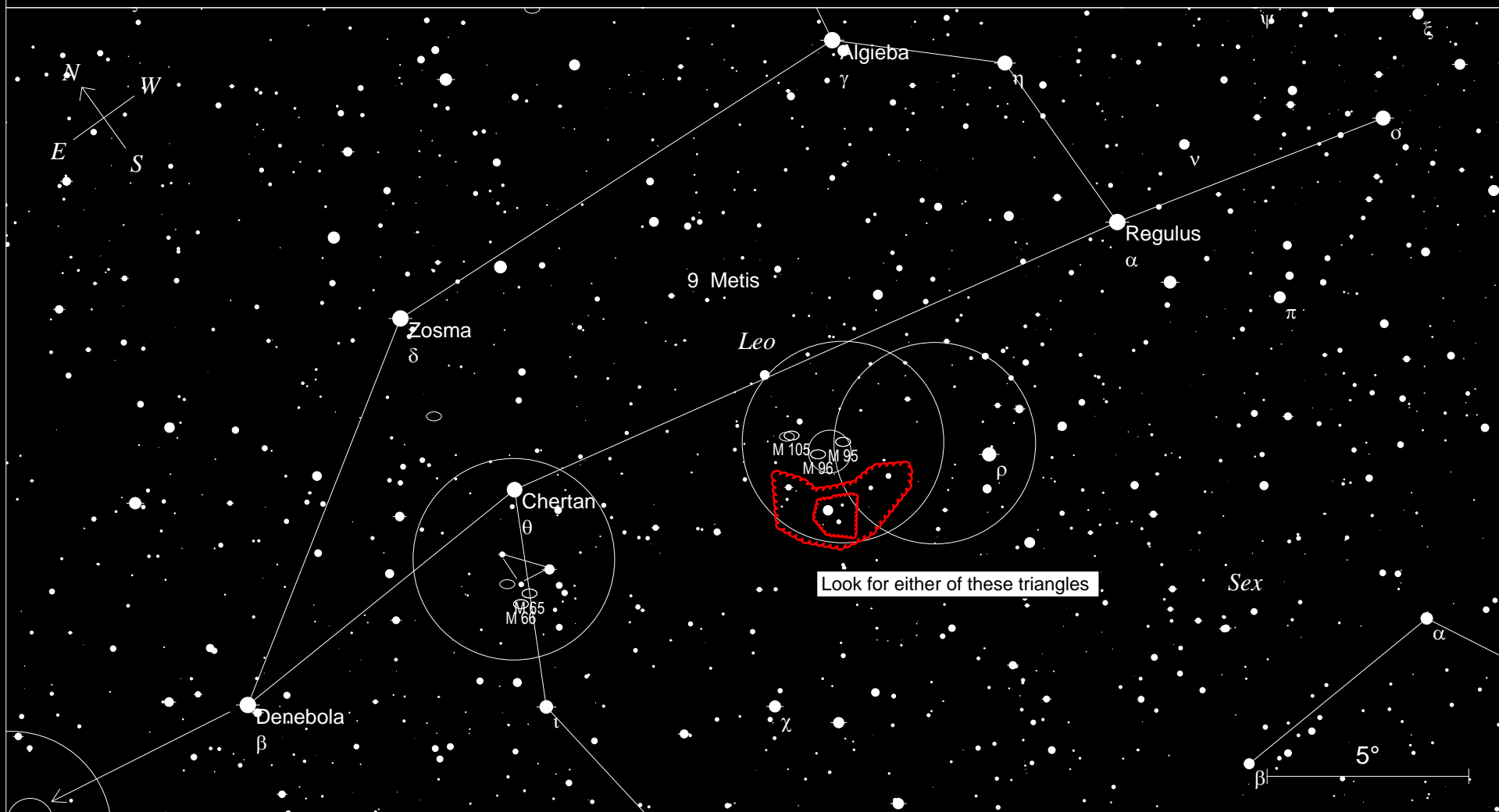
STARS		SYMBOLS		FOV Circle 5°
● <2	• 4.5	● Multiple star	☐ Dark nebula	△ Radio source
● 2.5	• 5	○ Variable star	⊕ Globular cluster	× X-ray source
● 3	• >5.5	☄ Comet	⊙ Open cluster	○ Other object
● 3.5		☉ Galaxy	♁ Planetary nebula	
• 4		☐ Bright nebula	☉ Quasar	

Local Time: 22:00:00 25-Mar-2006
 Location: 37° 11' 15" N 121° 33' 0" W

UTC: 06:00:00 26-Mar-2006
 RA: 9h54m38s Dec: +13° 44' Field: 30.0°

Sidereal Time: 10:07:59
 Julian Day: 2453820.7500

Figure 20 Leo Galaxies



STARS		SYMBOLS		
● <3	● 8	⊠ Dark nebula	⊕ Globular cluster	△ Radio source
● 4	● >9	○ Variable star	⊙ Open cluster	× X-ray source
● 5		☄ Comet	♁ Planetary nebula	○ Other object
● 6		☉ Galaxy	☉ Quasar	
● 7		□ Bright nebula		

FOV Circle 5°
small circle 1°

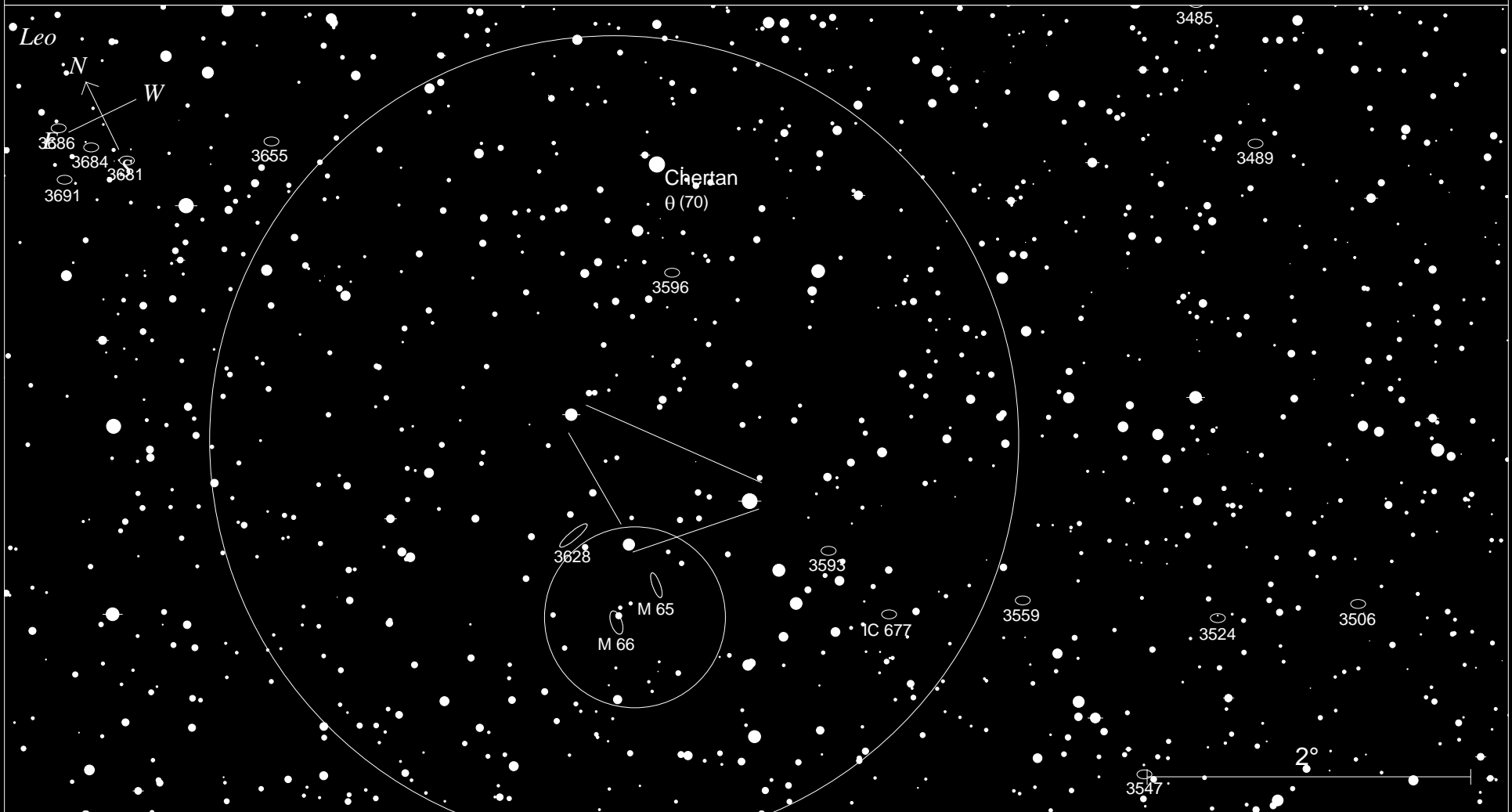
Figure 21 Eyepiece View of M95 95 105



<p>STARS</p> <p>● <5 ● 10 ● 6 ● 11 ● 7 ● 12 ● 8 ● >13 ● 9</p>		<p>SYMBOLS</p> <p>● Multiple star □ Dark nebula △ Radio source ○ Variable star ⊕ Globular cluster × X-ray source ☄ Comet ○ Open cluster ○ Other object ○ Galaxy ◇ Planetary nebula □ Bright nebula ⊞ Quasar</p>		<p>FOV Circle 5° small circle 1°</p>
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<p>Local Time: 22:10:00 26-Mar-2006 Location: 37° 11' 15" N 121° 33' 0" W</p>	<p>UTC: 05:10:00 27-Mar-2006 RA: 10h45m51s Dec: +11° 35' Field: 5.0°</p>	<p>Sidereal Time: 09:21:47 Julian Day: 2453821.7153</p>
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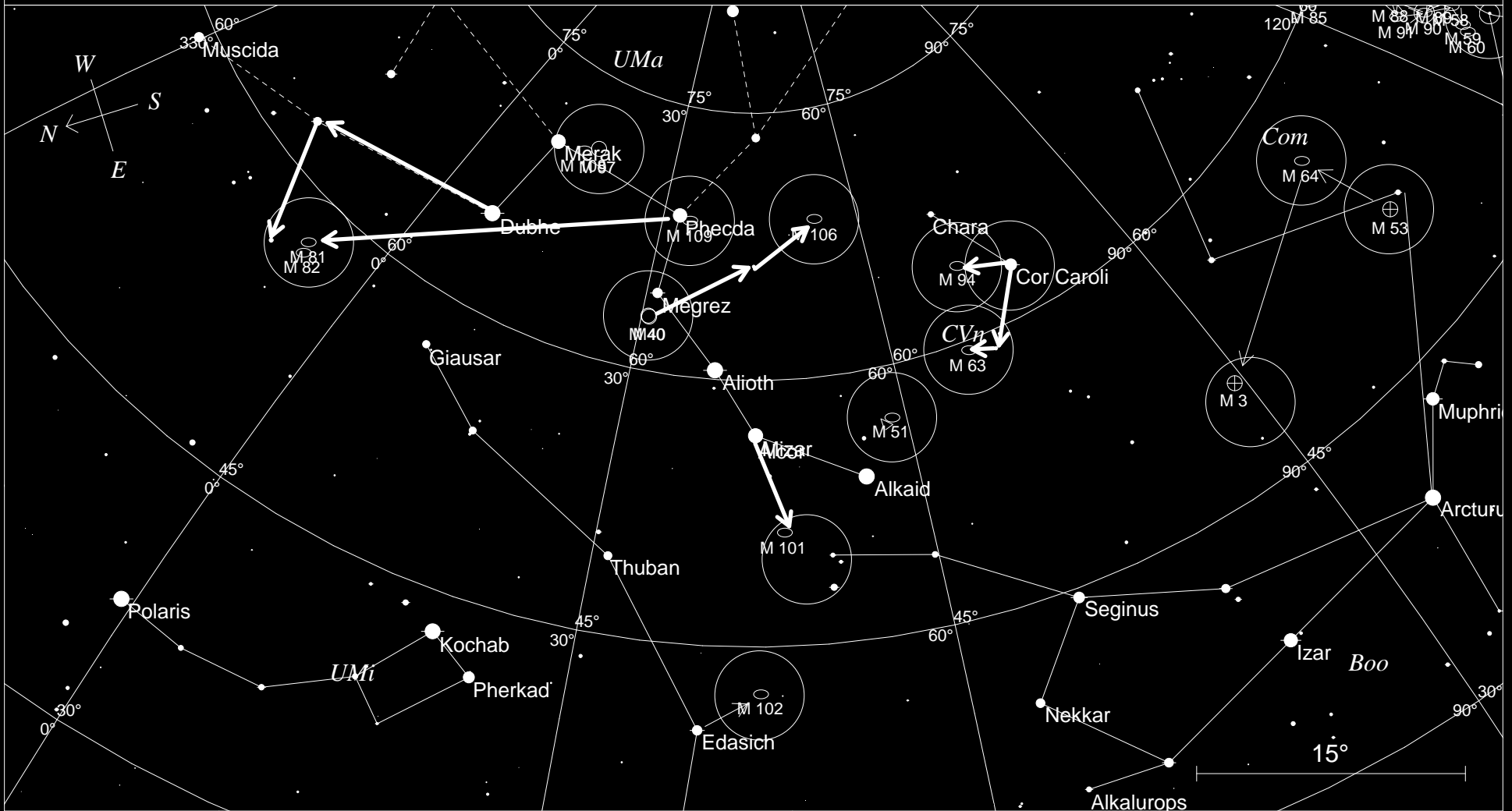
Figure 22 Finder M 65 66



STARS		SYMBOLS		
● <5	● 10	● Multiple star	◻ Dark nebula	△ Radio source
● 6	● 11	○ Variable star	⊕ Globular cluster	× X-ray source
● 7	● 12	☄ Comet	○ Open cluster	○ Other object
● 8	● >13	○ Galaxy	○ Planetary nebula	
● 9		◻ Bright nebula	⊞ Quasar	
				Large FOV Circle 5° Small FOV Circle 1°

Local Time: 22:10:00 25-Mar-2006 UTC: 06:10:00 26-Mar-2006 Sidereal Time: 10:18:00
 Location: 37° 11' 15" N 121° 33' 0" W RA: 11h15m01s Dec: +13° 45' Field: 5.0° Julian Day: 2453820.7569

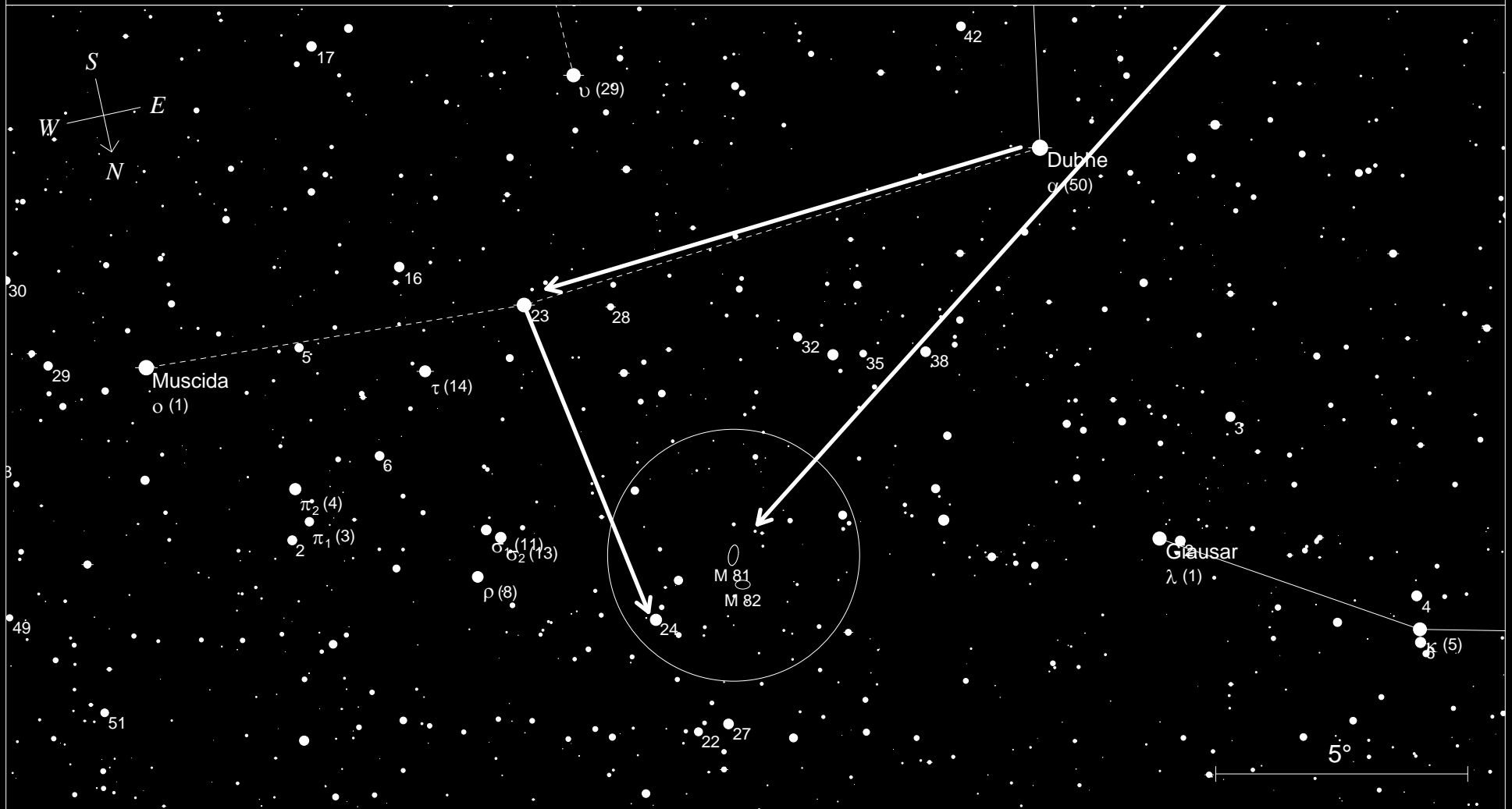
Figure 23 - Visual Uma and Cvn



STARS		SYMBOLS		FOV Circle 5°
● <2	● 4.5	● Multiple star	☐ Dark nebula	△ Radio source
● 2.5	● 5	○ Variable star	⊕ Globular cluster	× X-ray source
● 3	● >5.5	☄ Comet	○ Open cluster	○ Other object
● 3.5		☾ Galaxy	♁ Planetary nebula	
● 4		☐ Bright nebula	☉ Quasar	

Local Time: 22:30:00 25-Mar-2006 UTC: 06:30:00 26-Mar-2006 Sidereal Time: 10:38:04
 Location: 37° 11' 15" N 121° 33' 0" W RA: 13h13m27s Dec: +54° 34' Field: 45.0° Julian Day: 2453820.7708

