Astronomical League Observing Programs from A to Z

But Starting with the Binocular Observing Programs

But First – Why pursue an Astronomical League Observing Program in the first place?

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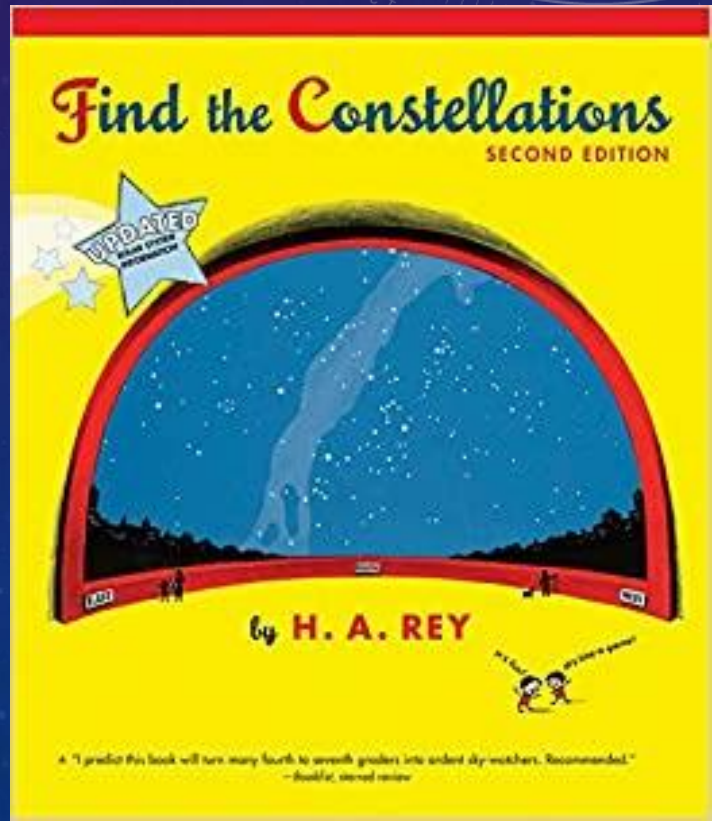
- For some of us astronomy may be a more recent pursuit and our knowledge base is at about the H.A. Rey's "Find the Constellations" level … and it's about time to go beyond the really elementary



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But ---- why start with binoculars?

- Some of us are confused by left/right up/down images in the view finder
- The early astronomers were also astrologers so …. they had their limits too

OK – Seriously why pursue AL Observing Programs?

- "…Observing Programs are designed to provide a direction for your observations and to provide a goal."
- Programs are designed around Beginner, Intermediate, Advanced amateur astronomers
- Program equipment requirements range from your Mark 20/20 (or 20/400) Naked Eye, Binoculars, Telescopes and use of technology ranging from manual to computerized go-to systems, strictly visual to complex Imaging, high tech photometry
- The offer you Certificates and Pins and most importantly a sense of accomplishment from having learned something new
- Observing Programs, Observing Awards, Special Observing Awards, Observing Certificates, Self-Service Certificates
- So … Don't be just a spectator … as tempting as it is some nights to just sit back in your zero-gravity lounger and enjoy the Night Sky … expand your neural pathways!!

Common Requirements – Equipment

- **Binoculars: 11x70, 20x80 (2) 10x42ED, 8x25, 7x22, ……**
  - Ultimate in astronomical sport for portability and affordability … after the Mk20 Eyeball
  - Expectation management … eyeball augmentation … vs pictures on the telescope box
  - Larger field of view (larger soda straw) and more light gathering for objective size
  - See how objects relate to one another in the night sky … without twisting your brain
- **Hands-on, purely manual, visual observing, out in the elements process**
  - Comfy observing chair, zero-gravity lounger, bug repellant, electrically heated vest, warm (electrically heated) socks, gloves, red lights, notebook and pen, TRIPOD(s), dew shields, hair-dryer, hand warmers, toe warmers, small table, Sky Atlas, Holst streaming over Bluetooth….but at least I am not to the point of needing a dedicated pick-up truck….yet.
  - Yes, some of us do our observing outside in the elements …..

Common Requirements – Terminology

- **Seeing**: based on atmospheric stability, how twinkly …
  - **Excellent** - The brighter stars are not twinkling at all; **Very Good** - The stars are twinkling slightly, but the brighter planets are not twinkling; **Good** - The brighter planets are twinkling slightly; **Fair** - The brighter planets are obviously twinkling; **Poor** (aka Ohio) - The atmosphere is turbulent, all objects are twinkling to the points where observation is not practical
- **Transparency**: how clear is the sky … the Little Dipper test
  - 1 - If you can't see Polaris; 2 - If you can only see Polaris; 3 - If you can see the two stars on the end of the bowl of the Little Dipper (Kochab and Pherkad); 4 - If you can see any of the stars in the handle of the Little Dipper; 5 - If you can see 6 of the 7 stars in the Little Dipper; 6 - If you can see all 7 stars in the Little Dipper; 7 - If you can see stars near the Little Dipper that are not part of the stick figure (you ain't anywhere near Dayton … and you are about seven years old)

Common Requirements – More Terminology

- **Locate – Identify – Observe**:
  - Locate - "to find" something, the obvious first step in the observing process, but simply locating an object does not count as an observation
  - Identify - to determine which object in an eyepiece view or in an image is the object you are observing
  - Observe - "noting detail" of your object: take an image, make a sketch, or describe details that you can see through the eyepiece
  - **Simply locating an object does not usually meet the requirements for the Observing Programs**
    - Will talk about the lack of fun I have had with M1 in a couple minutes
    - Many nights spent attempting Markarian's Chain (ok, only five of the links)

Binocular Observing Programs*

AL Program Name	AL Difficulty	Steve's Difficulty Rating	Obs vs Options	Equipment	Web Link
Solar System (Cert)	Novice	Medium Hard	20/25 "Projects"	NE, 11x70	https://www.astroleague.org/al/obsclubs/plantery/plnobscl.html
Lunar (Cert)	Novice	Less Hard	18/18 NE, 46/46//100 10 Optional Exercises	NE, 10x42, 11x70+	https://www.astroleague.org/al/obsclubs/lunar/lunar1.html
Galileo (do what he did but w/out getting incarcerated)	Novice	A Lot Harder than AL thinks it is….	11/13 (supernovae, (plot comets, aurora, rel size?)	20x80	https://www.astroleague.org/al/obsclub/galileo_club/galileo_club.html
Double Star	Intermediate	Hard (but least hard)	50/120, NE(5), Desc,	10x42ED, 11x70	https://www.astroleague.org/programs/BinoDS_Intro
Messier *(Faint Fuzzies)*	Intermediate	Harder	50/110, Desc, N. Nevada	11x70, 20x80	https://www.astroleague.org/al/obsclubs/binomess/binomess.html
Variable Star (9.5)	Intermediate	Brain Hurt Hard	4x15(60)/153 AAVSO Logging	10x42ED, 11x70	https://www.astroleague.org/programs/binocular-variable-star-program
Deep Sky *(Fainter Fuzzies)*	Intermediate	Very Very Hard	60/60 Merid/DS/Desc	10X42ED, 11x70+	https://www.astroleague.org/al/obsclubs/dsbinoc/dsbinoc.html
Advanced Double Star (10.1)	Intermediate	Excruciatingly Hard	50/100, Sketch/Plot3	11 (15)x70, 20x80, …?	https://www.astroleague.org/programs/advanced-binocular-double-star-program
Master Observer Award	Advanced	TBD	Complete eight programs	Binoculars – duh!?	https://www.astroleague.org/content/binocular-master-observer-award

*** Also Sky Puppies for those amateur astronomers under ten and Southern Skies for those near or south of the equator**

Logging and Data Management

Quick View of Requirements	
Binocular Messier Observing Program	
Tools Used (Eyes (E), Binoculars (B), Telescopes (T))	B
Manual (M) / Device Aided (DA)	M
Remote Telescopes Allowed	No
Visual (V) / Imaging (I)	V
Number of Levels	1
Number of Observations	50
Must be an AL Member	Yes
Recommended Minimum Instrument Size	20 mm
Date Deadline for Submission	No
Special Equipment Required	No
Equipment Must Be Constructed	No
Observations Must Be Submitted to an On-Line Database	No

Observation Requirements	
Binocular Messier Observing Program	
Object Name/Number	Yes
Observer's Latitude	Yes
Observer's Longitude	Yes
Date of Observation (LT or UT)	Yes
Time of Observation (LT or UT)	Yes
Description of Object	Yes
Size of Instrument Used	Yes
For Visual Observations:	
Seeing	Yes
Transparency	Yes
Power/Magnification	Yes

Logging and Data Management

Quick View of Requirements Binocular Variable Star Observing Program	
Tools Used (Eyes (E), Binoculars (B), Telescopes (T))	B
Manual (M) / Device Aided (DA)	M
Remote Telescopes Allowed	No
Visual (V) / Imaging (I)	V
Number of Levels	1
Number of Observations	60
Must be an AL Member	Yes
Recommended Minimum Instrument Size	35 mm
Date Deadline for Submission	No
Special Equipment Required	No
Equipment Must Be Constructed	No
Observations Must Be Submitted to an On-Line Database	Yes

Quick View of Requirements Deep Sky Binocular Observing Program	
Tools Used (Eyes (E), Binoculars (B), Telescopes (T))	B
Manual (M) / Device Aided (DA)	M
Remote Telescopes Allowed	No
Visual (V) / Imaging (I)	V
Number of Levels	1
Number of Observations	60
Must be an AL Member	Yes
Recommended Minimum Instrument Size	50 mm
Date Deadline for Submission	No
Special Equipment Required	No
Equipment Must Be Constructed	No
Observations Must Be Submitted to an On-Line Database	No