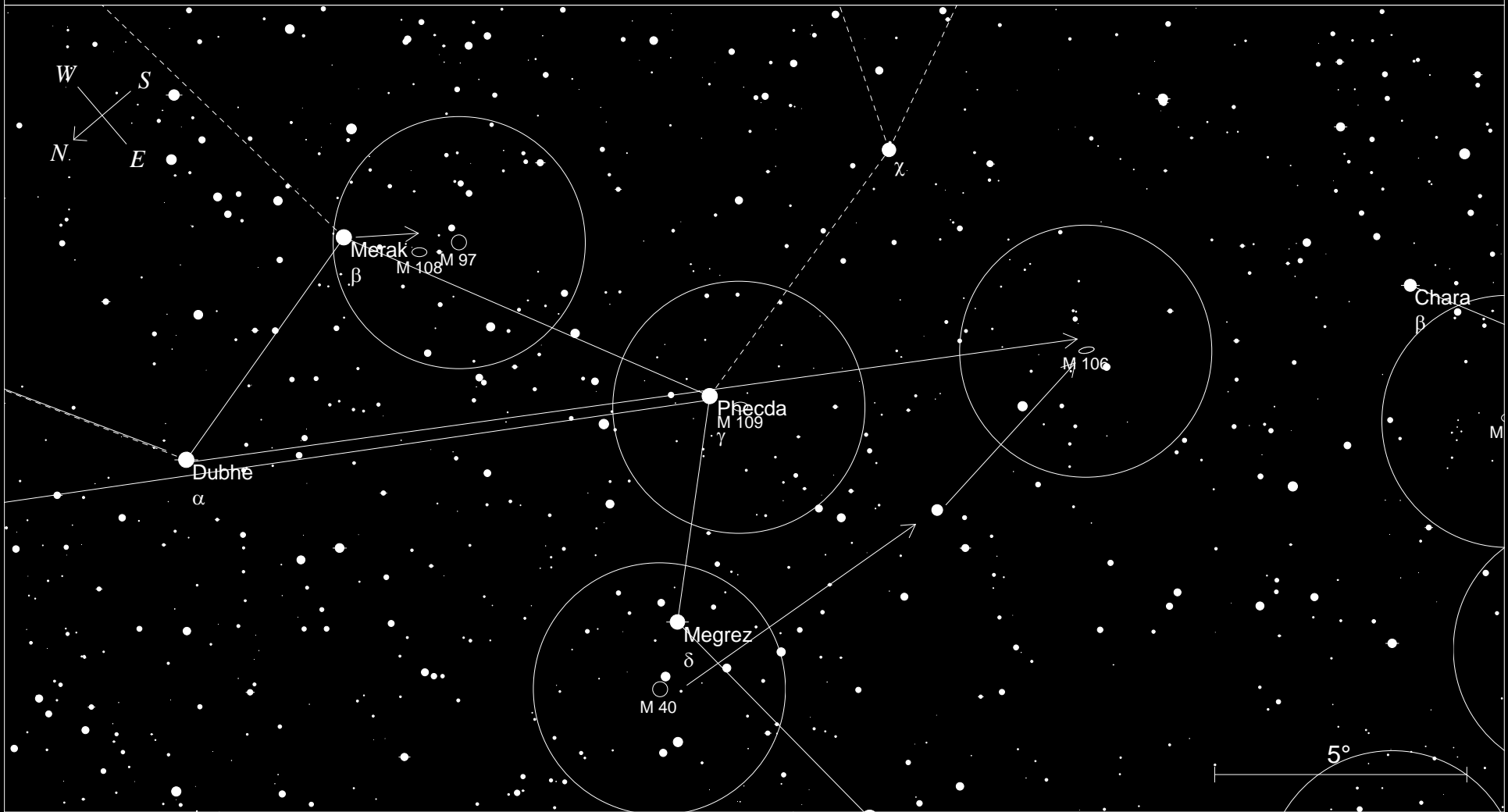
Figure 24 M 81 82



STARS		SYMBOLS		FOV Circle 5°
● <3	8	● Multiple star	⊠ Dark nebula	
● 4	>9	○ Variable star	⊕ Globular cluster	
● 5		☄ Comet	⊙ Open cluster	
● 6		○ Galaxy	⊕ Planetary nebula	
● 7		□ Bright nebula	⊞ Quasar	
			△ Radio source	
			× X-ray source	
			○ Other object	

Local Time: 22:30:00 25-Mar-2006 UTC: 06:30:00 26-Mar-2006 Sidereal Time: 10:38:04
 Location: 37° 11' 15" N 121° 33' 0" W RA: 10h07m51s Dec: +66° 18' Field: 16.0° Julian Day: 2453820.7708

Figure 25 - Finder M97 108 109 40 106



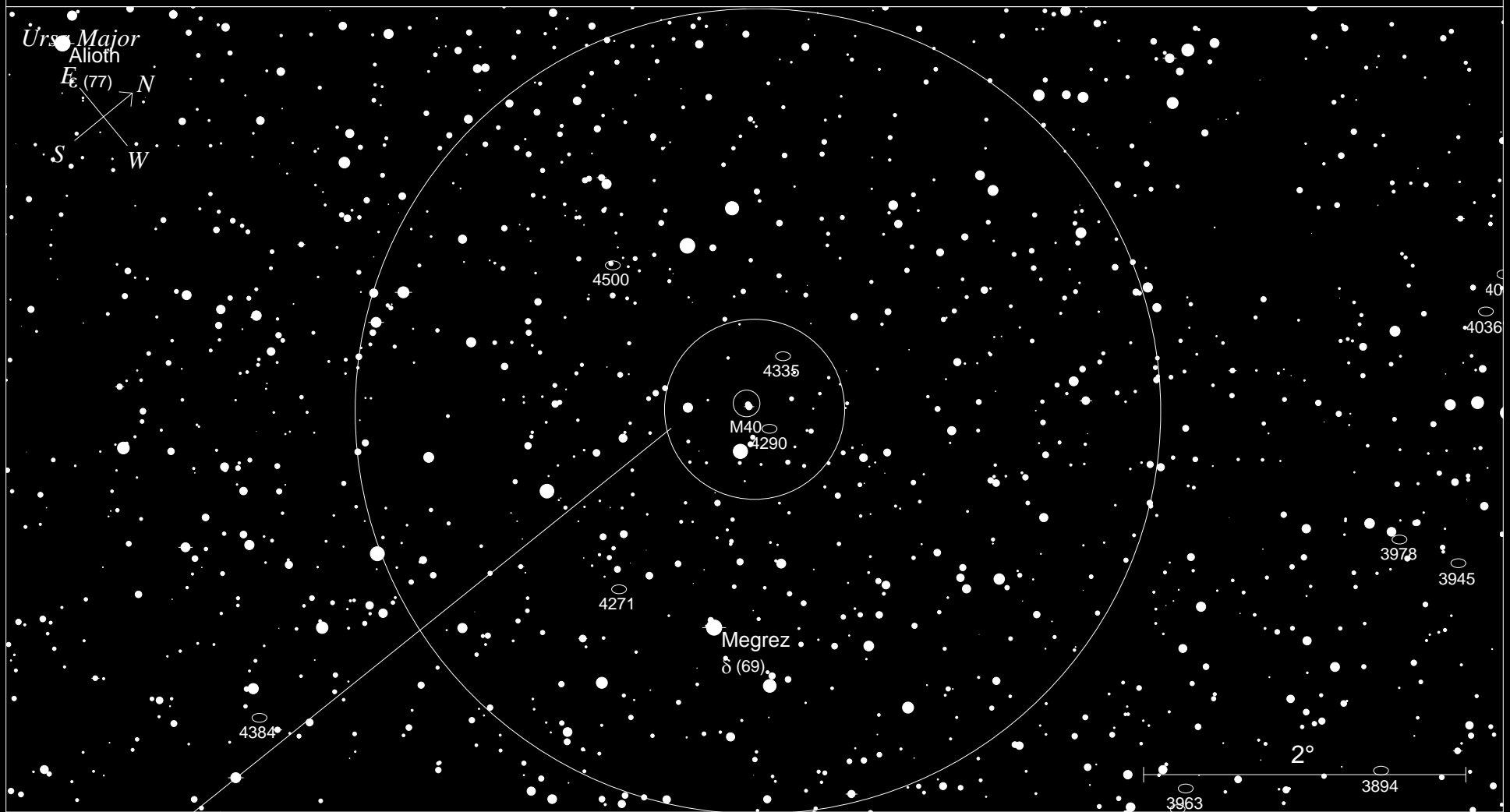
<p>STARS</p> <p>● <3 8 ● 4 >9 ● 5 ● 6 ● 7</p>		<p>SYMBOLS</p> <p>● Multiple star □ Dark nebula △ Radio source ○ Variable star ⊕ Globular cluster × X-ray source ☄ Comet ○ Open cluster ○ Other object ○ Galaxy ○ Planetary nebula □ Bright nebula ○ Quasar</p>		<p>FOV Circle 5°</p>
--	--	--	--	----------------------

Local Time: 22:30:00 25-Mar-2006
 Location: 37° 11' 15" N 121° 33' 0" W

UTC: 06:30:00 26-Mar-2006
 RA: 11h59m17s Dec: +53° 09' Field: 16.0°

Sidereal Time: 10:38:04
 Julian Day: 2453820.7708

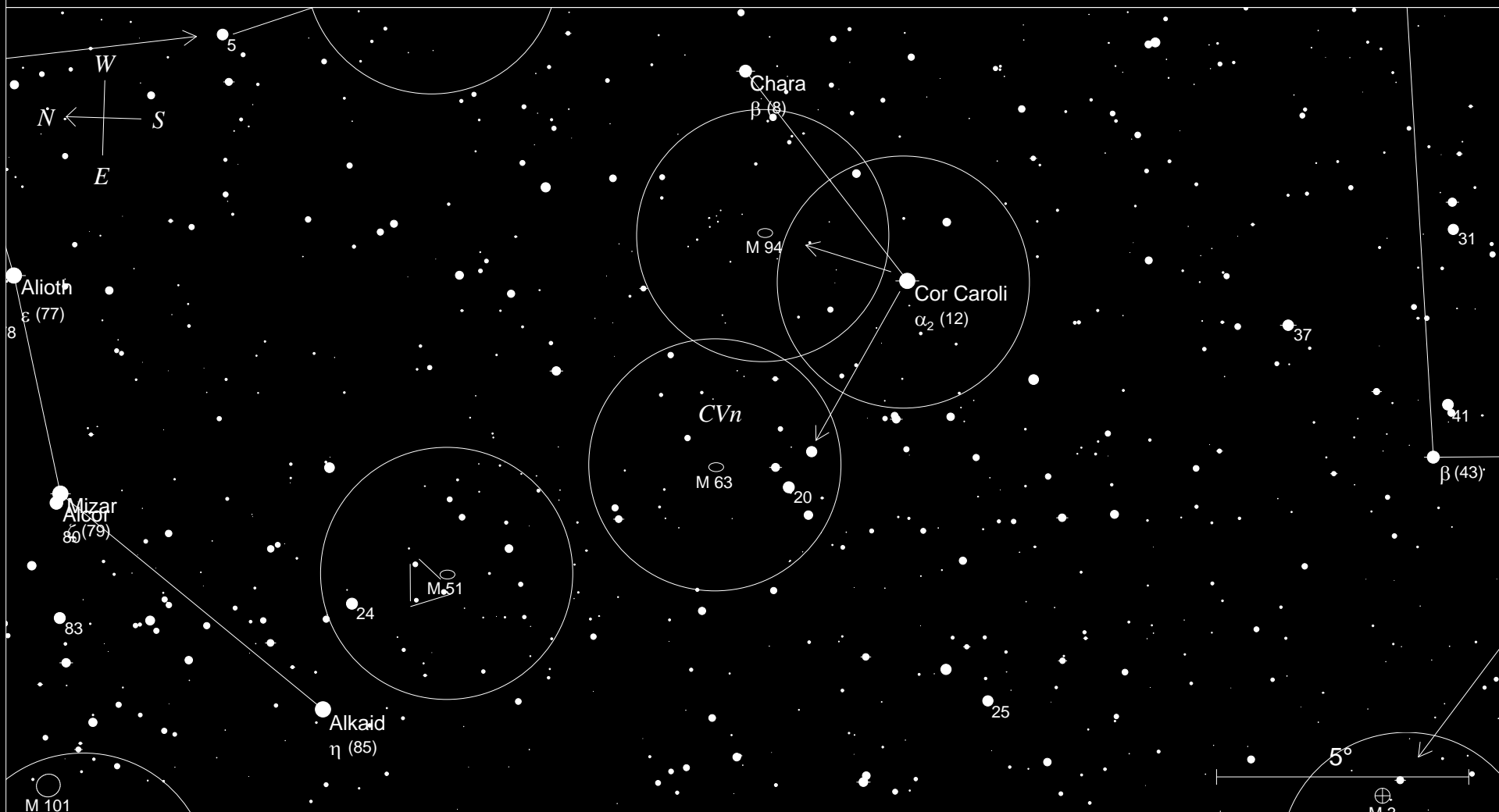
Figure 26 - Eyepiece view M40



<p>STARS</p> <ul style="list-style-type: none"> ● <5 ● 10 ● 6 ● 11 ● 7 ● 12 ● 8 ● >13 ● 9 		<p>SYMBOLS</p> <ul style="list-style-type: none"> ● Multiple star ○ Variable star ☄ Comet ☾ Galaxy □ Bright nebula ☐ Dark nebula ⊕ Globular cluster ○ Open cluster ⊖ Planetary nebula ☉ Quasar △ Radio source × X-ray source ○ Other object 		<p>FOV Circle 5°</p>
--	--	---	--	----------------------

<p>Local Time: 22:30:00 25-Mar-2006 Location: 37° 11' 15" N 121° 33' 0" W</p>	<p>UTC: 06:30:00 26-Mar-2006 RA: 12h22m15s Dec: +58° 03' Field: 5.0°</p>	<p>Sidereal Time: 10:38:04 Julian Day: 2453820.7708</p>
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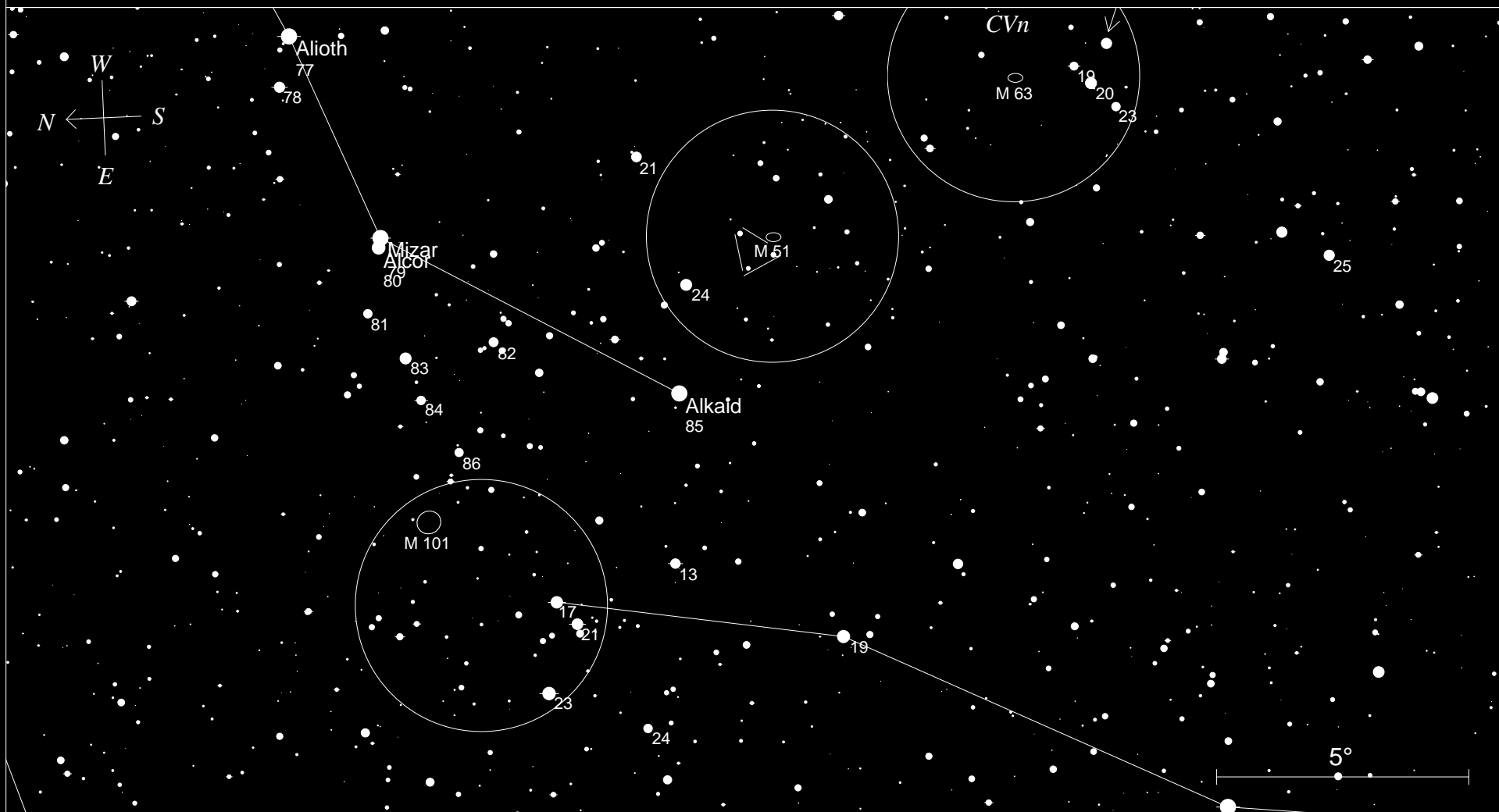
Figure 27 M94 63 51



<p>STARS</p> <p>● <3 8 ● 4 >9 ● 5 ● 6 ● 7</p>		<p>SYMBOLS</p> <p>● Multiple star □ Dark nebula △ Radio source ○ Variable star ⊕ Globular cluster × X-ray source ☄ Comet ⊙ Open cluster ○ Other object ☾ Galaxy ☾ Planetary nebula □ Bright nebula ☾ Quasar</p>		<p>FOV Circle 5°</p>
--	--	--	--	----------------------

Local Time: 22:50:00 25-Mar-2006 UTC: 06:50:00 26-Mar-2006 Sidereal Time: 10:58:07
 Location: 37° 11' 15" N 121° 33' 0" W RA: 13h09m56s Dec: +41° 15' Field: 16.0° Julian Day: 2453820.7847

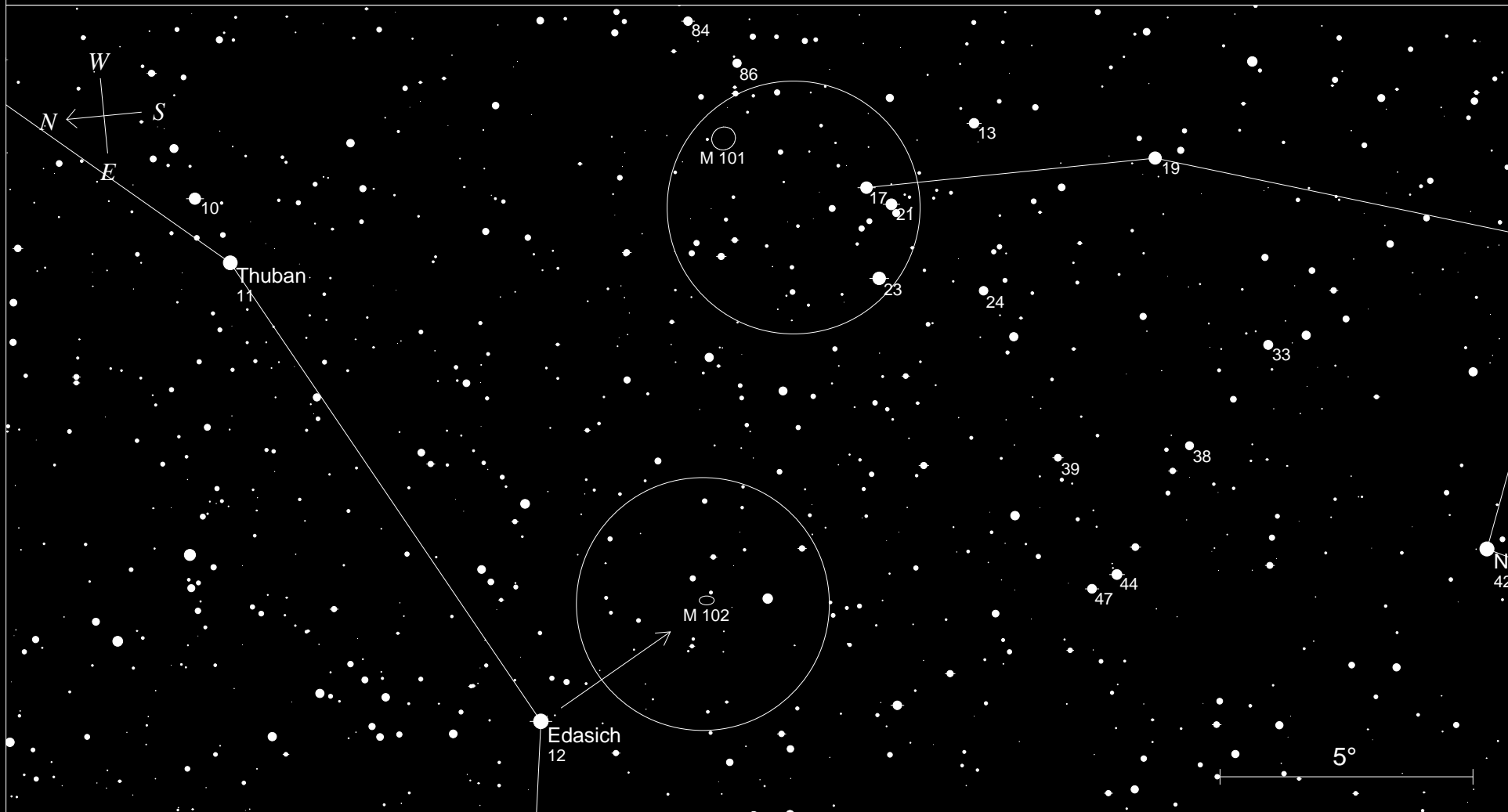
Figure 28 Finder M51 101



<p>STARS</p> <ul style="list-style-type: none"> ● <3 8 ● 4 >9 ● 5 ● 6 ● 7 		<p>SYMBOLS</p> <ul style="list-style-type: none"> ● Multiple star ○ Variable star ☄ Comet ☾ Galaxy □ Bright nebula ☐ Dark nebula ⊕ Globular cluster ⊙ Open cluster ♁ Planetary nebula ☉ Quasar △ Radio source × X-ray source ○ Other object 		<p>FOV Circle 5°</p>
---	--	---	--	----------------------

<p>Local Time: 22:50:00 25-Mar-2006 Location: 37° 11' 15" N 121° 33' 0" W</p>	<p>UTC: 06:50:00 26-Mar-2006 RA: 13h50m19s Dec: +47° 46' Field: 16.0°</p>	<p>Sidereal Time: 10:58:07 Julian Day: 2453820.7847</p>
--	--	--

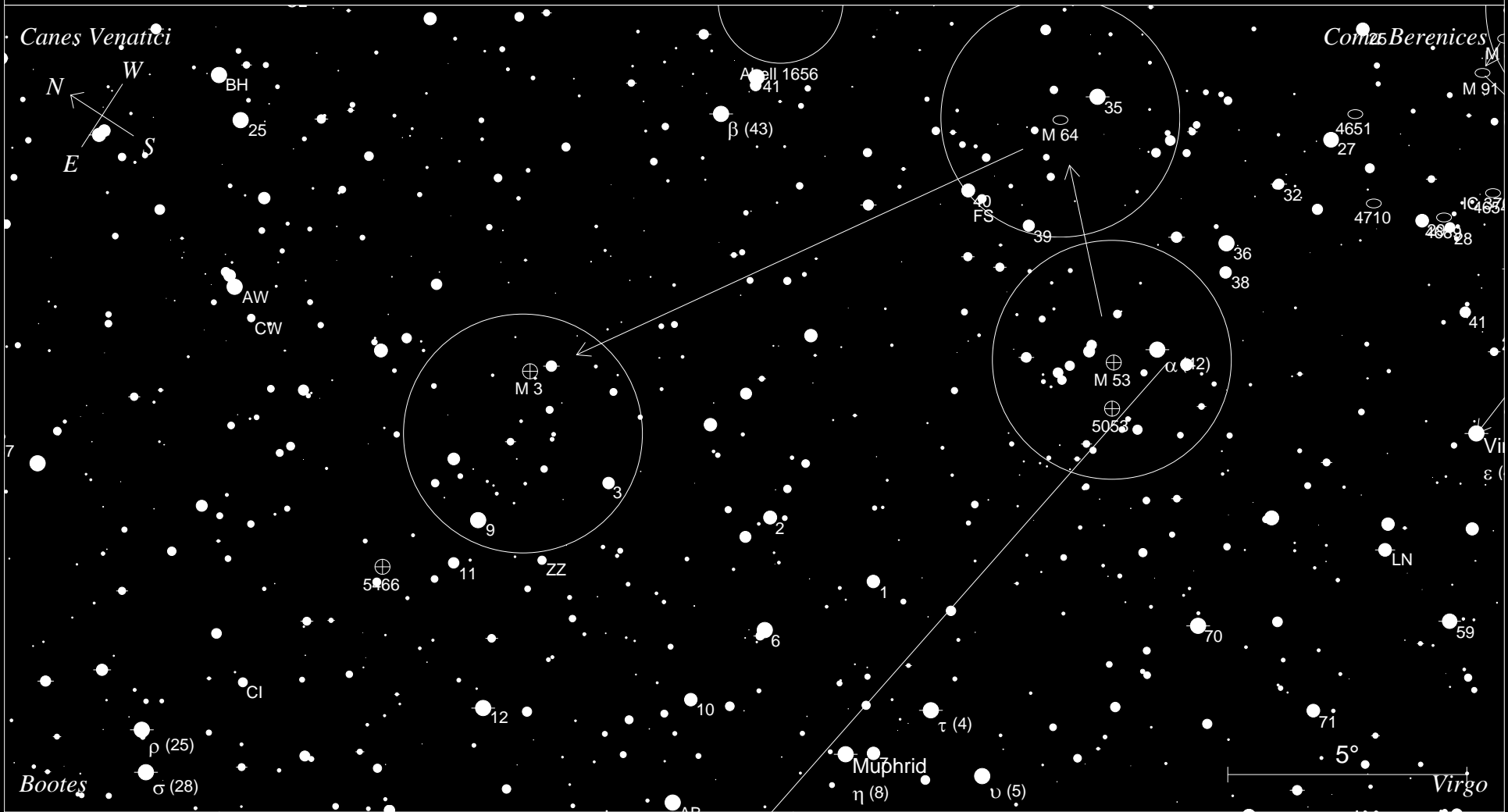
Figure 29 M102



<p>STARS</p> <ul style="list-style-type: none"> ● <3 8 ● 4 >9 ● 5 ● 6 ● 7 		<p>SYMBOLS</p> <ul style="list-style-type: none"> ● Multiple star ○ Variable star ☄ Comet ○ Galaxy □ Bright nebula ☐ Dark nebula ⊕ Globular cluster ○ Open cluster ♁ Planetary nebula ☉ Quasar △ Radio source × X-ray source ○ Other object 		<p>FOV Circle 5°</p>
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<p>Local Time: 23:10:00 25-Mar-2006 Location: 37° 11' 15" N 121° 33' 0" W</p>	<p>UTC: 07:10:00 26-Mar-2006 RA: 14h40m37s Dec: +54° 31' Field: 16.0°</p>	<p>Sidereal Time: 11:18:10 Julian Day: 2453820.7986</p>
--	--	--

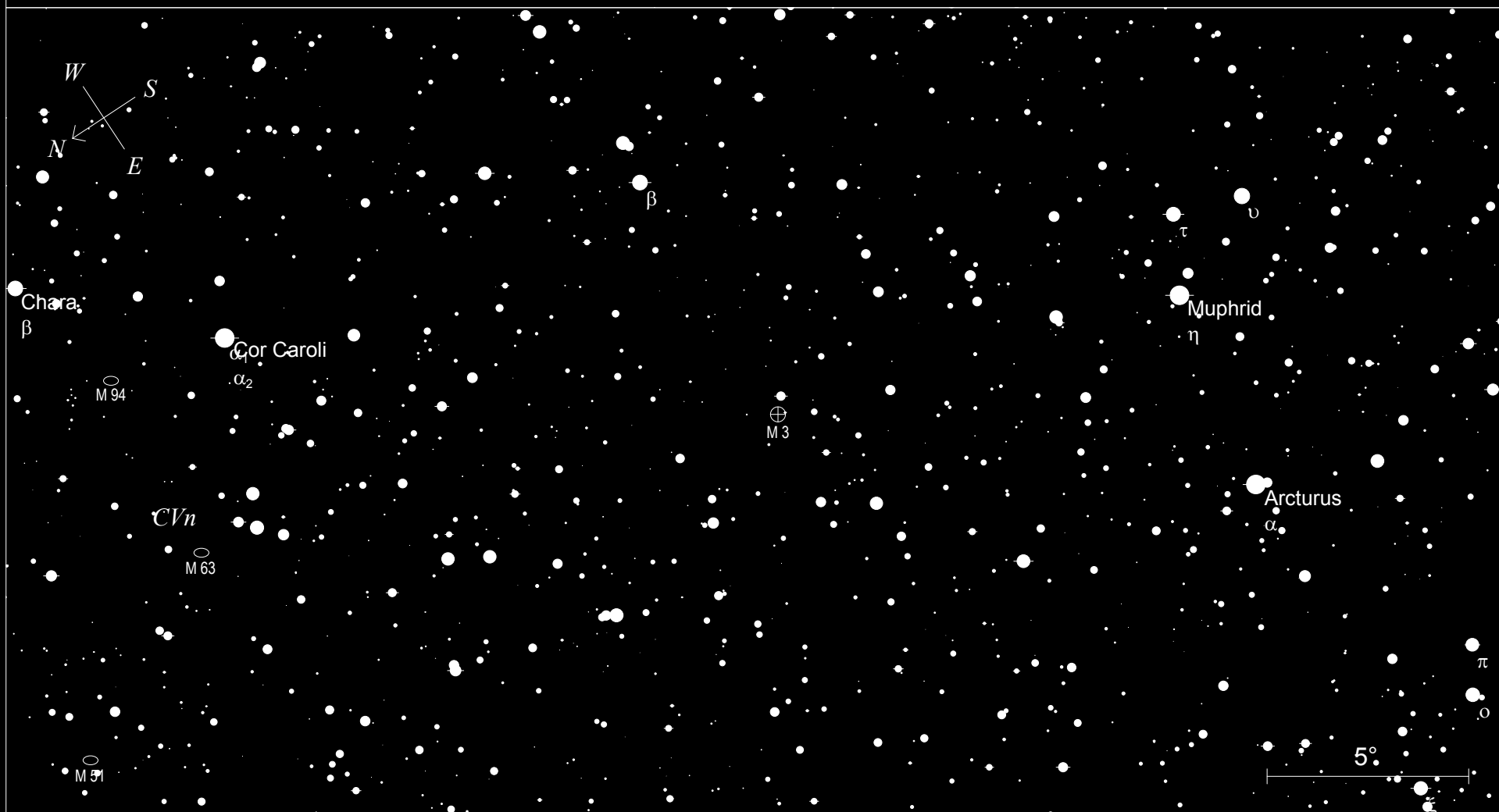
Figure 30 M53 64 3



<p>STARS</p> <ul style="list-style-type: none"> ● <5 ● 7.5 ● 5.5 ● 8 ● 6 ● 8.5 ● 6.5 ● >9 ● 7 		<p>SYMBOLS</p> <ul style="list-style-type: none"> ● Multiple star ○ Variable star ☄ Comet ○ Galaxy □ Bright nebula ☐ Dark nebula ⊕ Globular cluster ○ Open cluster ○ Planetary nebula ⊗ Quasar △ Radio source × X-ray source ○ Other object 		<p>FOV Circle 5°</p>
--	--	---	--	----------------------

Local Time: 23:15:00 25-Mar-2006 UTC: 07:15:00 26-Mar-2006 Sidereal Time: 11:23:11
 Location: 37° 11' 15" N 121° 33' 0" W RA: 13h33m49s Dec: +24° 00' Field: 16.9° Julian Day: 2453820.8021

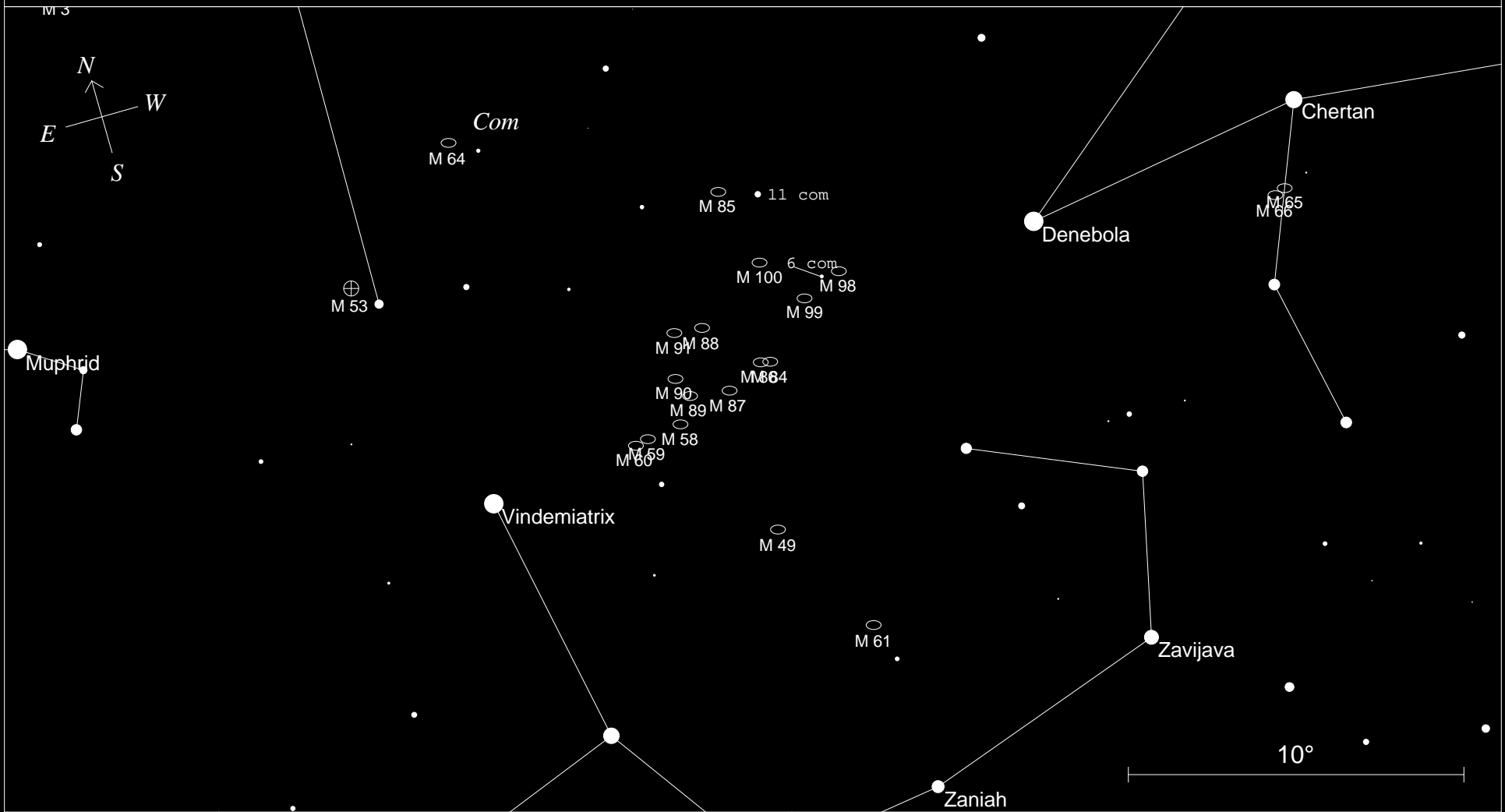
Figure 30a M3



STARS		SYMBOLS			
● <3	● 8	● Multiple star	☐ Dark nebula	△ Radio source	
● 4	● >9	○ Variable star	⊕ Globular cluster	× X-ray source	
● 5		☄ Comet	⊙ Open cluster	○ Other object	
● 6		○ Galaxy	♁ Planetary nebula		
● 7		☐ Bright nebula	☉ Quasar		

Local Time: 22:00:00 17-Mar-2007 UTC: 06:00:00 18-Mar-2007 Sidereal Time: 09:34:10
 Location: 37° 19' 48" N 121° 52' 48" W RA: 13h40m49s Dec: +28° 44' Field: 20.0° Julian Day: 2454177.7500

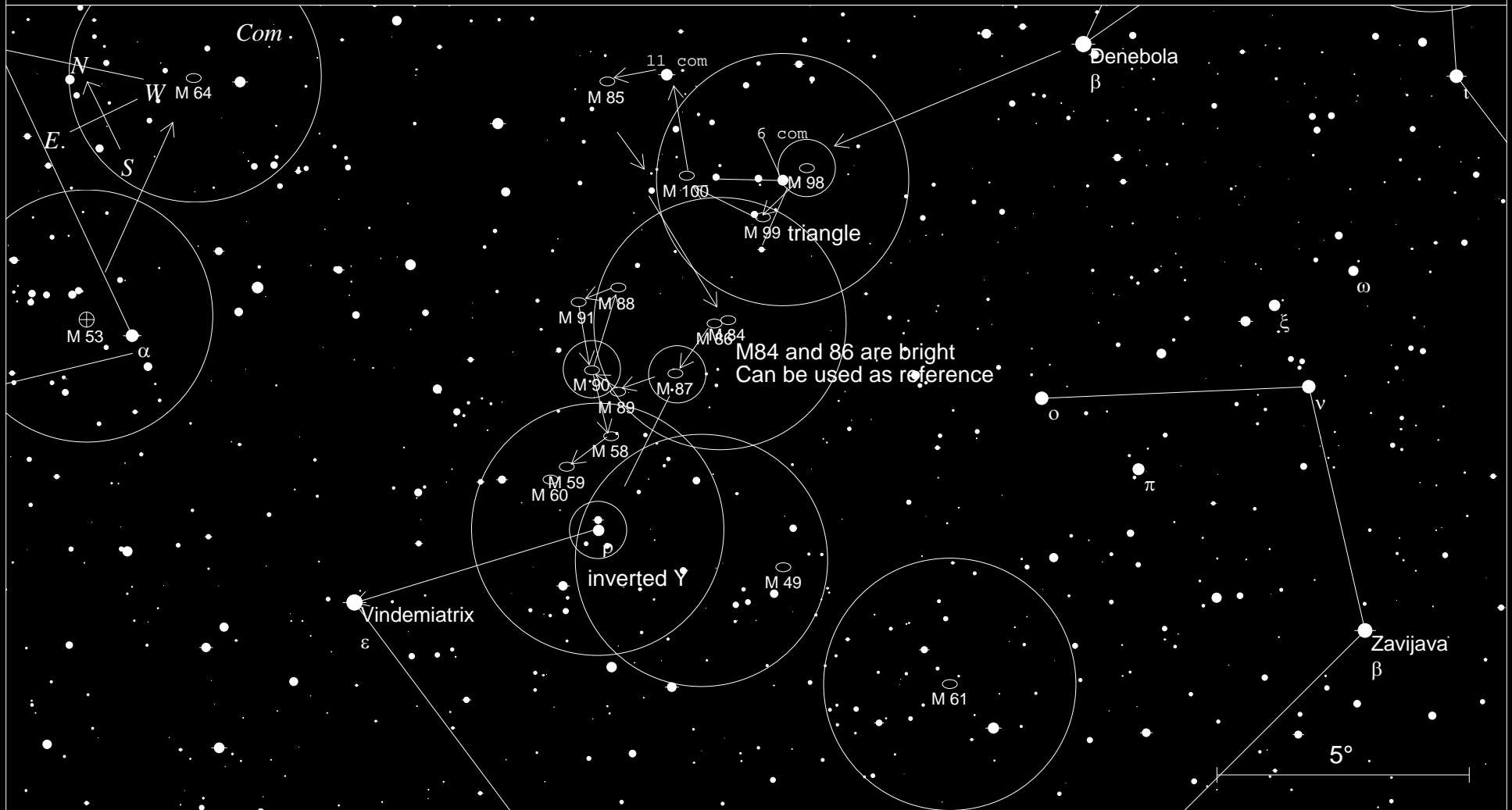
Figure 31 - Visual Virgo



STARS		SYMBOLS			
● <3	● >5.5	● Multiple star	☐ Dark nebula	△ Radio source	
● 3.5		○ Variable star	⊕ Globular cluster	✕ X-ray source	
● 4		☄ Comet	○ Open cluster	○ Other object	
● 4.5		○ Galaxy	○ Planetary nebula		
● 5		☐ Bright nebula	☉ Quasar		

Local Time: 23:45:00 25-Mar-2006 UTC: 07:45:00 26-Mar-2006 Sidereal Time: 11:53:16
 Location: 37° 11' 15" N 121° 33' 0" W RA: 12h29m02s Dec: +11° 38' Field: 24.0° Julian Day: 2453820.8229