Observation Requirements Deep Sky Binocular Observing Program	
Object Name/Number	Yes
Observer's Latitude	Yes
Observer's Longitude	Yes
Date of Observation (LT or UT)	Yes
Time of Observation (LT or UT)	Yes
Description of Object	Yes
Size of Instrument Used	Yes
For Visual Observations:	
Sketch of Object	Yes
Seeing	Yes
Transparency	Yes
Power/Magnification	Yes

Quick View of Requirements Binocular Double Star Observing Program	
Tools Used (Eyes (E), Binoculars (B), Telescopes (T))	E / B
Manual (M) / Device Aided (DA)	M
Remote Telescopes Allowed	No
Visual (V) / Imaging (I)	V
Number of Levels	1
Number of Observations	50
Must be an AL Member	Yes
Recommended Minimum Instrument Size	20 mm
e Deadline for Submission	No
pecial Equipment Required	No
Equipment Must Be Constructed	No
Observations Must Be Submitted to an On-Line Database	No

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Quick View of Requirements	
Galileo Observing Program	
Regular / Binocular	
Tools Used (Eyes (E), Binoculars (B), Telescopes (T))	B / T
Manual (M) / Device Aided (DA)	M
Remote Telescopes Allowed	No
Visual (V) / Imaging (I)	V
Number of Levels	1
Number of Activities	13
Must be an AL Member	Yes
Recommended Minimum Instrument Size	2 inch
Date Deadline for Submission	No
Special Equipment Required	No
Equipment Must Be Constructed	No
Observations Must Be Submitted to an On-Line Database	No

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ar O. P.	
	Yes
Observer's Latitude	Yes
Observer's Longitude	Yes
Date of Observation (LT or UT)	Yes
Time of Observation (LT or UT)	Yes
Description of Object	Yes
Size of Instrument Used	Yes
For Visual Observations:	
Sketch	
Seeing	
Transp	
Power/	

Quick View of Requirements	
Binocular Messier Observing Program	
Tools Used (Eyes (E), Binoculars (B), Telescopes (T))	B
Manual (M) / Device Aided (DA)	M
Remote Telescopes Allowed	No
Visual (V) / Imaging (I)	V
Number of Levels	1
Number of Observations	50
Must be an AL Member	Yes
Recommended Minimum Instrument Size	20 mm
Date Deadline for Submission	No
Special Equipment Required	No
Equipment Must Be Constructed	No
Observations Must Be Submitted to an On-Line Database	No

Observation Requirements	
Galileo Observing Program	
Object Name/Number	Yes
Observer's Latitude	Yes
Observer's Longitude	Yes
Date of Observation (LT or UT)	Yes
Time of Observation (LT or UT)	Yes
Description of Object	Yes
For Visual Observations:	
Sketch of Object	Yes
Seeing	Yes
Transparency	Yes
Power/Magnification	Yes

Quick View of	
Binocular Double St	
Tools Used (Eyes (E), Binoculars (B), Telescopes (T))	E / B
Manual (M) / Device Aided (DA)	M
Remote Telescopes Allowed	No
Visual (V) / Imaging (I)	V
Number of Levels	1
Number of Observations	50
Must be an AL Member	Yes
Recommended Minimum Instrument Size	20 mm
Date Deadline for Submission	No
Special Equipment Required	No
Equipment Must Be Constructed	No
tions Must Be Submitted	

Observation Requirements	
Binocular Messier Observing Program	
Object Name/Number	Yes
Observer's Latitude	Yes
Observer's Longitude	Yes
Date of Observation (LT or UT)	Yes
Time of Observation (LT or UT)	Yes
Description of Object	Yes
Size of Instrument Used	Yes
For Visual Observations:	
Seeing	Yes
Transparency	Yes
Power/Magnification	Yes

Quick Vie	
Binocular Vari	
ols Used (Eye	
(B), Telescope	
nual (M) / Dev	
mote Telesco	
ual (V) / Imagi	
mber of Levels	
mber of Observations	60
st be an AL Member	Yes
commended Minimum Instrument Size	35 mm
te Deadline for Submission	No
ecial Equipment Required	No
ipment Must Be Constructed	No
Observations Must Be Submitted to an On-Line Database	Yes

Quick View of Requirements	
Lunar Observing Program	
Tools Used (Eyes (E), Binoculars (B), Telescopes (T))	E / B / T
Manual (M) / Device Aided (DA)	M
Remote Telescopes Allowed	No
Visual (V) / Imaging (I)	V / I
Number of Levels	1
Number of Observations	100
Must be an AL Member	Yes
Recommended Minimum Instrument Size	2 inch
Date Deadline for Submission	No
Special Equipment Required	No
Equipment Must Be Constructed	No
Observations Must Be Submitted	