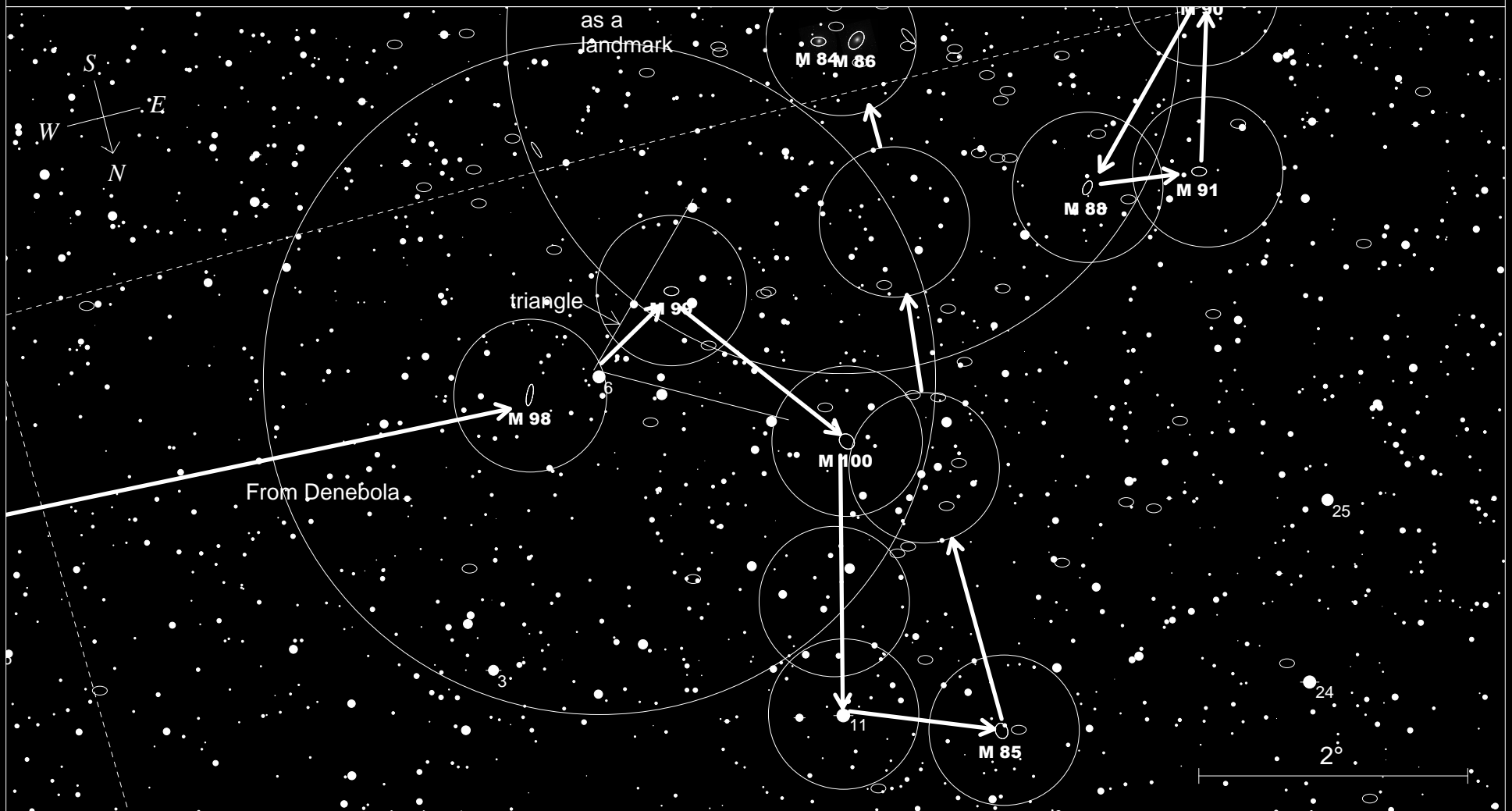
Figure 32 Finder Virgo Overview



<p>STARS</p> <ul style="list-style-type: none"> ● <3 8 ● 4 >9 ● 5 ● 6 ● 7 		<p>SYMBOLS</p> <ul style="list-style-type: none"> ● Multiple star ○ Variable star ☄ Comet ☾ Galaxy □ Bright nebula ◻ Dark nebula ⊕ Globular cluster ○ Open cluster ⊕ Planetary nebula ⊗ Quasar △ Radio source × X-ray source ○ Other object 		<p>Large FOV Circle 5° Small FOV Circle 1°</p>
---	--	---	--	--

<p>Local Time: 23:15:00 25-Mar-2006 Location: 37° 11' 15" N 121° 33' 0" W</p>	<p>UTC: 07:15:00 26-Mar-2006 RA: 12h26m29s Dec: +11° 01' Field: 16.0°</p>	<p>Sidereal Time: 11:23:11 Julian Day: 2453820.8021</p>
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Figure 33 Eyepiece M98 to M 84/86



STARS		
● <3	● 8	● >13
● 4	● 9	
● 5	● 10	
● 6	● 11	
● 7	● 12	

SYMBOLS		
● Multiple star	◻ Dark nebula	△ Radio source
○ Variable star	⊕ Globular cluster	× X-ray source
☄ Comet	⊙ Open cluster	○ Other object
☉ Galaxy	⊕ Planetary nebula	
◻ Bright nebula	⊕ Quasar	

Large FOV Circle 5°
Small FOV Circle 1°

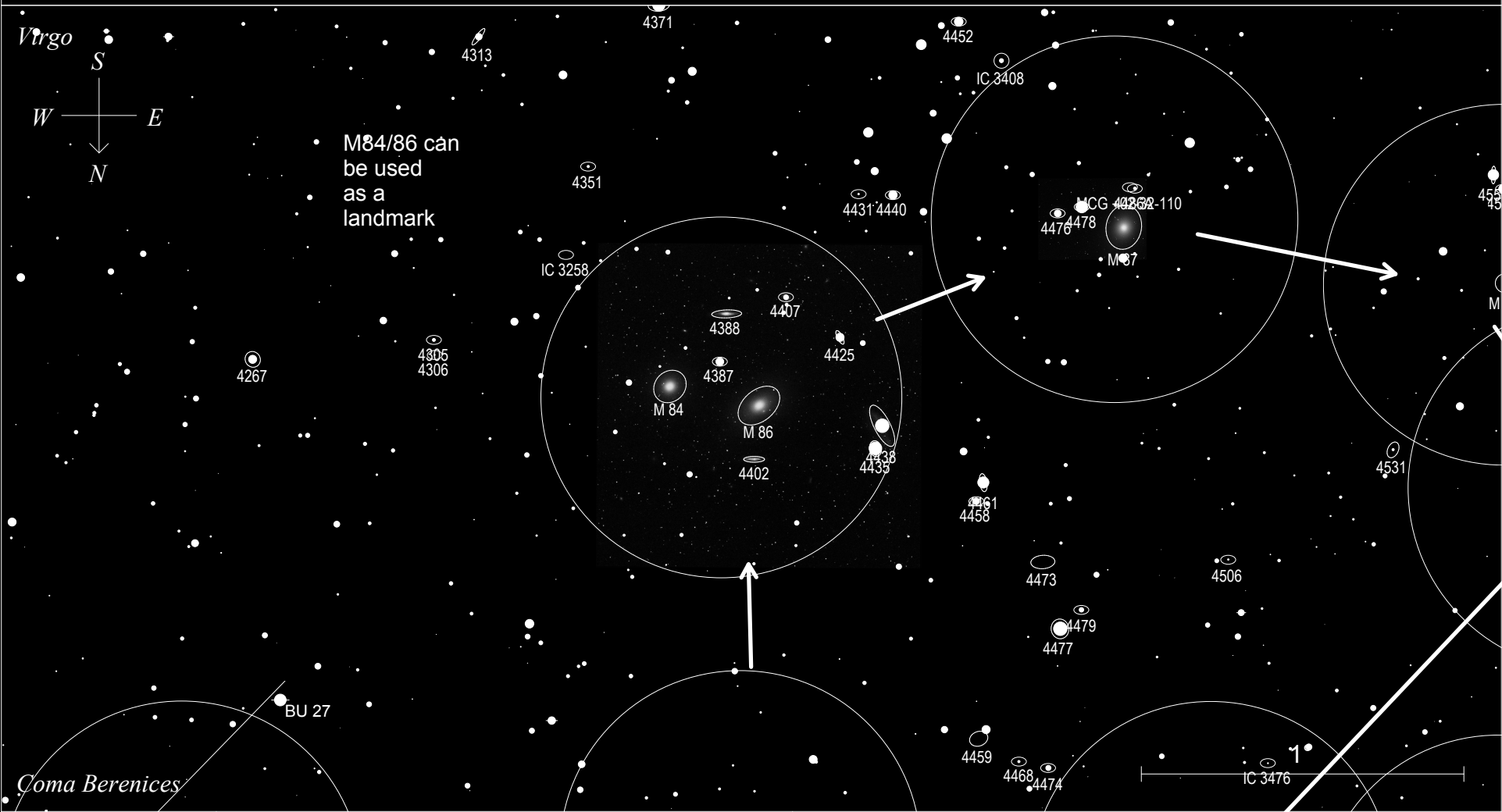
Copyright(c) 2006-2009 Robert J. Hawley. All Rights Reserved
Images are POSS1 Blue used with permission STSci/AURA

Local Time: 23:45:00 25-Mar-2006
Location: 37° 11' 15" N 121° 33' 0" W

UTC: 07:45:00 26-Mar-2006
RA: 12h20m44s Dec: +15° 23' Field: 6.0°

Sidereal Time: 11:53:16
Julian Day: 2453820.8229

Figure 33a Eyepiece M84/86 area



M84/86 can be used as a landmark

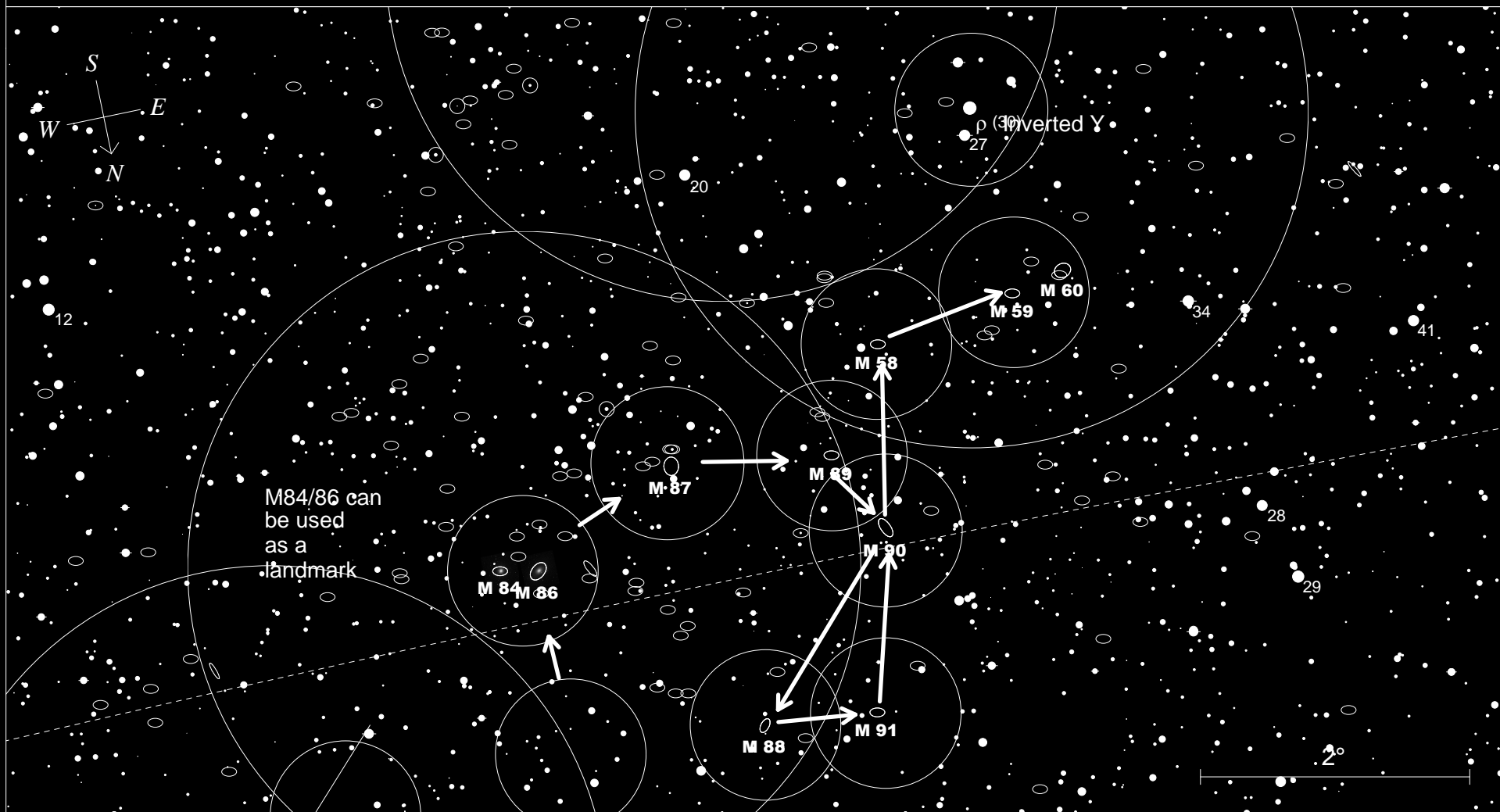
STARS		SYMBOLS		FOV Circle 1°
● <5	● 10	● Multiple star	☐ Dark nebula	Copyright(c) 2007-2009 Robert J. Hawley. All Rights Reserved. Images are POSS1 Blue used with permission STSci/AURA
● 6	● 11	○ Variable star	⊕ Globular cluster	
● 7	● 12	☄ Comet	⊙ Open cluster	
● 8	● >13	☾ Galaxy	♁ Planetary nebula	
● 9		☐ Bright nebula	☉ Quasar	
			△ Radio source	
			✕ X-ray source	
			○ Other object	

Local Time: 23:45:00 25-Mar-2006
 Location: 37° 11' 15" N 121° 33' 0" W

UTC: 07:45:00 26-Mar-2006
 RA: 12h26m26s Dec: +12° 55' Field: 2.5°

Sidereal Time: 11:53:16
 Julian Day: 2453820.8229

Figure 34 Eyepiece M 84/86 to M60



STARS		
● <3	● 8	● >13
● 4	● 9	
● 5	● 10	
● 6	● 11	
● 7	● 12	

SYMBOLS		
● Multiple star	☐ Dark nebula	△ Radio source
○ Variable star	⊕ Globular cluster	× X-ray source
☄ Comet	○ Open cluster	○ Other object
☄ Galaxy	⊙ Planetary nebula	
☐ Bright nebula	⊙ Quasar	

Large FOV Circle 5°
Small FOV Circle 1°

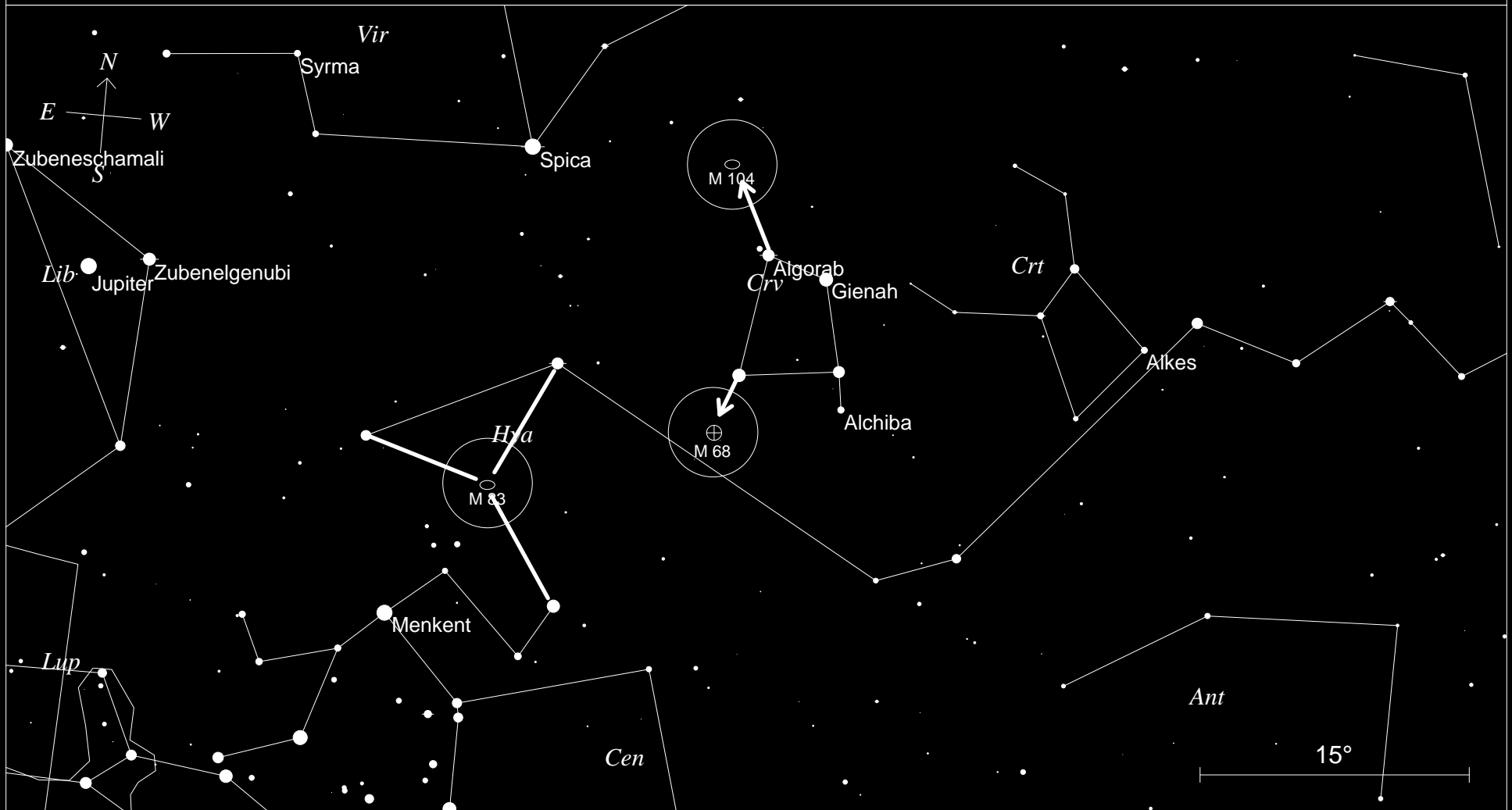
Copyright(c) 2006-2009 Robert J. Hawley. All Rights Reserved
Images are POSS1 Blue used with permission STSci/AURA

Local Time: 00:00:00 26-Mar-2006
Location: 37° 11' 15" N 121° 33' 0" W

UTC: 08:00:00 26-Mar-2006
RA: 12h34m02s Dec: +12° 04' Field: 6.0°

Sidereal Time: 12:08:19
Julian Day: 2453820.8333

Figure 35 Visual M104 68 83

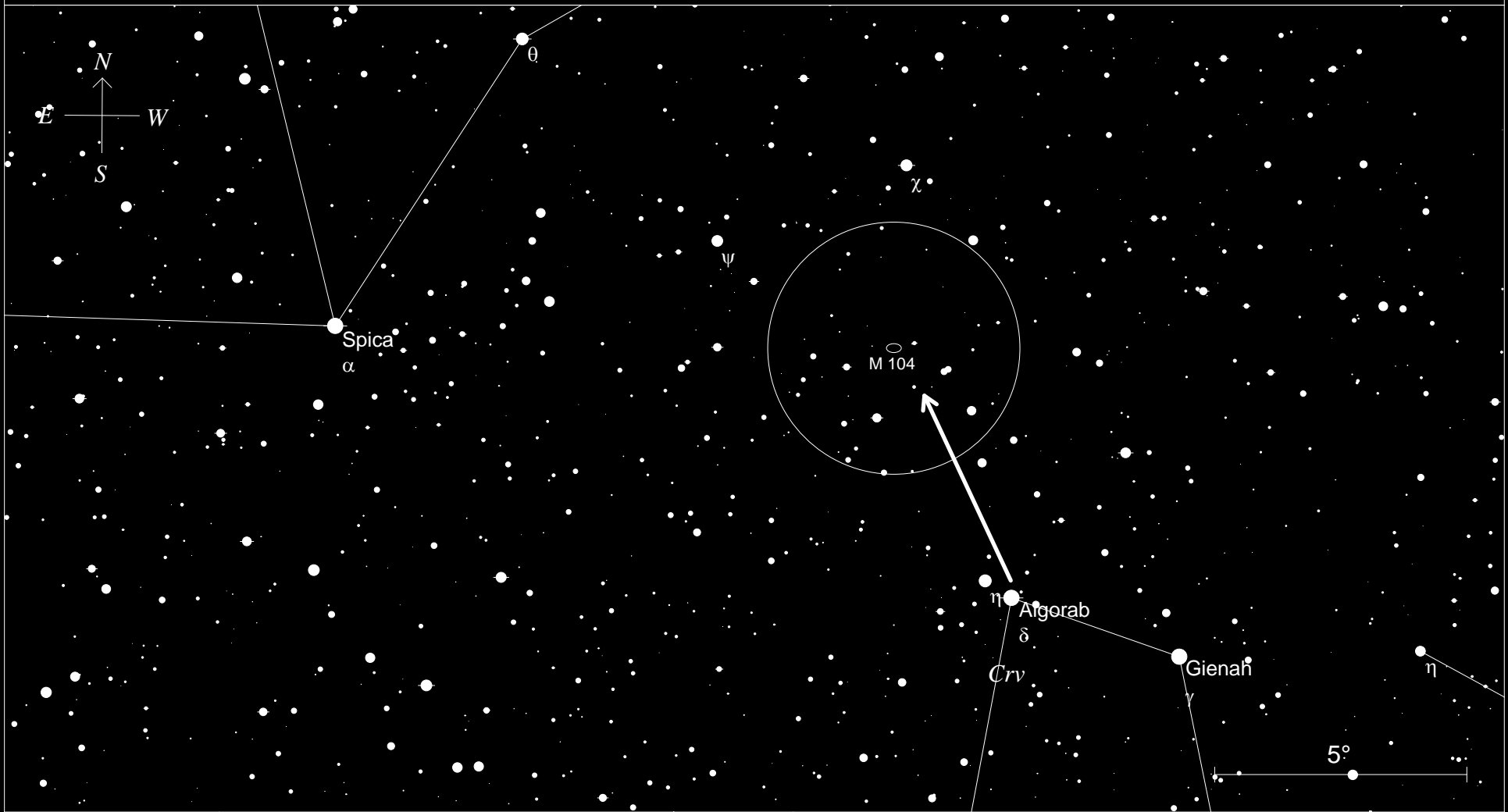


STARS		SYMBOLS	
● <2	● 4.5	☐ Dark nebula	△ Radio source
● 2.5	● 5	○ Multiple star	× X-ray source
● 3	● >5.5	⊕ Globular cluster	○ Other object
● 3.5		☾ Comet	
● 4		○ Open cluster	
		○ Galaxy	
		⊙ Planetary nebula	
		☐ Bright nebula	☉ Quasar