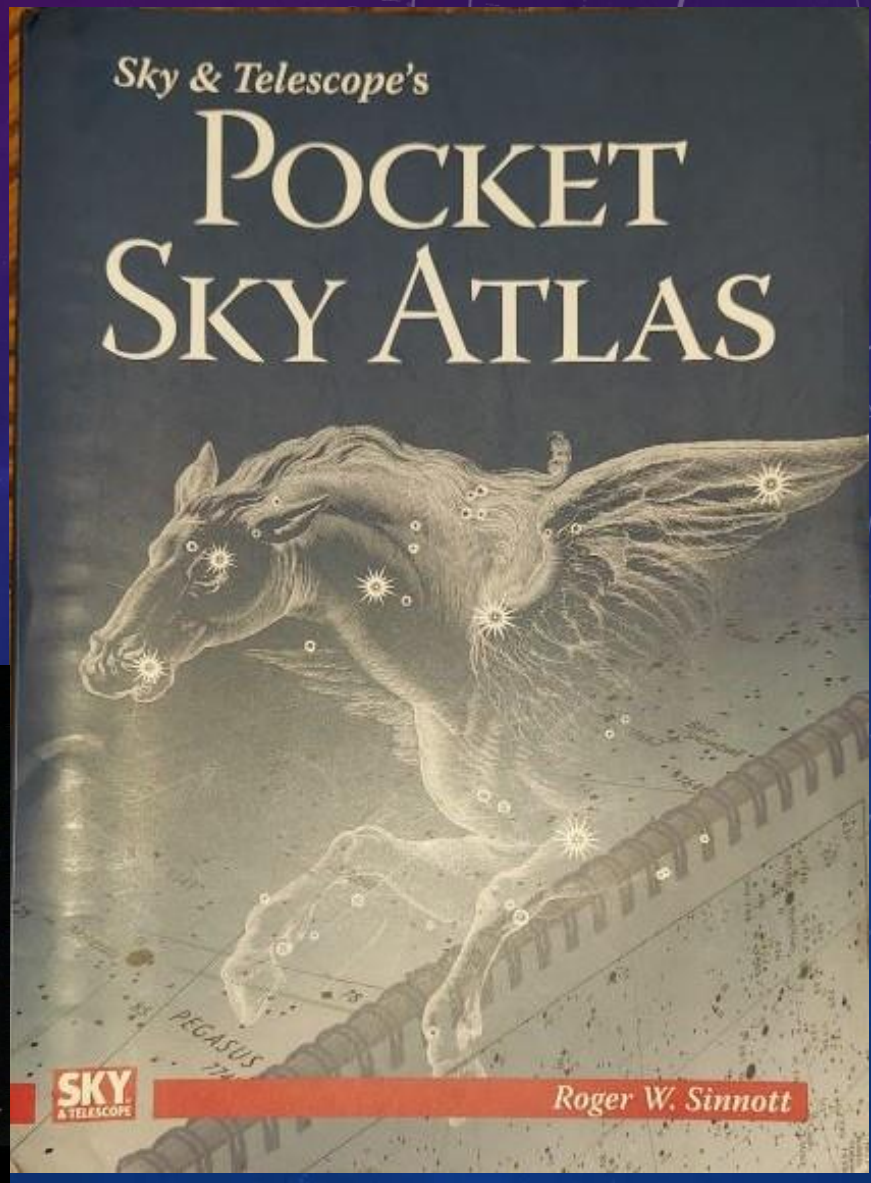
Observation Requirements	
Lunar Observing Program	
Object Name/Number	Yes
Observer's Latitude	Yes
Observer's Longitude	Yes
Date of Observation (LT or UT)	Yes
Time of Observation (LT or UT)	Yes
For Visual Observations:	
Seeing	Yes
Transparency	Yes
For Imaging Observations:	
Camera Used	Yes
Image Details	Yes
Image of Object	Yes

Quick View of Requirements	
Deep Sky Binocular Observing Program	
Tools Used (Eyes (E), Binoculars (B), Telescopes (T))	B
Manual (M) / Device Aided (DA)	M
Remote Telescopes Allowed	No
Visual (V) / Imaging (I)	V
Number of Levels	1
Number of Observations	60
Must be an AL Member	Yes
Recommended Minimum Instrument Size	50 mm
Date Deadline for Submission	No
Equipment Required	No
nt Must Be Constructed	No
tions Must Be Submitted -Line Database	No