Large FOV Circle 5°
Small FOV Circle 1°

Local Time: 00:45:00 26-Mar-2006 UTC: 08:45:00 26-Mar-2006 Sidereal Time: 12:53:26
 Location: 37° 11' 15" N 121° 33' 0" W RA: 12h29m45s Dec: -25° 12' Field: 45.0° Julian Day: 2453820.8646

Figure 36 Finder M104



<p>STARS</p> <ul style="list-style-type: none"> ● <3 8 ● 4 >9 ● 5 ● 6 ● 7 	<p>SYMBOLS</p> <table border="0"> <tr> <td>● Multiple star</td> <td>☐ Dark nebula</td> <td>△ Radio source</td> </tr> <tr> <td>○ Variable star</td> <td>⊕ Globular cluster</td> <td>× X-ray source</td> </tr> <tr> <td>☄ Comet</td> <td>○ Open cluster</td> <td>○ Other object</td> </tr> <tr> <td>☾ Galaxy</td> <td>⊖ Planetary nebula</td> <td></td> </tr> <tr> <td>☐ Bright nebula</td> <td>☉ Quasar</td> <td></td> </tr> </table>	● Multiple star	☐ Dark nebula	△ Radio source	○ Variable star	⊕ Globular cluster	× X-ray source	☄ Comet	○ Open cluster	○ Other object	☾ Galaxy	⊖ Planetary nebula		☐ Bright nebula	☉ Quasar		<p>FOV Circle 5°</p>
● Multiple star	☐ Dark nebula	△ Radio source															
○ Variable star	⊕ Globular cluster	× X-ray source															
☄ Comet	○ Open cluster	○ Other object															
☾ Galaxy	⊖ Planetary nebula																
☐ Bright nebula	☉ Quasar																

Local Time: 00:45:00 26-Mar-2006	UTC: 08:45:00 26-Mar-2006	Sidereal Time: 12:53:26
Location: 37° 11' 15" N 121° 33' 0" W	RA: 12h51m36s Dec: -12° 53' Field: 16.0°	Julian Day: 2453820.8646

Figure 37 Finder M68



STARS		SYMBOLS		FOV Circle 5°
● <3	8	● Multiple star	⊠ Dark nebula	
● 4	>9	○ Variable star	⊕ Globular cluster	
● 5		☄ Comet	⊙ Open cluster	
● 6		○ Galaxy	♁ Planetary nebula	
● 7		□ Bright nebula	☉ Quasar	
			△ Radio source	
			× X-ray source	
			○ Other object	

Local Time: 00:50:00 26-Mar-2006
 Location: 37° 11' 15" N 121° 33' 0" W

UTC: 08:50:00 26-Mar-2006
 RA: 12h34m21s Dec: -22° 40' Field: 16.0°

Sidereal Time: 12:58:27
 Julian Day: 2453820.8681

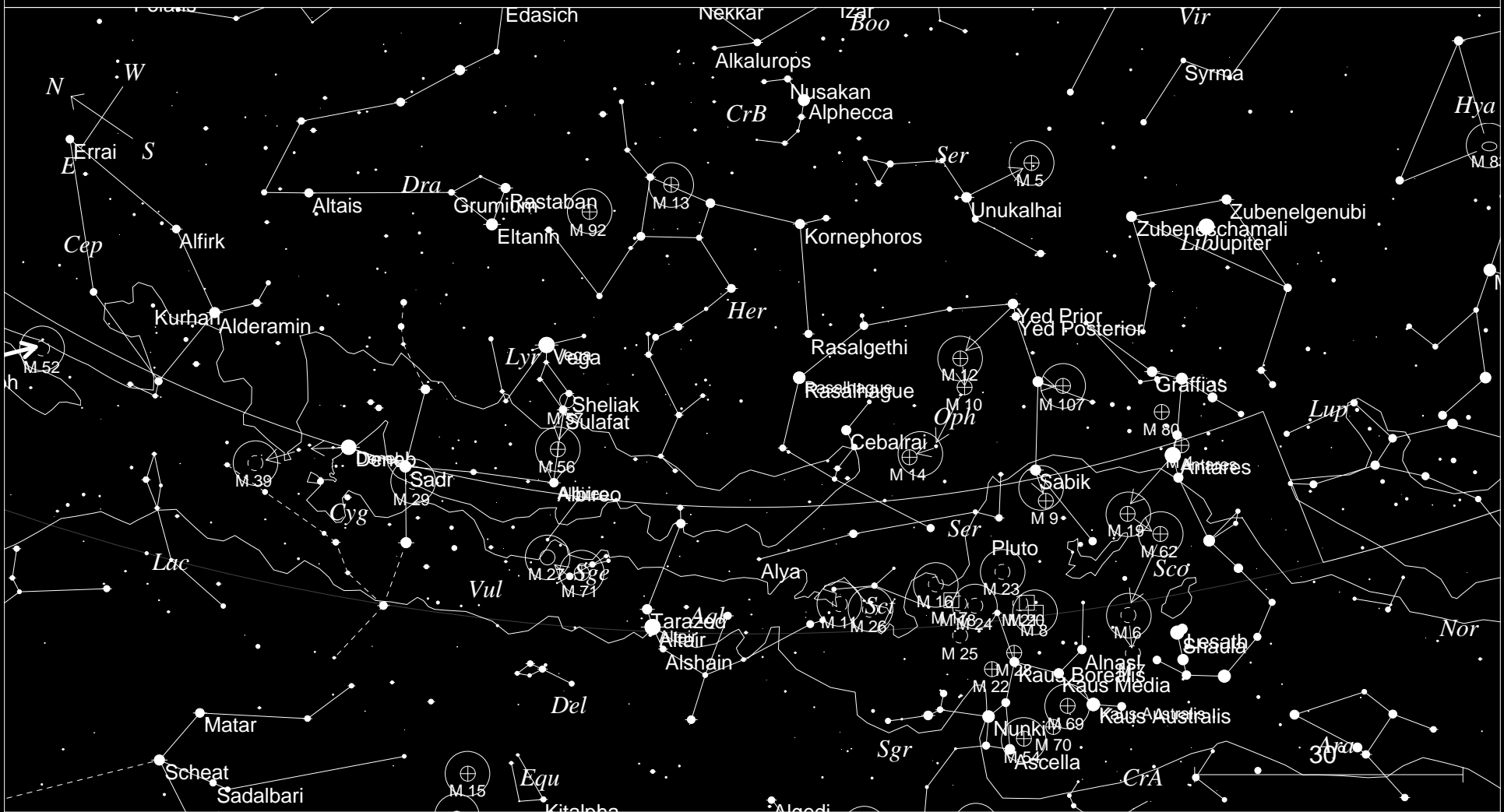
Figure 38 Finder M83



<p>STARS</p> <ul style="list-style-type: none"> ● <3 8 ● 4 >9 ● 5 ● 6 ● 7 		<p>SYMBOLS</p> <ul style="list-style-type: none"> ● Multiple star ○ Variable star ☄ Comet ☾ Galaxy ☐ Bright nebula ☒ Dark nebula ⊕ Globular cluster ⊙ Open cluster ⊕ Planetary nebula ☉ Quasar △ Radio source × X-ray source ○ Other object 		<p>FOV Circle 5°</p>
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<p>Local Time: 00:55:00 26-Mar-2006 Location: 37° 11' 15" N 121° 33' 0" W</p>	<p>UTC: 08:55:00 26-Mar-2006 RA: 13h19m23s Dec: -29° 55' Field: 16.0°</p>	<p>Sidereal Time: 13:03:28 Julian Day: 2453820.8715</p>
--	--	--

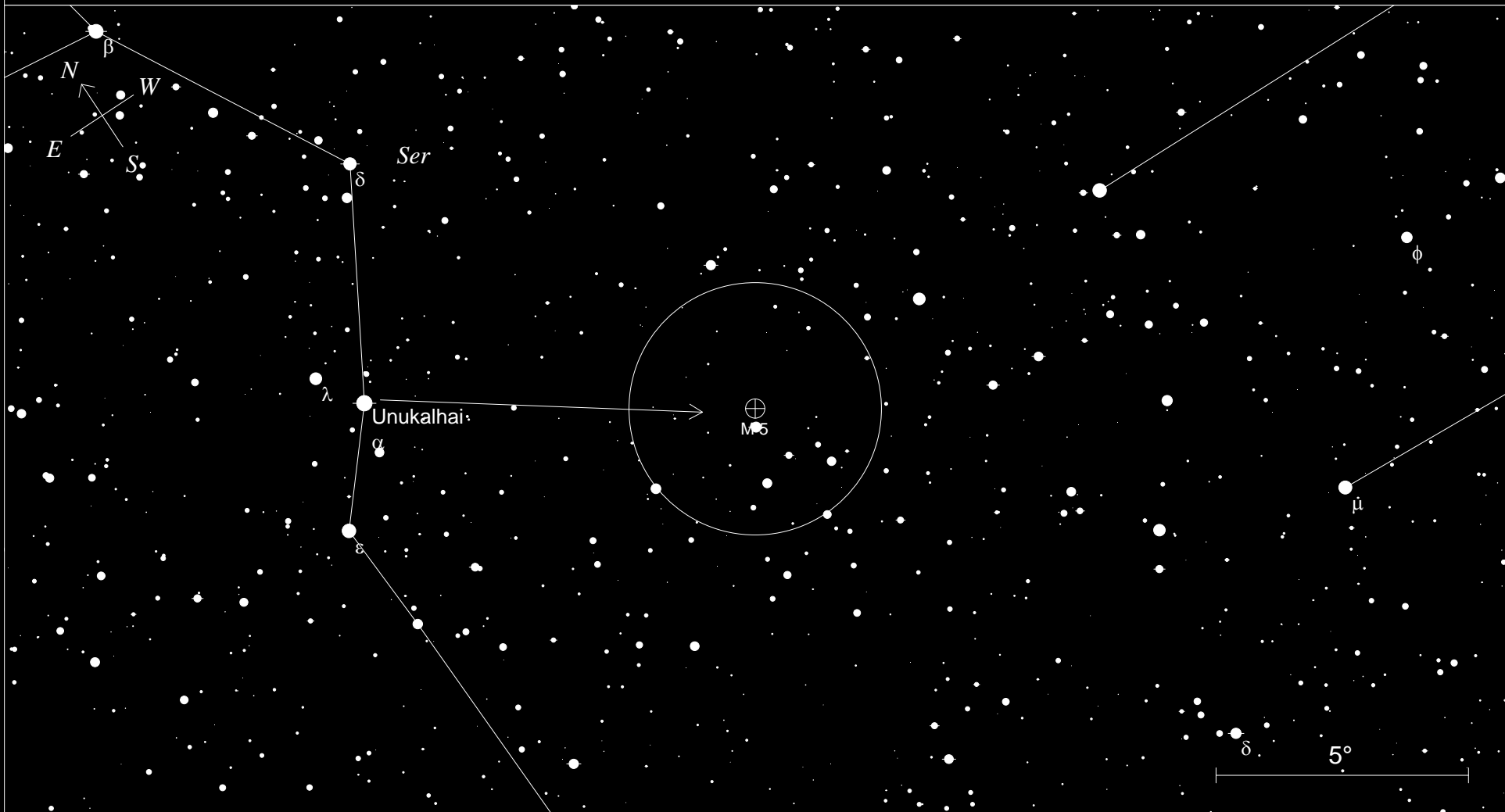
Figure 39 Visual Early Summer Objects



STARS ● <1 ● >5.5 ● 2 ● 3 ● 4 ● 5		SYMBOLS ● Multiple star □ Dark nebula △ Radio source ○ Variable star ⊕ Globular cluster × X-ray source ☄ Comet ⊕ Open cluster ○ Other object ☄ Galaxy ⊕ Planetary nebula □ Bright nebula ⊕ Quasar		FOV Circle 5°
--	--	---	--	---------------

Local Time: 01:15:00 26-Mar-2006 UTC: 09:15:00 26-Mar-2006 Sidereal Time: 13:23:31
 Location: 37° 11' 15" N 121° 33' 0" W RA: 18h00m43s Dec: +15° 05' Field: 90.0° Julian Day: 2453820.8854

Figure 40 M5



STARS		SYMBOLS		FOV Circle 5°
● 3	8	● Multiple star	⊠ Dark nebula	
● 4	>9	○ Variable star	⊕ Globular cluster	
● 5		☄ Comet	⊙ Open cluster	
● 6		☾ Galaxy	♁ Planetary nebula	
● 7		□ Bright nebula	☉ Quasar	
			△ Radio source	
			× X-ray source	
			○ Other object	

Local Time: 01:15:00 26-Mar-2006
 Location: 37° 11' 15" N 121° 33' 0" W

UTC: 09:15:00 26-Mar-2006
 RA: 15h18m53s Dec: +2° 03' Field: 16.0°

Sidereal Time: 13:23:31
 Julian Day: 2453820.8854

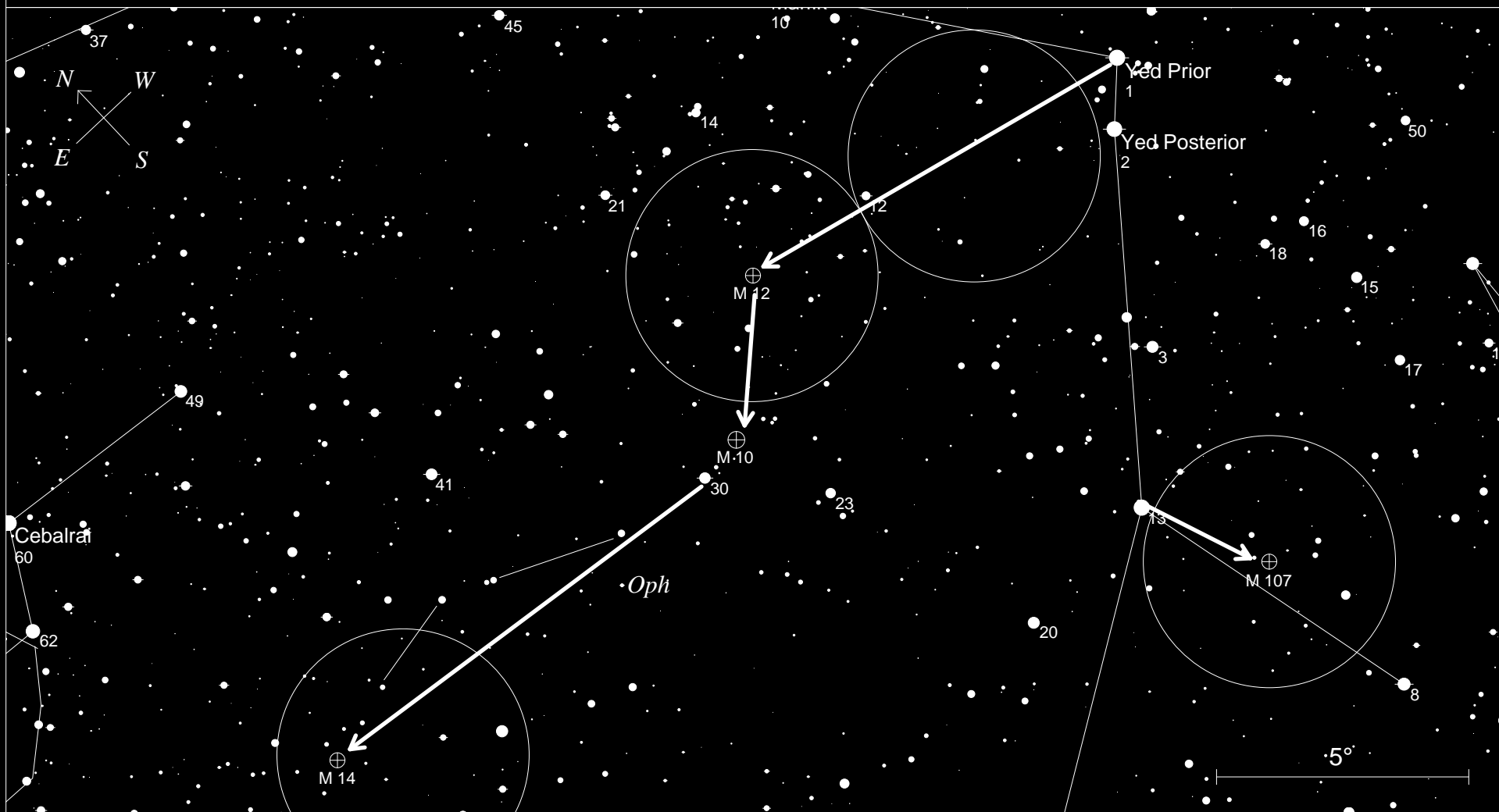
Figure 41 M13 and 92



<p>STARS</p> <p>● <3 8 ● 4 >9 ● 5 ● 6 ● 7</p>		<p>SYMBOLS</p> <p>● Multiple star □ Dark nebula ○ Variable star ⊕ Globular cluster ☄ Comet ○ Open cluster ○ Galaxy ⊕ Planetary nebula □ Bright nebula ⊗ Quasar</p>		<p>SYMBOLS</p> <p>△ Radio source × X-ray source ○ Other object</p>		<p>FOV Circle 5°</p>
--	--	--	--	---	--	----------------------

Local Time: 01:20:00 26-Mar-2006 UTC: 09:20:00 26-Mar-2006 Sidereal Time: 13:28:32
 Location: 37° 11' 15" N 121° 33' 0" W RA: 17h15m33s Dec: +42° 03' Field: 16.0° Julian Day: 2453820.8889

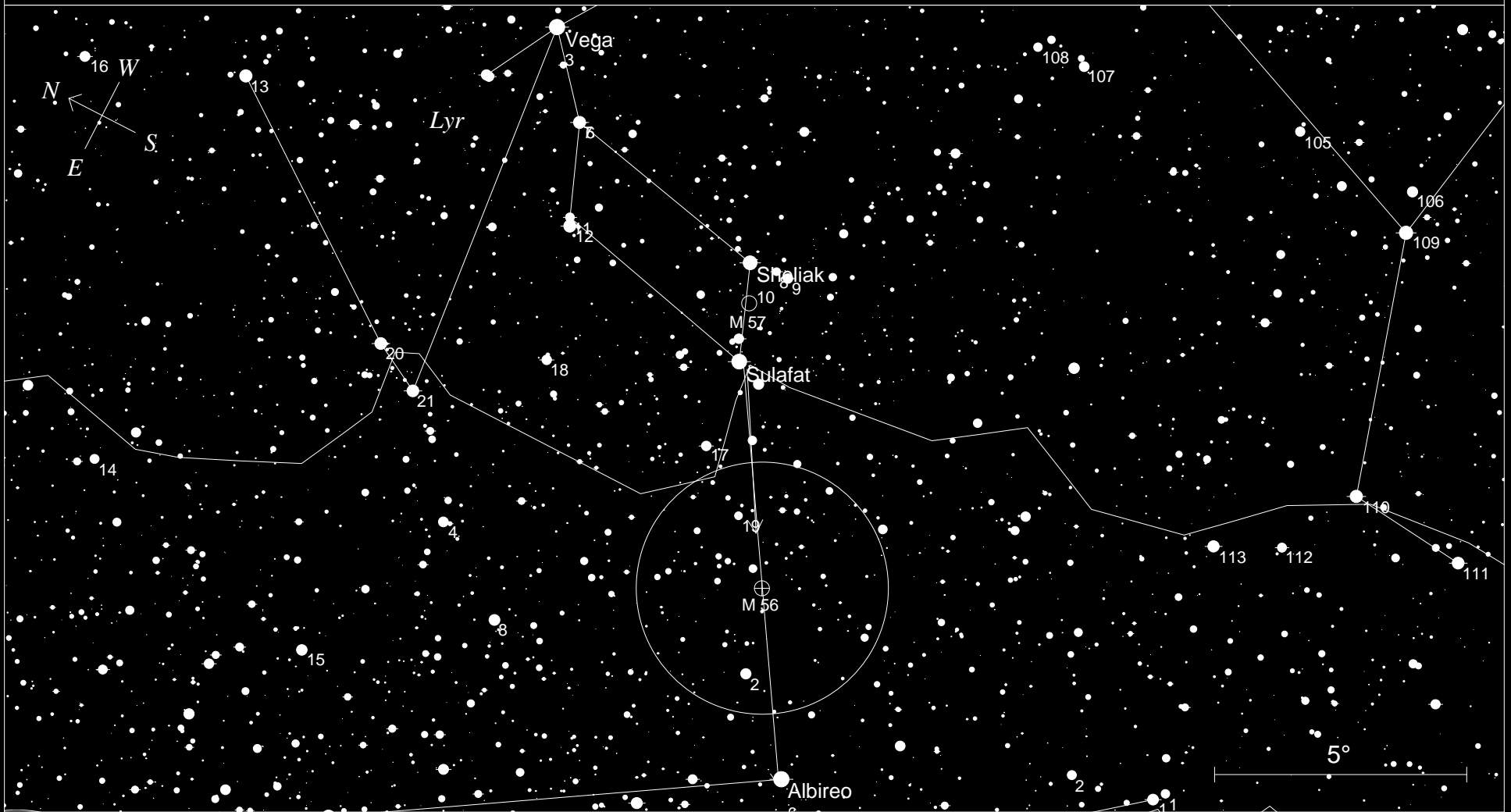
Figure 42 M107 12 10 14



STARS		SYMBOLS		FOV Circle 5°
● <3	● 8	⊠ Dark nebula	△ Radio source	
● 4	● >9	⊕ Globular cluster	× X-ray source	
● 5		⊙ Open cluster	○ Other object	
● 6		☄ Comet		
● 7		☾ Galaxy		
		☐ Bright nebula	☉ Quasar	

Local Time: 01:30:00 26-Mar-2006 UTC: 09:30:00 26-Mar-2006 Sidereal Time: 13:38:33
 Location: 37° 11' 15" N 121° 33' 0" W RA: 16h54m45s Dec: -3° 57' Field: 16.0° Julian Day: 2453820.8958

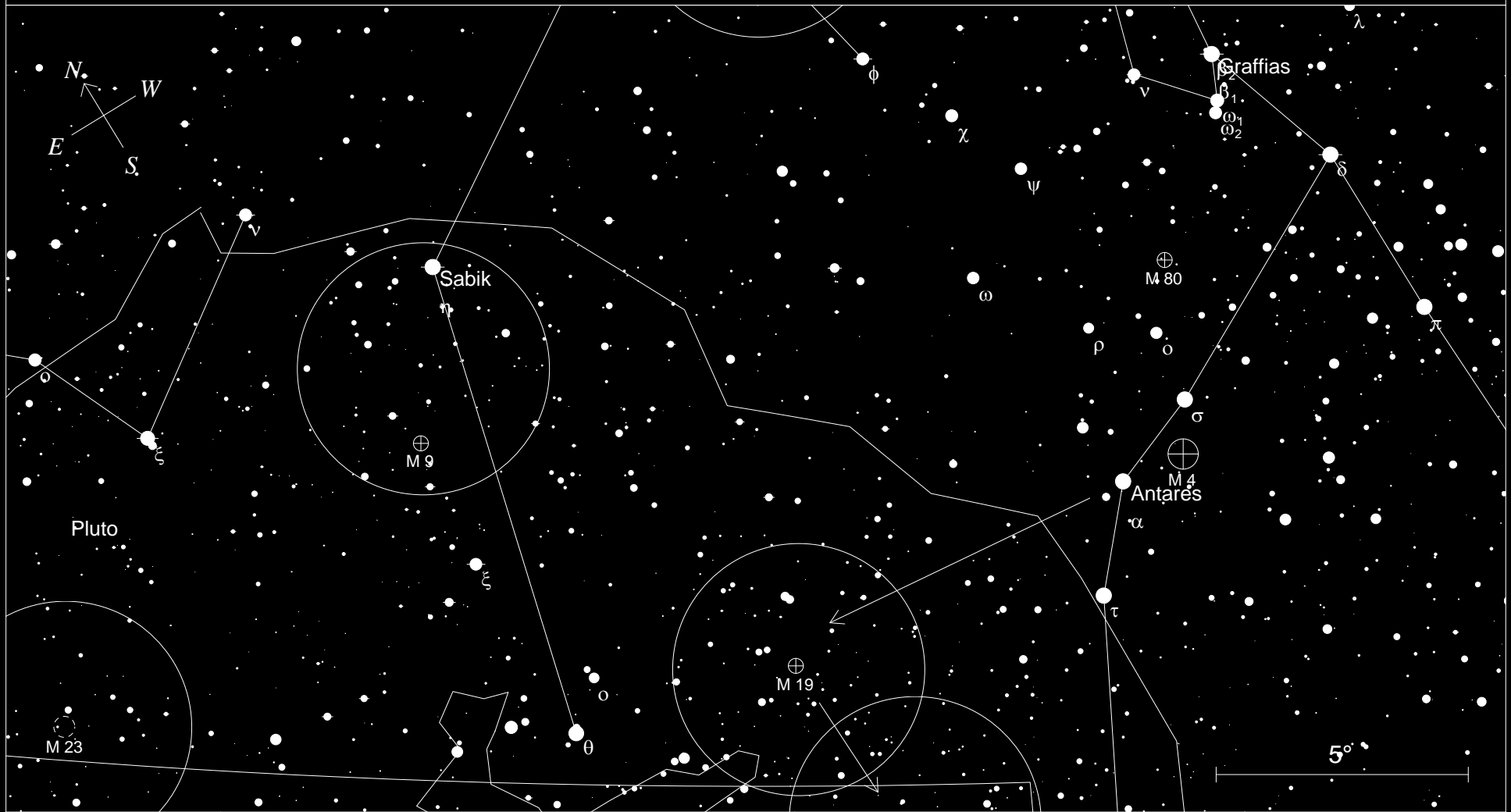
Figure 43 M57 M56



<p>STARS</p> <ul style="list-style-type: none"> ● <3 8 ● 4 >9 ● 5 ● 6 ● 7 		<p>SYMBOLS</p> <ul style="list-style-type: none"> ● Multiple star ○ Variable star ☄ Comet ☾ Galaxy □ Bright nebula ◻ Dark nebula ⊕ Globular cluster ○ Open cluster ○ Planetary nebula ⊗ Quasar △ Radio source × X-ray source ○ Other object 		<p>FOV Circle 5°</p>
---	--	---	--	----------------------

<p>Local Time: 02:00:00 26-Mar-2006 Location: 37° 11' 15" N 121° 33' 0" W</p>	<p>UTC: 10:00:00 26-Mar-2006 RA: 19h02m27s Dec: +32° 00' Field: 16.0°</p>	<p>Sidereal Time: 14:08:38 Julian Day: 2453820.9167</p>
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Figure 44 M9 M4 M80



STARS		SYMBOLS		FOV Circle 5°
● <3	● 8	● Multiple star	⊠ Dark nebula	
● 4	● >9	○ Variable star	⊕ Globular cluster	
● 5		☄ Comet	○ Open cluster	
● 6		○ Galaxy	○ Planetary nebula	
● 7		□ Bright nebula	⊞ Quasar	
			△ Radio source	
			× X-ray source	
			○ Other object	

Local Time: 02:15:00 26-Mar-2006
 Location: 37° 11' 15" N 121° 33' 0" W

UTC: 10:15:00 26-Mar-2006
 RA: 16h54m09s Dec: -21° 31' Field: 16.0°

Sidereal Time: 14:23:41
 Julian Day: 2453820.9271

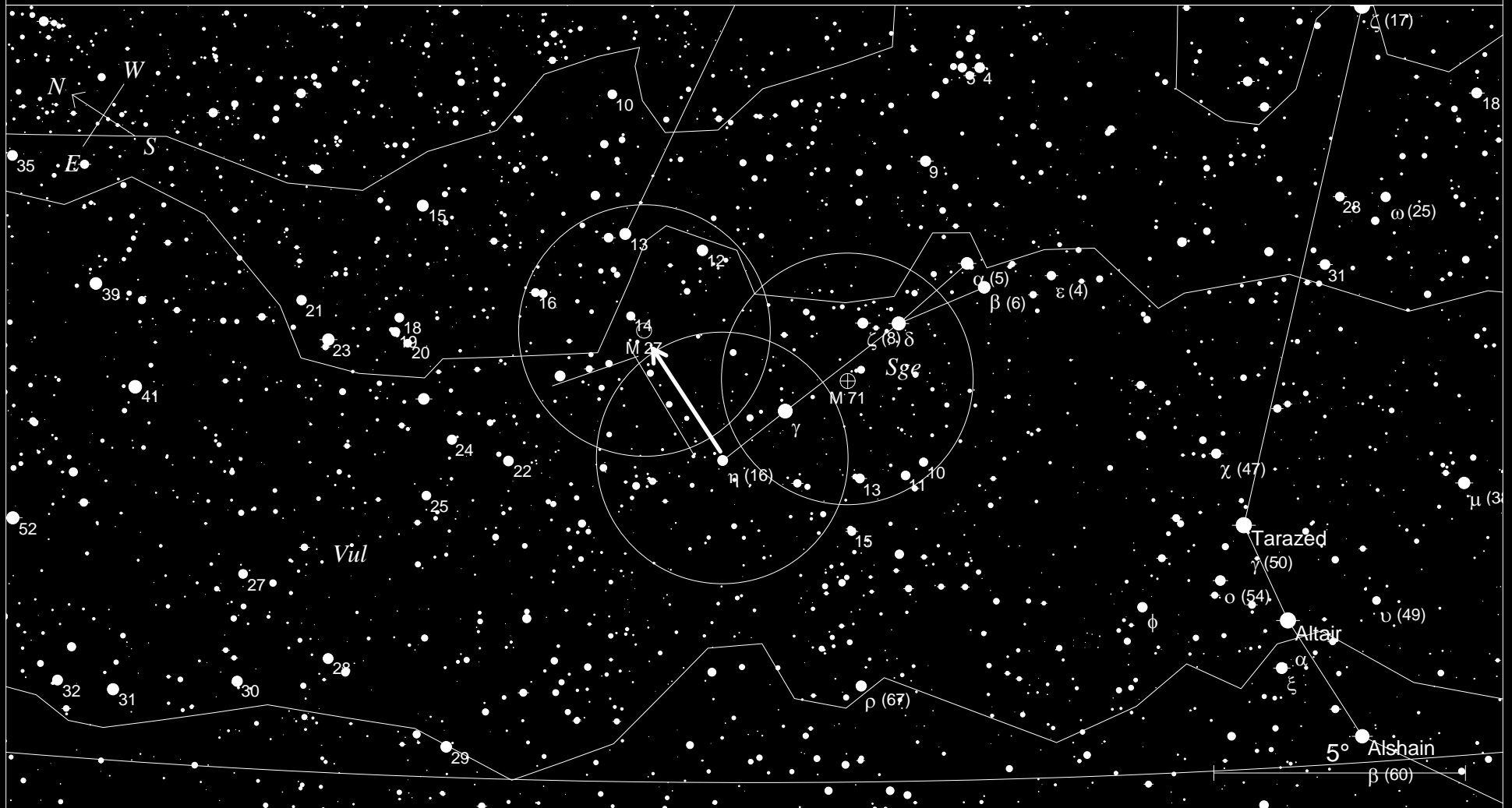
Figure 45 Finder M29 39



STARS		SYMBOLS		FOV Circle 5°
● <3	● 8	● Multiple star	⊠ Dark nebula	
● 4	● >9	○ Variable star	⊕ Globular cluster	
● 5		☄ Comet	○ Open cluster	
● 6		☄ Galaxy	○ Planetary nebula	
● 7		□ Bright nebula	⊞ Quasar	
			△ Radio source	
			× X-ray source	
			○ Other object	

Local Time: 02:30:00 26-Mar-2006 UTC: 10:30:00 26-Mar-2006 Sidereal Time: 14:38:43
 Location: 37° 11' 15" N 121° 33' 0" W RA: 20h51m13s Dec: +45° 03' Field: 16.0° Julian Day: 2453820.9375

Figure 46 M71 M27



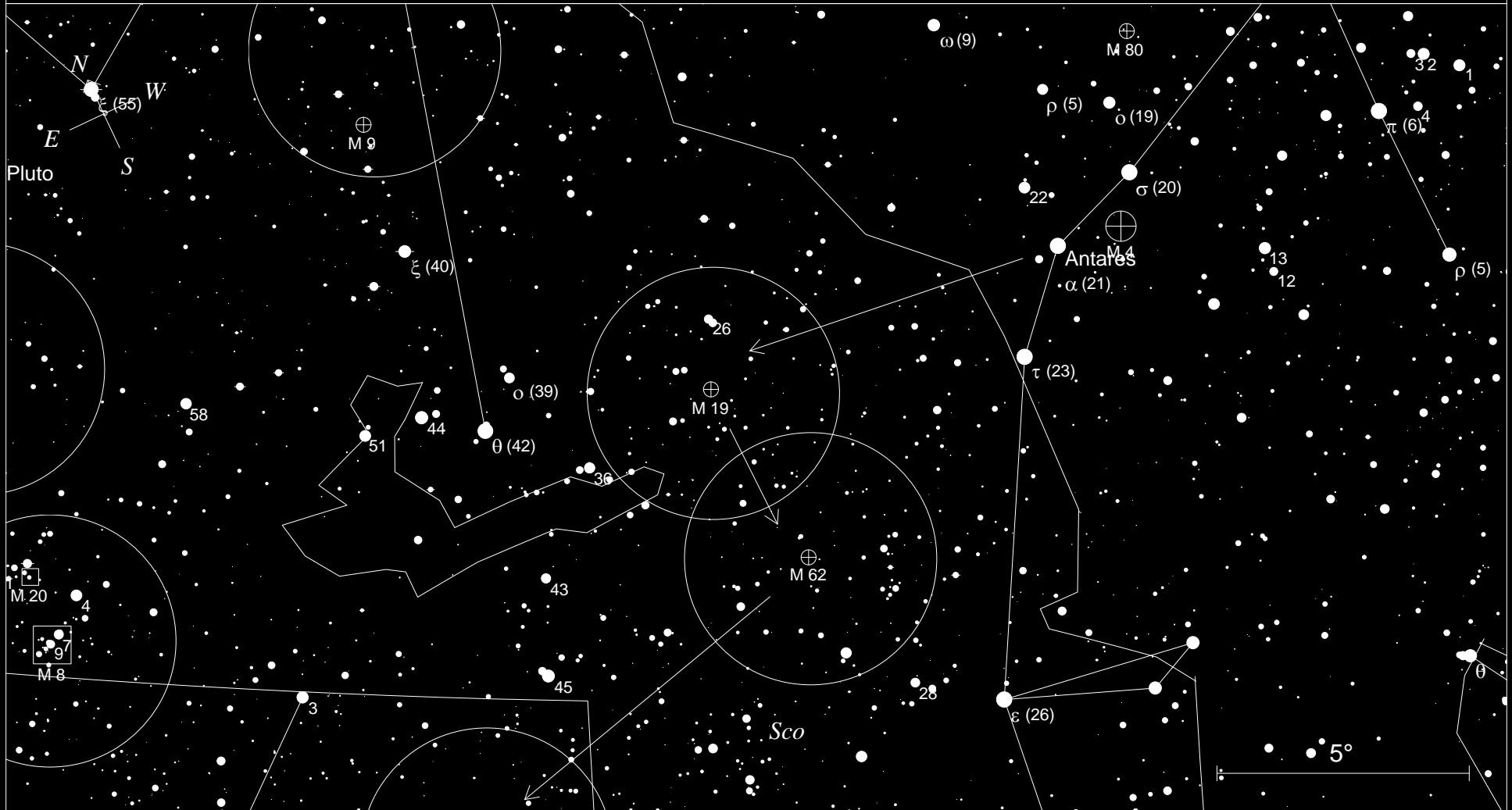
STARS		SYMBOLS			FOV Circle 5°
● <3	8	● Multiple star	☐ Dark nebula	△ Radio source	
● 4	>9	○ Variable star	⊕ Globular cluster	× X-ray source	
● 5		☄ Comet	○ Open cluster	○ Other object	
● 6		☾ Galaxy	⊙ Planetary nebula		
● 7		☐ Bright nebula	☉ Quasar		

Local Time: 02:40:00 26-Mar-2006
 Location: 37° 11' 15" N 121° 33' 0" W

UTC: 10:40:00 26-Mar-2006
 RA: 20h00m13s Dec: +20° 03' Field: 16.0°

Sidereal Time: 14:48:45
 Julian Day: 2453820.9444

Figure 47 M19 62



<p>STARS</p> <ul style="list-style-type: none"> ● <3 8 ● 4 >9 ● 5 ● 6 ● 7 		<p>SYMBOLS</p> <ul style="list-style-type: none"> ● Multiple star ○ Variable star ☄ Comet ☾ Galaxy ☐ Bright nebula ☐ Dark nebula ⊕ Globular cluster ○ Open cluster ⊕ Planetary nebula ⊗ Quasar △ Radio source × X-ray source ○ Other object 		<p>FOV Circle 5°</p>
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Local Time: 02:50:00 26-Mar-2006	UTC: 10:50:00 26-Mar-2006	Sidereal Time: 14:58:46
Location: 37° 11' 15" N 121° 33' 0" W	RA: 17h00m03s Dec: -26° 58' Field: 16.0°	Julian Day: 2453820.9514