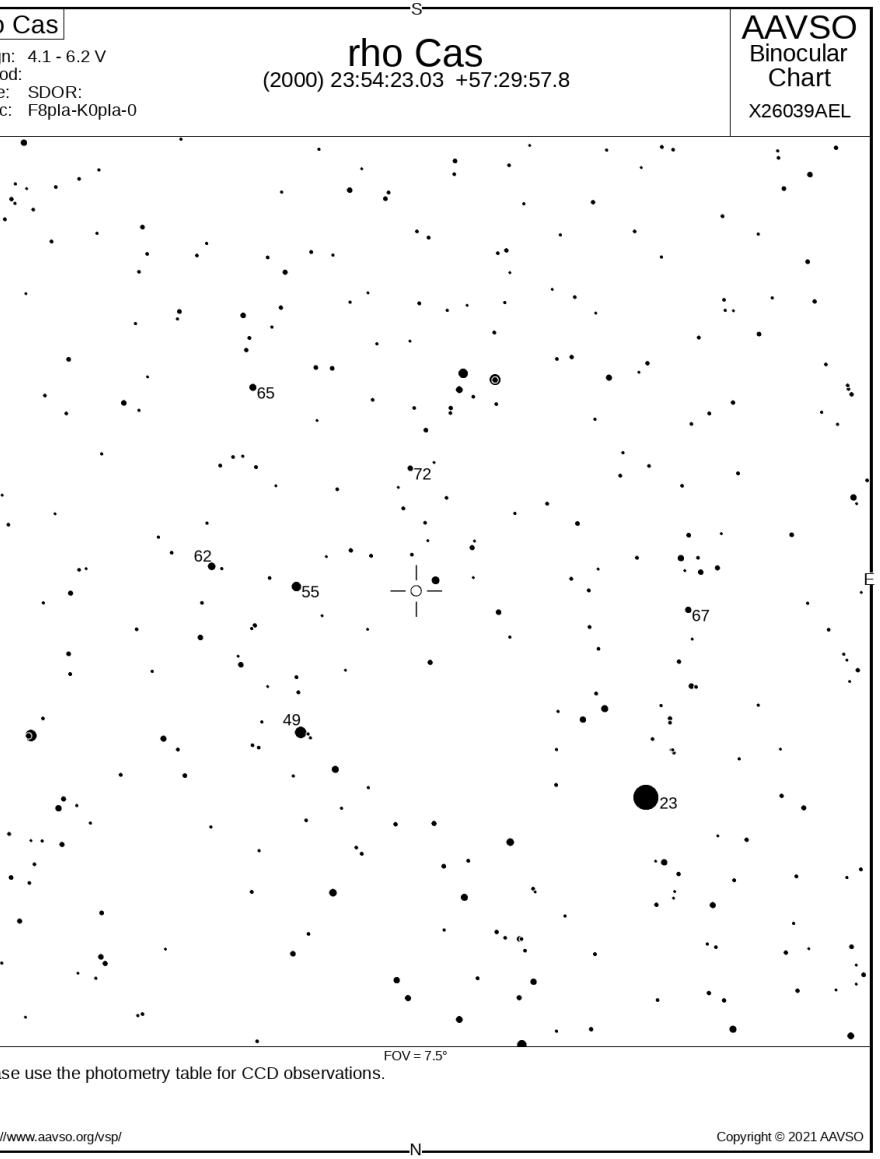
ervation Requirements	
Sky Binocular Observing Program	
ne/Number	Yes
Latitude	Yes
Longitude	Yes
Date of Observation (LT or UT)	Yes
Time of Observation (LT or UT)	Yes
Description of Object	Yes
Size of Instrument Used	Yes
For Visual Observations:	
Sketch of Object	Yes
Seeing	Yes
Transparency	Yes
Power/Magnification	Yes

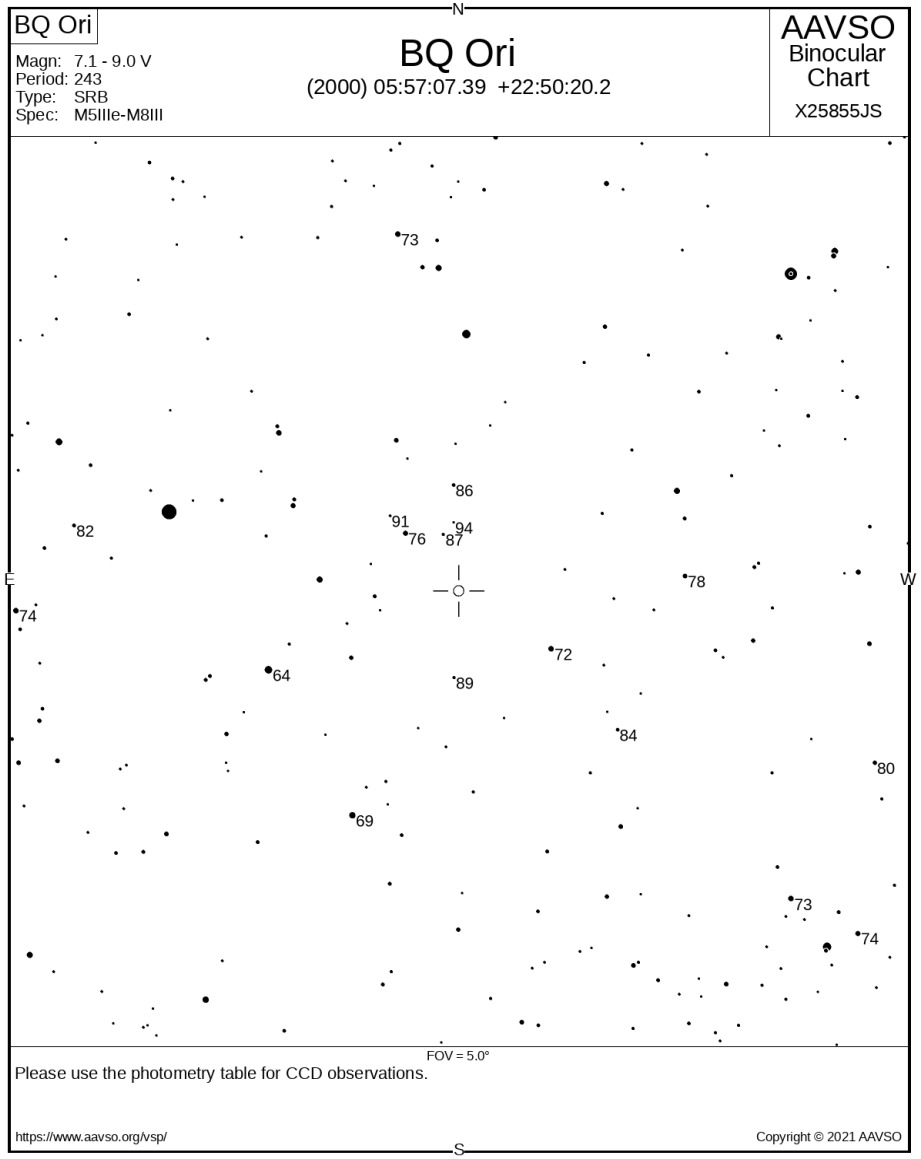
Resources

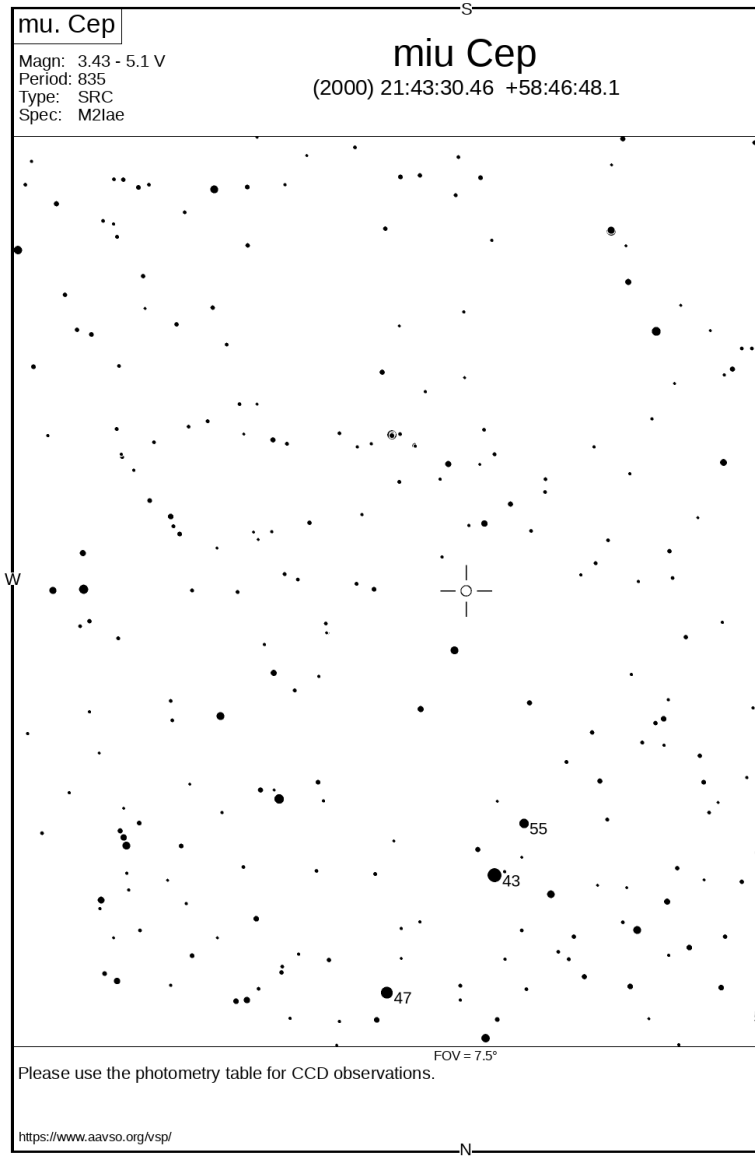
- *Sky & Telescope's* Pocket Sky Atlas
- Sky Safari Plus (the $4.95 version)
- AAVSO Variable Star Plotter
- Free Star Charts (freestarcharts.com)
- Bob and Dave and John, etc.