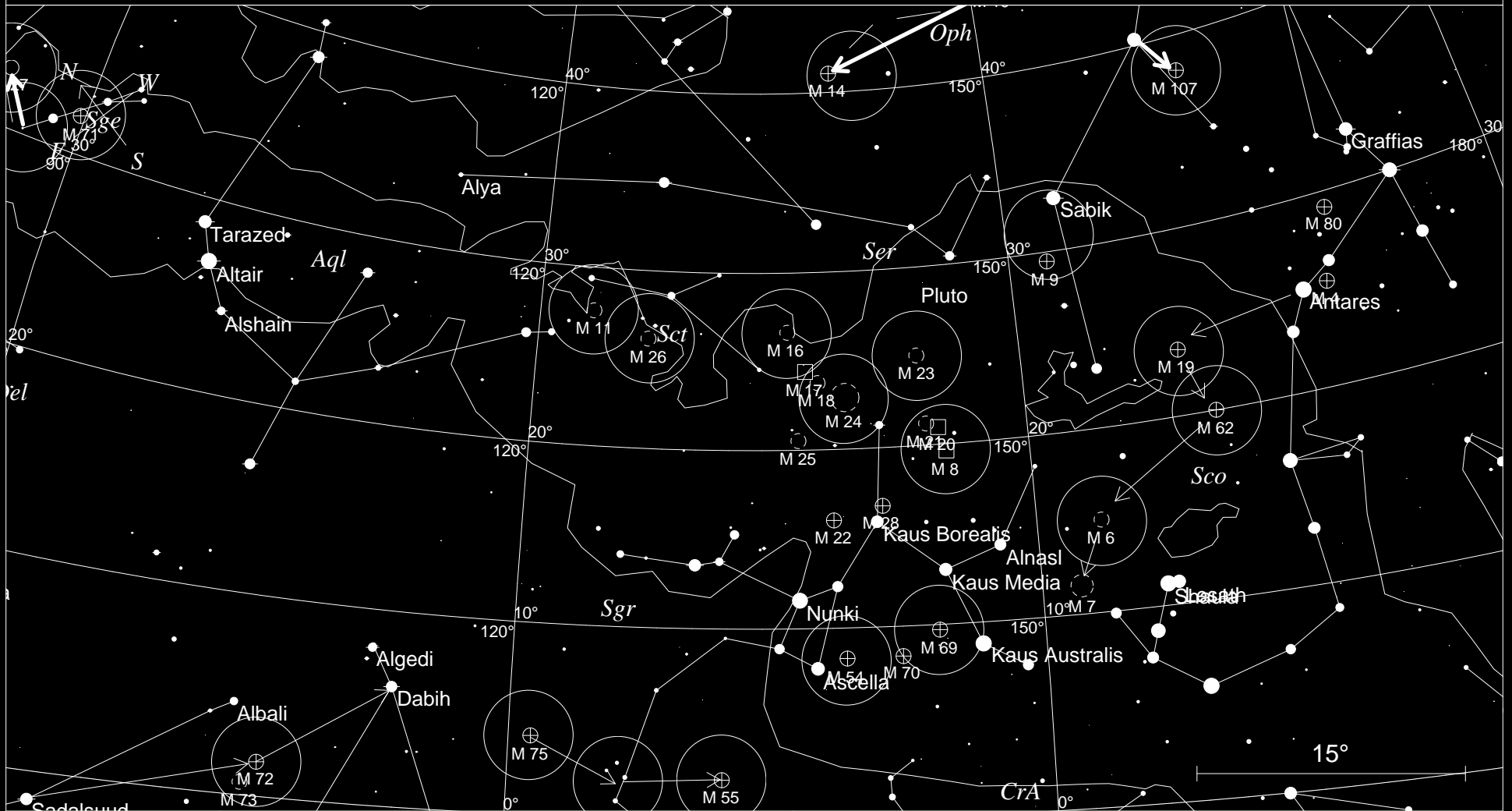
Figure 48 M6 M7



STARS	SYMBOLS		FOV Circle 5°
● <3	● Multiple star	◻ Dark nebula	△ Radio source
● 4	○ Variable star	⊕ Globular cluster	× X-ray source
● 5	☄ Comet	○ Open cluster	○ Other object
● 6	☄ Galaxy	○ Planetary nebula	
● 7	◻ Bright nebula	⊞ Quasar	

Local Time: 03:15:00 26-Mar-2006 UTC: 11:15:00 26-Mar-2006 Sidereal Time: 15:23:51
 Location: 37° 11' 15" N 121° 33' 0" W RA: 17h23m07s Dec: -36° 13' Field: 16.0° Julian Day: 2453820.9688

Figure 49 Visual Summer Milky Way



STARS		SYMBOLS		FOV Circle 5°
● <2	• 4.5	● Multiple star	☐ Dark nebula	△ Radio source
● 2.5	• 5	○ Variable star	⊕ Globular cluster	× X-ray source
● 3	• >5.5	☄ Comet	○ Open cluster	○ Other object
● 3.5		☾ Galaxy	○ Planetary nebula	
● 4		☐ Bright nebula	☉ Quasar	

Local Time: 03:30:00 26-Mar-2006 UTC: 11:30:00 26-Mar-2006 Sidereal Time: 15:38:53
 Location: 37° 11' 15" N 121° 33' 0" W RA: 18h35m49s Dec: -16° 06' Field: 45.0° Julian Day: 2453820.9792

Figure 50 Finder M11 to M24



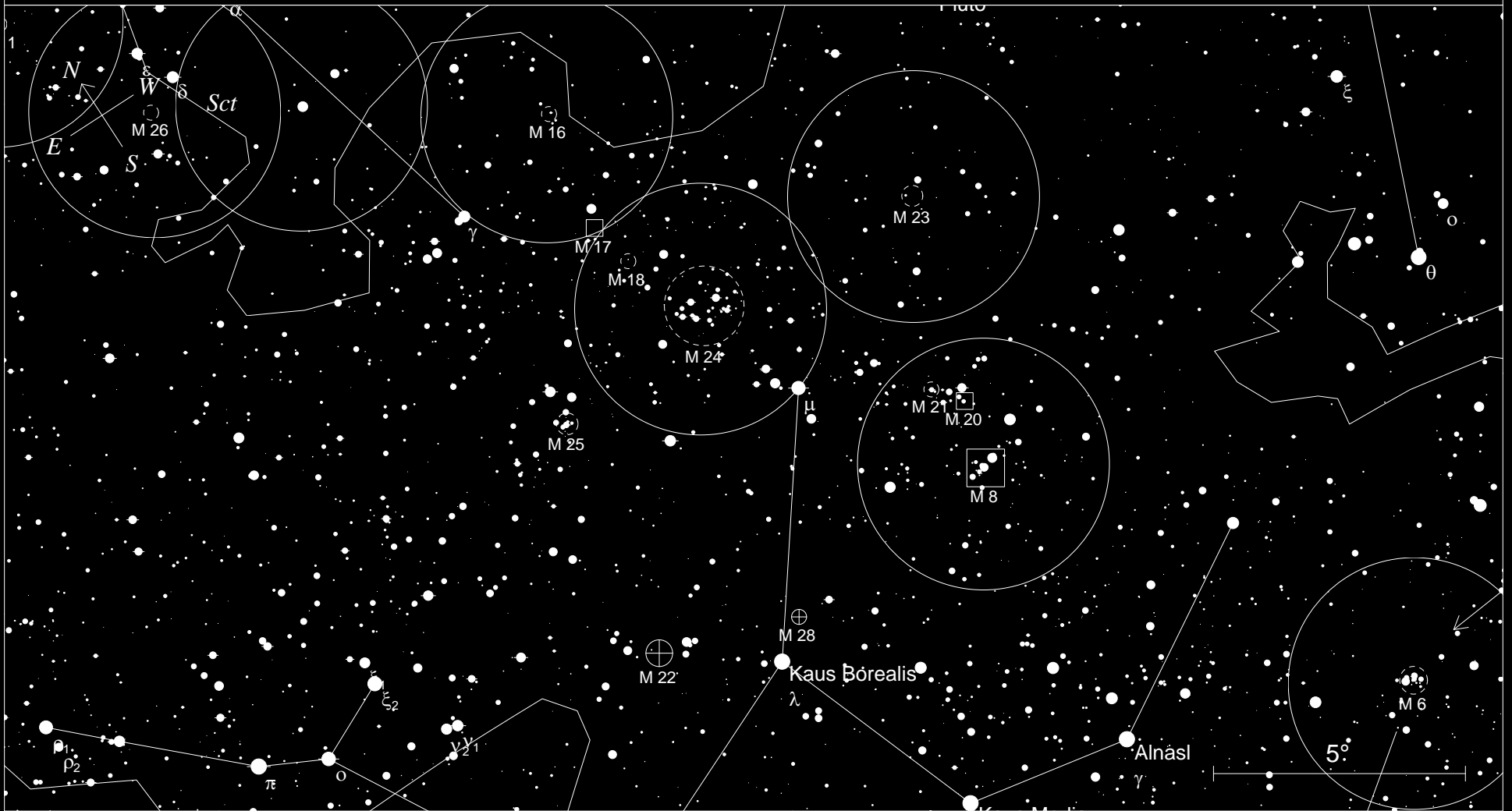
STARS	SYMBOLS		FOV Circle 5°
● <3	● Multiple star	◻ Dark nebula	△ Radio source
● 4	○ Variable star	⊕ Globular cluster	× X-ray source
● 5	☄ Comet	○ Open cluster	○ Other object
● 6	☾ Galaxy	⊙ Planetary nebula	
● 7	◻ Bright nebula	⊞ Quasar	

Local Time: 03:30:00 26-Mar-2006
 Location: 37° 11' 15" N 121° 33' 0" W

UTC: 11:30:00 26-Mar-2006
 RA: 18h36m10s Dec: -11° 27' Field: 16.0°

Sidereal Time: 15:38:53
 Julian Day: 2453820.9792

Figure 51 M16 to M22

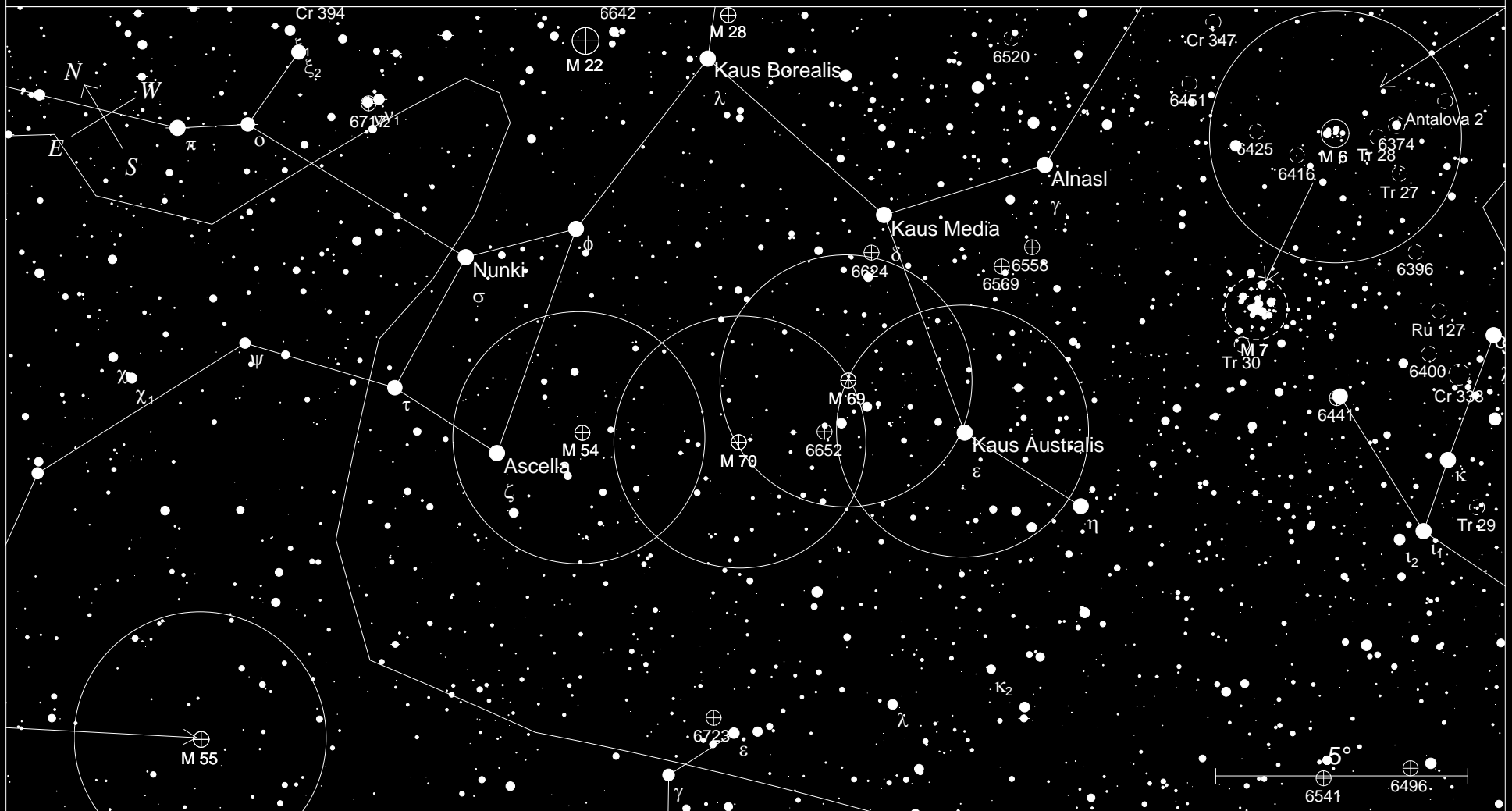


STARS		SYMBOLS		
● <3	8	● Multiple star	⊠ Dark nebula	△ Radio source
● 4	>9	○ Variable star	⊕ Globular cluster	× X-ray source
● 5		☄ Comet	○ Open cluster	○ Other object
● 6		☄ Galaxy	○ Planetary nebula	
● 7		□ Bright nebula	⊠ Quasar	

FOV Circle 5°

Local Time: 03:30:00 26-Mar-2006 UTC: 11:30:00 26-Mar-2006 Sidereal Time: 15:38:53
 Location: 37° 11' 15" N 121° 33' 0" W RA: 18h18m17s Dec: -20° 54' Field: 16.0° Julian Day: 2453820.9792

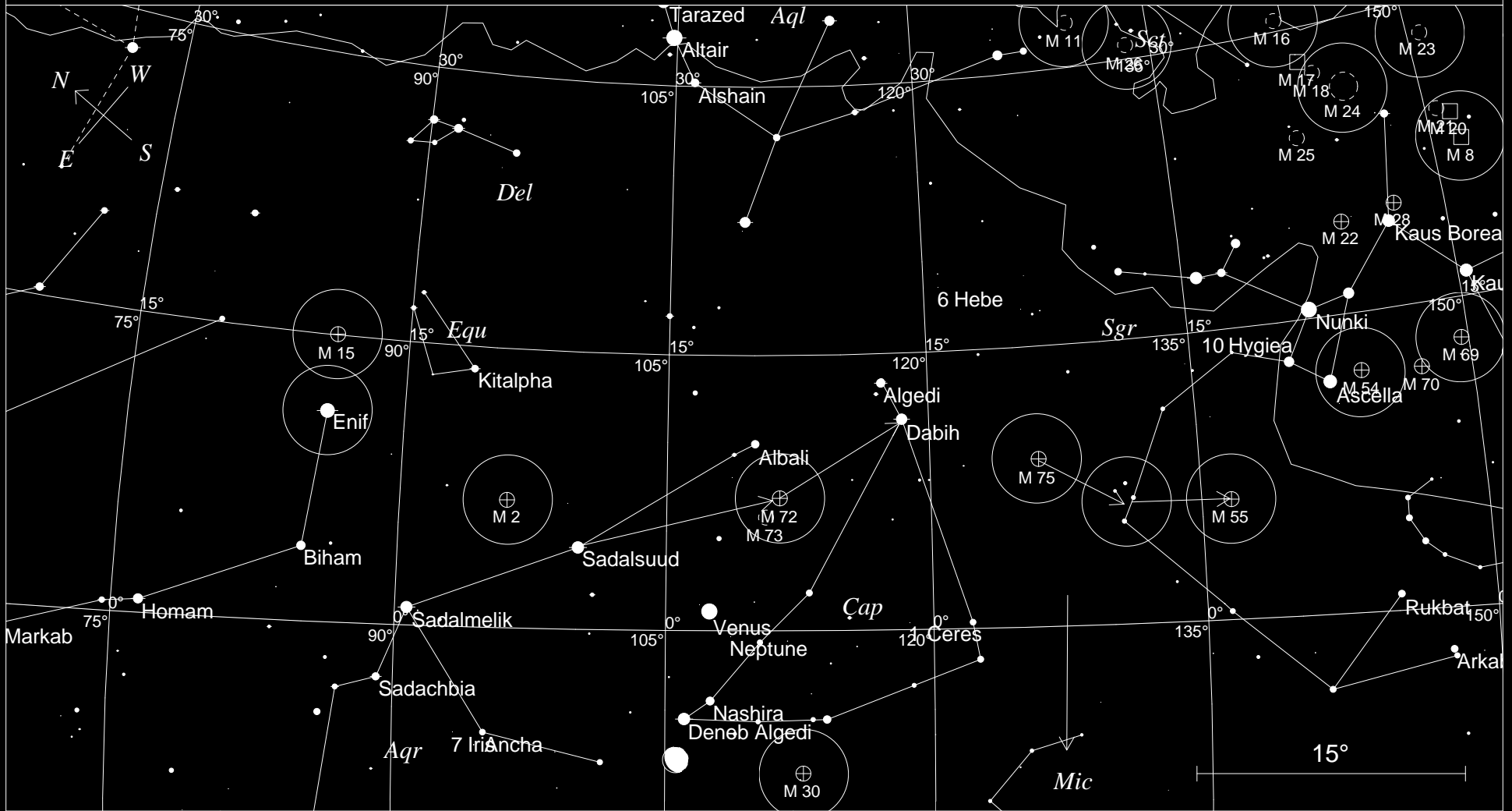
Figure 52 M69 to 54



STARS		SYMBOLS		FOV Circle 5°
● <3	● 8	● Multiple star	☐ Dark nebula	5°
● 4	● >9	○ Variable star	⊕ Globular cluster	
● 5		☄ Comet	○ Open cluster	
● 6		☉ Galaxy	⊕ Planetary nebula	
● 7		☐ Bright nebula	☉ Quasar	
			△ Radio source	
			× X-ray source	
			○ Other object	

Local Time: 03:54:00 26-Mar-2006 UTC: 11:54:00 26-Mar-2006 Sidereal Time: 16:02:57
 Location: 37° 11' 15" N 121° 33' 0" W RA: 18h40m42s Dec: -31° 54' Field: 16.0° Julian Day: 2453820.9958

Figure 53 Visual Sunrise Objects



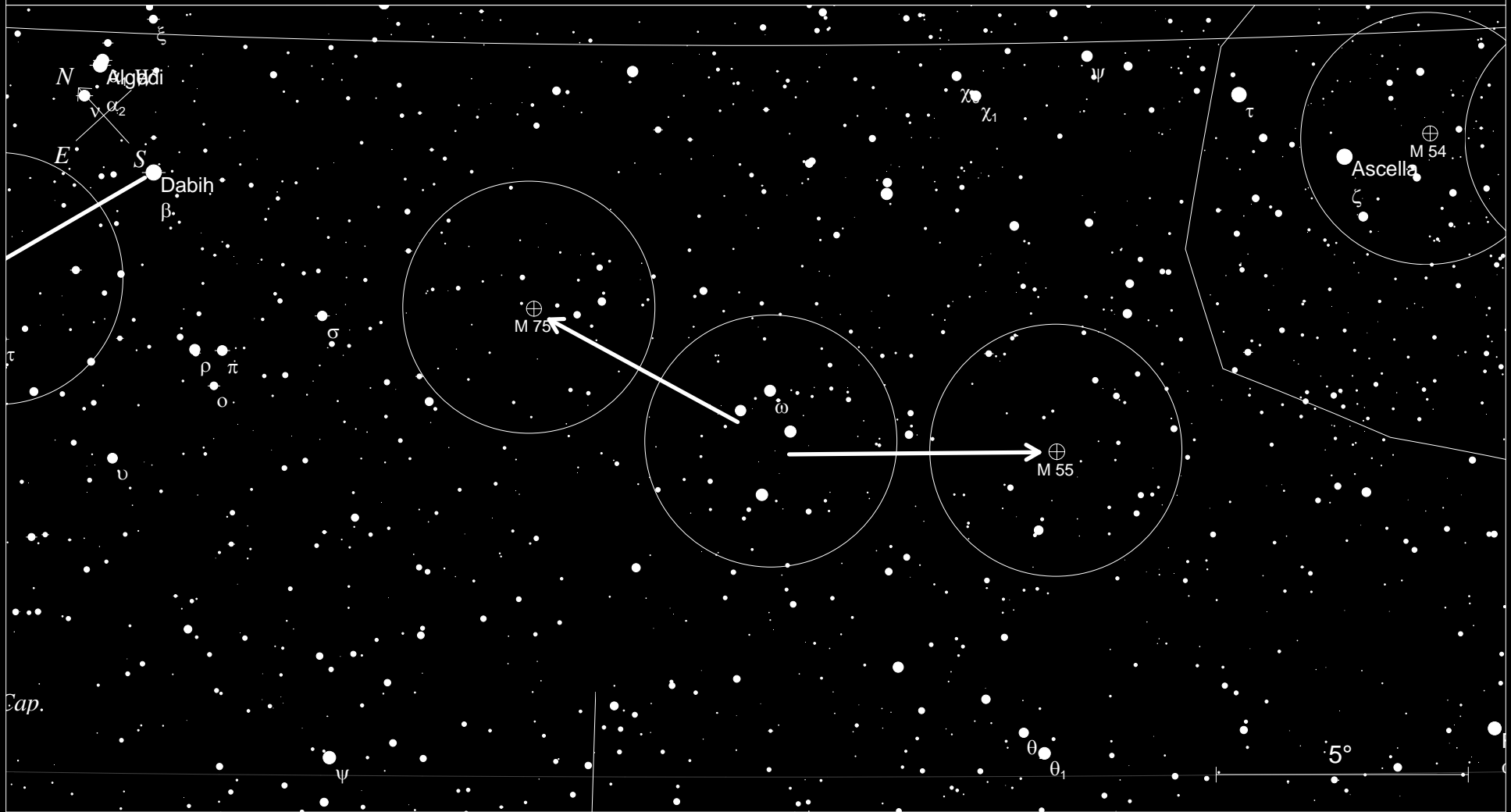
STARS		SYMBOLS		FOV Circle 5°
● <2	● 4.5	● Multiple star	☐ Dark nebula	△ Radio source
● 2.5	● 5	○ Variable star	⊕ Globular cluster	× X-ray source
● 3	● >5.5	☄ Comet	○ Open cluster	○ Other object
● 3.5		☄ Galaxy	☉ Planetary nebula	
● 4		☐ Bright nebula	☉ Quasar	

Local Time: 04:00:00 26-Mar-2006
 Location: 37° 11' 15" N 121° 33' 0" W

UTC: 12:00:00 26-Mar-2006
 RA: 20h41m51s Dec: -8° 05' Field: 45.0°

Sidereal Time: 16:08:58
 Julian Day: 2453821.0000

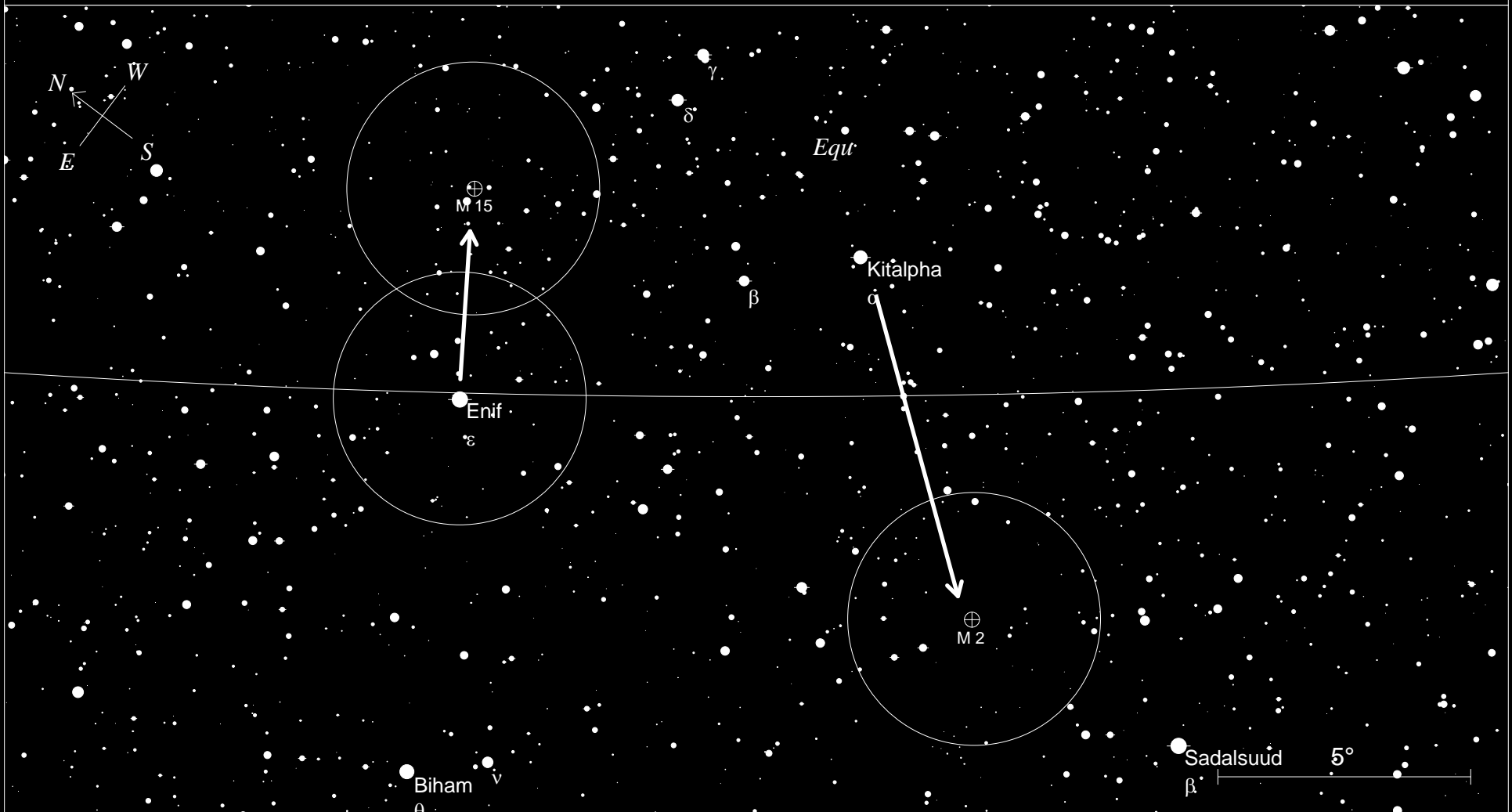
Figure 54 M75 M55



STARS		SYMBOLS		FOV Circle 5°
● <3	8	● Multiple star	⊠ Dark nebula	
● 4	>9	○ Variable star	⊕ Globular cluster	
● 5		☄ Comet	⊗ Open cluster	
● 6		☾ Galaxy	⊙ Planetary nebula	
● 7		☐ Bright nebula	⊞ Quasar	
			△ Radio source	
			× X-ray source	
			○ Other object	

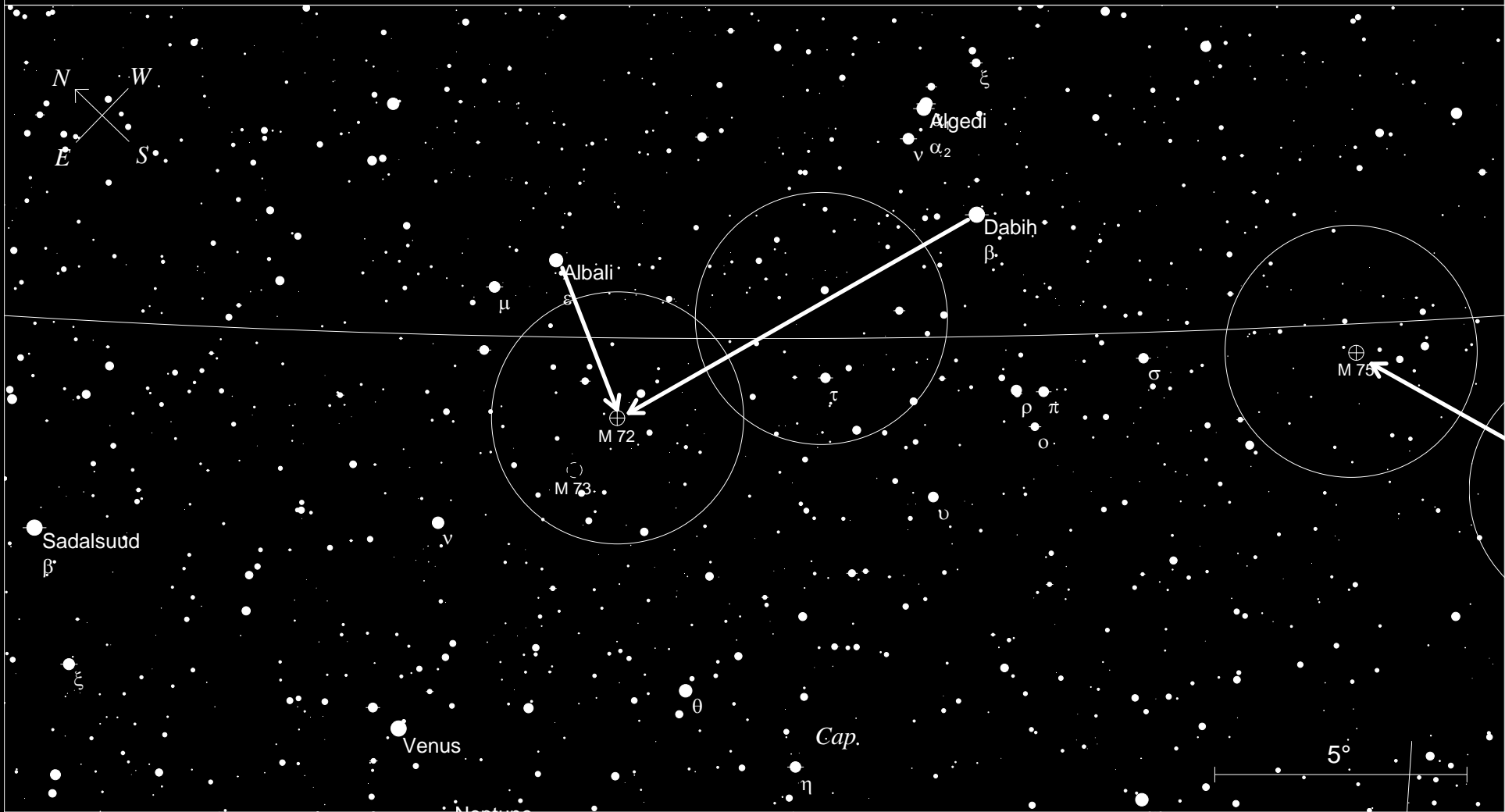
Local Time: 04:00:00 26-Mar-2006 UTC: 12:00:00 26-Mar-2006 Sidereal Time: 16:08:58
 Location: 37° 11' 15" N 121° 33' 0" W RA: 19h58m13s Dec: -26° 21' Field: 16.0° Julian Day: 2453821.0000

Figure 55 M15 M2



<p>STARS</p> <ul style="list-style-type: none"> ● <3 ● 4 ● 5 ● 6 ● 7 ● 8 ● >9 	<p>SYMBOLS</p> <ul style="list-style-type: none"> ● Multiple star ○ Variable star ☄ Comet ○ Galaxy □ Bright nebula ☐ Dark nebula ⊕ Globular cluster ○ Open cluster ○ Planetary nebula ⊗ Quasar △ Radio source × X-ray source ○ Other object 	<p>FOV Circle 5°</p>
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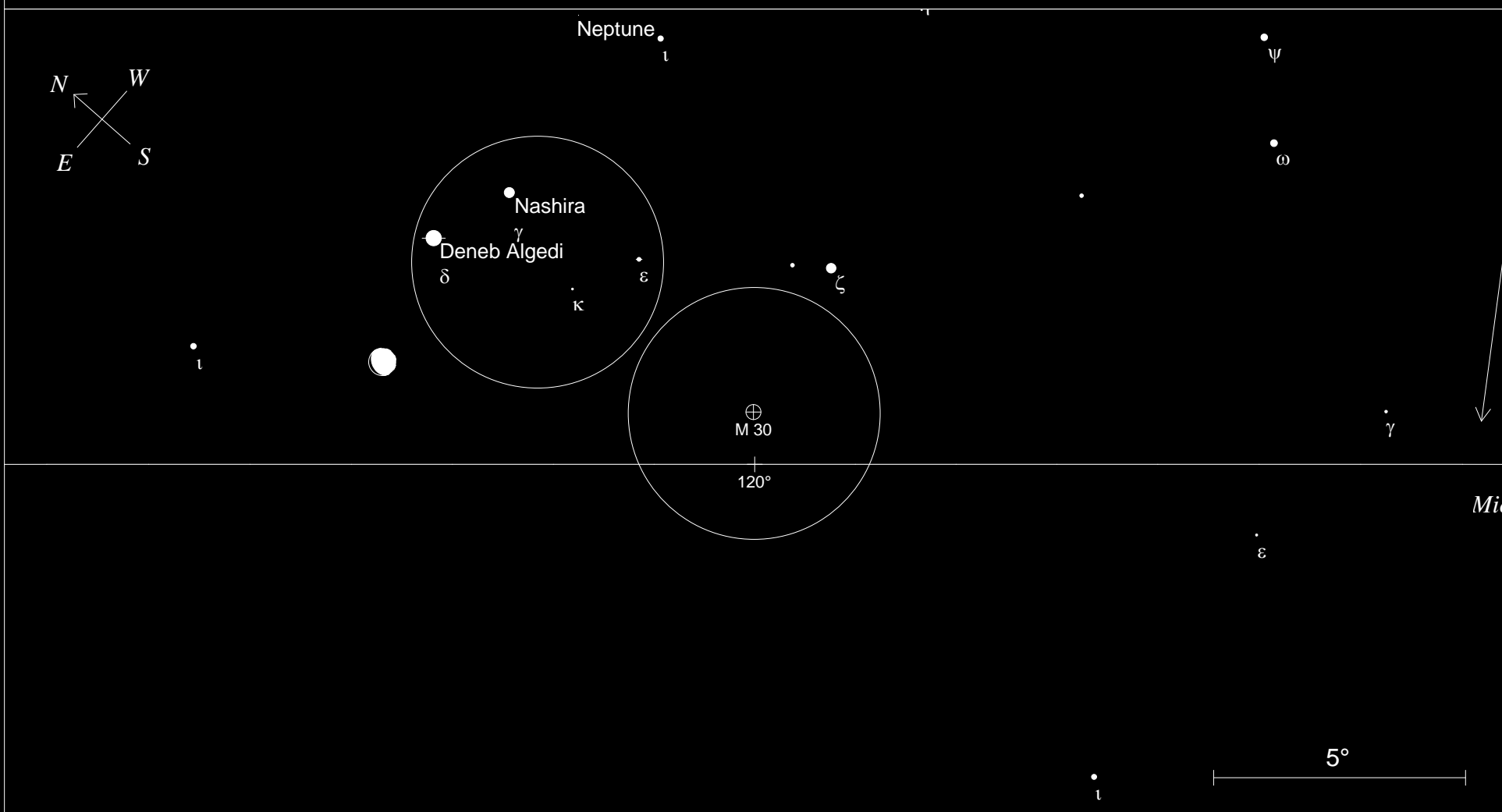
Figure 56 M72 73



STARS		SYMBOLS		FOV Circle 5°
● <3	8	● Multiple star	☐ Dark nebula	
● 4	>9	○ Variable star	⊕ Globular cluster	
● 5		☄ Comet	⊙ Open cluster	
● 6		☉ Galaxy	♁ Planetary nebula	
● 7		☐ Bright nebula	☉ Quasar	
			△ Radio source	
			✕ X-ray source	
			○ Other object	

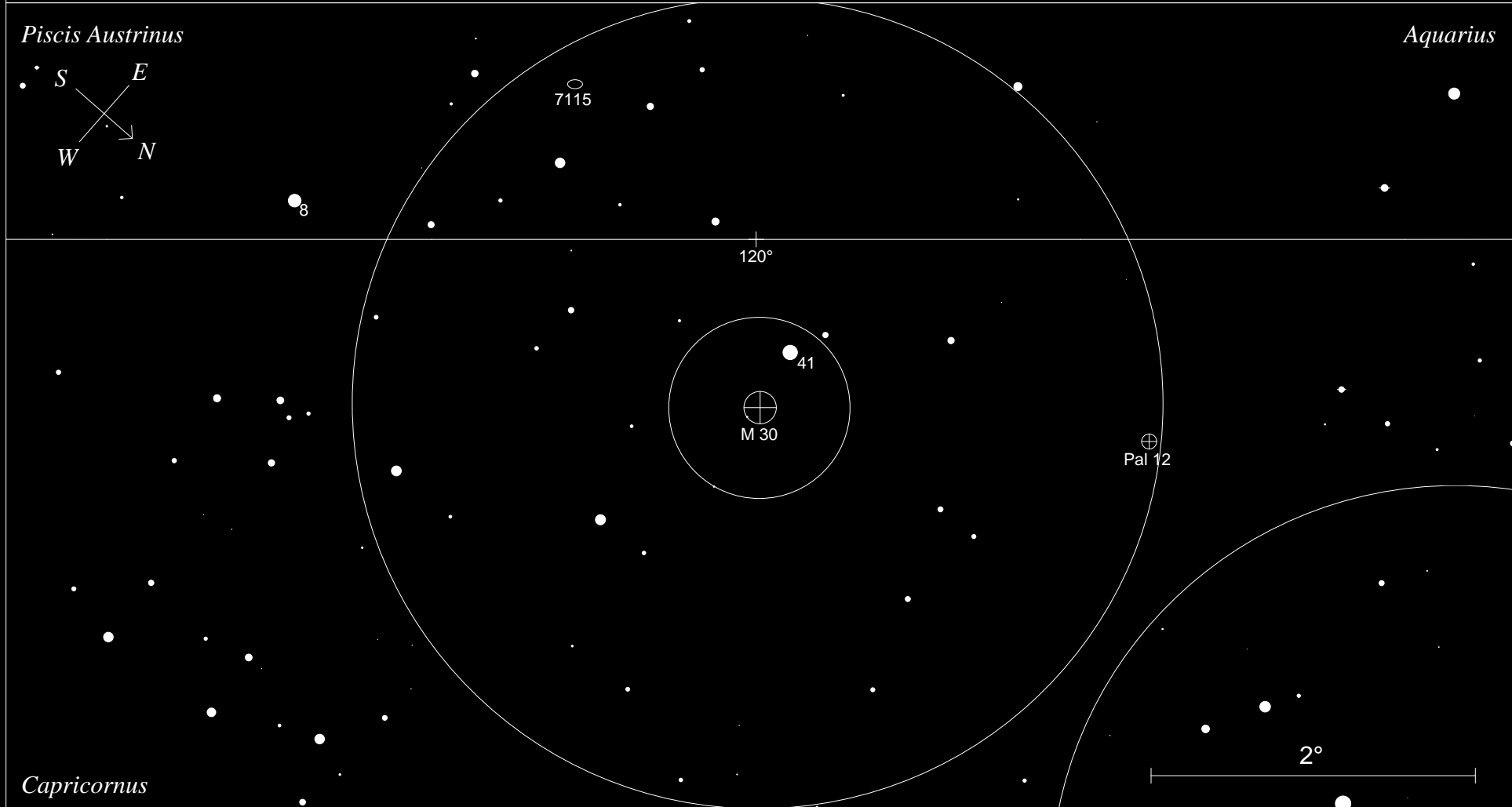
Local Time: 04:30:00 26-Mar-2006 UTC: 12:30:00 26-Mar-2006 Sidereal Time: 16:39:03
 Location: 37° 11' 15" N 121° 33' 0" W RA: 20h45m29s Dec: -14° 20' Field: 16.0° Julian Day: 2453821.0208

Figure 57 Finder M30



<p>STARS</p> <p>● <3 ● 4 ● >5</p> <p>● 3.2 ● 4.2</p> <p>● 3.4 ● 4.4</p> <p>● 3.6 ● 4.6</p> <p>● 3.8 ● 4.8</p>	<p>SYMBOLS</p> <p>● Multiple star □ Dark nebula △ Radio source</p> <p>○ Variable star ⊕ Globular cluster ✕ X-ray source</p> <p>☄ Comet ○ Open cluster ○ Other object</p> <p>○ Galaxy ⊙ Planetary nebula</p> <p>□ Bright nebula ⊞ Quasar</p>	<p>FOV Circle 5°</p>
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Figure 58 Eyepiece view M30



STARS		SYMBOLS		
● <5	● 7.5	● Multiple star	◻ Dark nebula	△ Radio source
● 5.5	● 8	○ Variable star	⊕ Globular cluster	✕ X-ray source
● 6	● 8.5	☄ Comet	○ Open cluster	○ Other object
● 6.5	● >9	○ Galaxy	⊙ Planetary nebula	
● 7		◻ Bright nebula	⊞ Quasar	

large FOV Circle 5°
small FOV Circle 1°

Local Time: 04:50:00 26-Mar-2006 UTC: 12:50:00 26-Mar-2006 Sidereal Time: 16:59:06
 Location: 37° 11' 15" N 121° 33' 0" W RA: 21h40m42s Dec: -23° 09' Field: 5.0° Julian Day: 2453821.0347