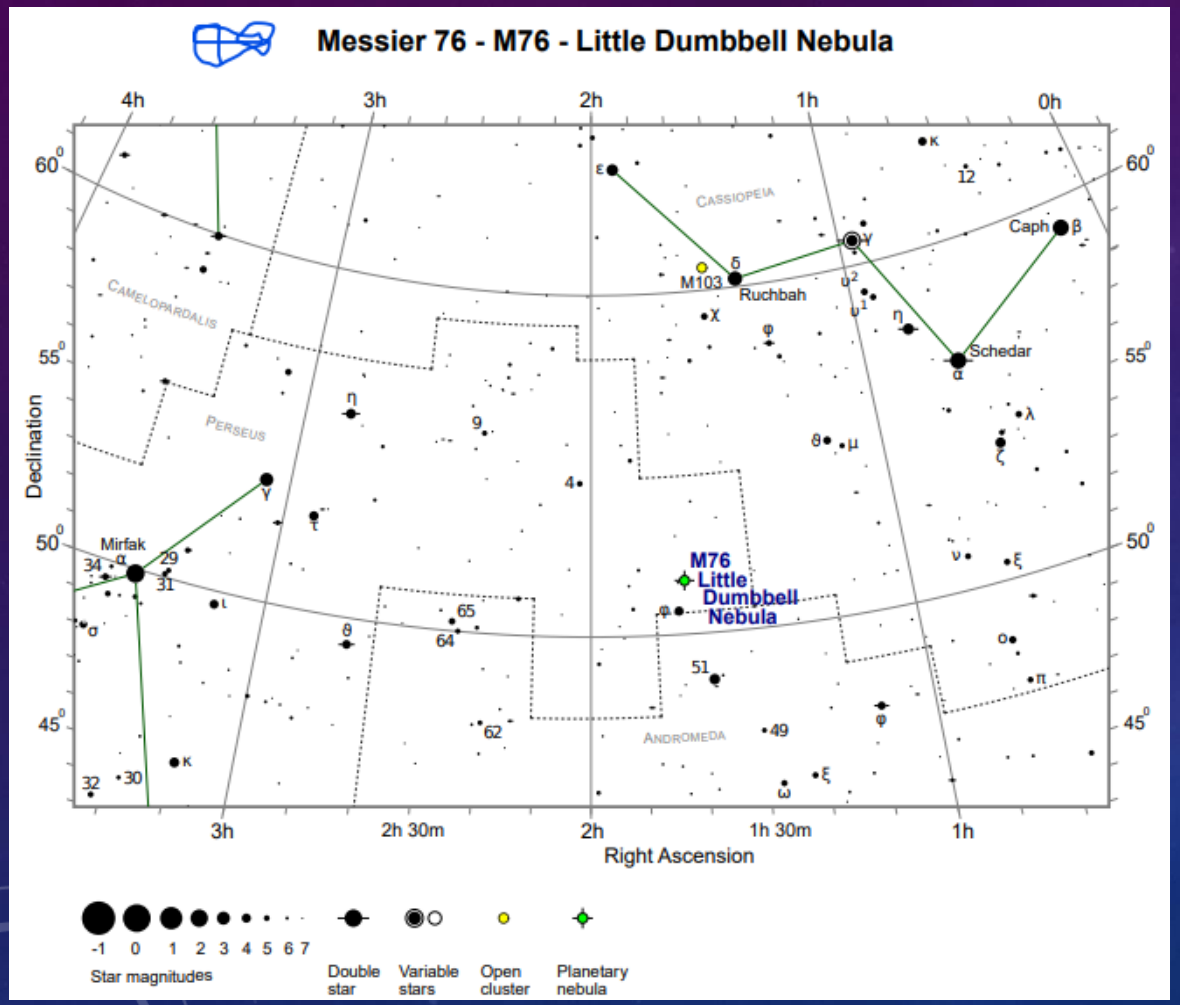
AAVSO Variable Star Plotter Product

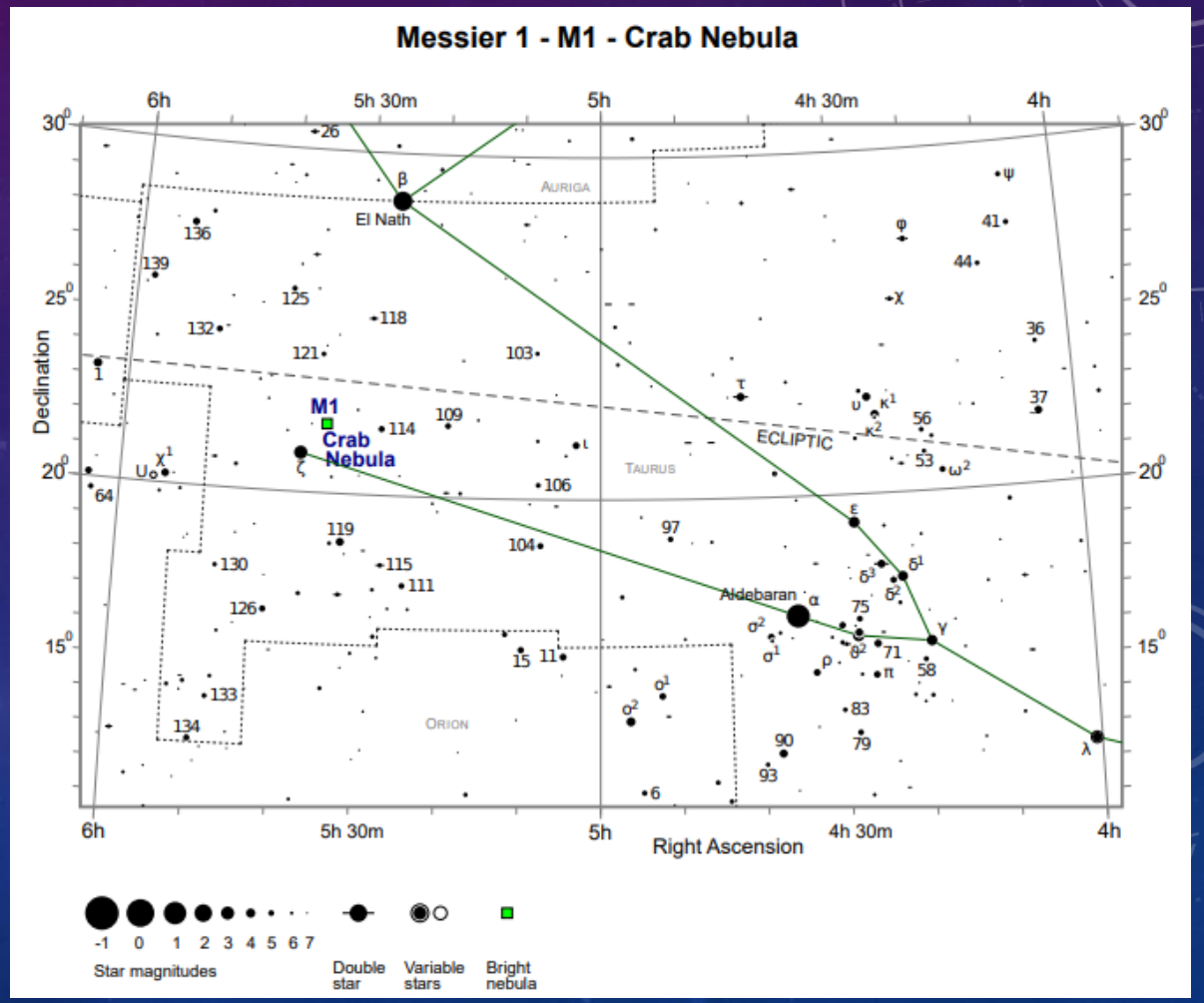






Free Star Charts





Lessons Learned

- When the program recommends a dark sky – they ain't kidding
- Give you eyes time to fully dark adapt, understand how averted vision works, have patience
- Beavercreek Neighborhood vs JBO Dark Site vs Sheldon National Antelope Refuge
- Recommended objective size is predicated on really dark skies
  - Did not believe 7x35 could do all Messiers until I stopped at SNAR
- Mount your primary observing binocular on a solid tripod and keep one set around your neck
- Thoroughly review data gathering requirements and set up your database first
- Take good notes
- The award approvers are pretty easy to work with and aren't looking for Thesis level work
- Look for faint fuzzies while you are young, they do not get any easier as you age (25 y/o daughter see some objects with the naked eye I need binocs for)
- Double Star program the easiest and the Advanced Double Star program the hardest

Comparing Naked Eye to Binoculars to Telescopes

1: Objects visible with the naked eye	2: Objects visible with 7×50 binoculars	3: Objects visible with small telescopes
5 planets	7 planets	8 planets + Pluto
2-3 galaxies	Several galaxies	Hundreds of galaxies
± 3 000 stars	± 100 000 stars	Millions of stars
A few double stars	Dozens of double stars	Hundreds of double stars
A few star clusters	Dozens of star clusters	Hundreds of star clusters
A few nebulae	Several nebulae	Dozens of nebulae
Planets as point sources	Several planets as disks, moons of Jupiter	Moons of several planets, surface details of some planets
Milky Way as hazy band	Star clouds and dark nebulae in Milky Way	Fine detail in Milky Way
Biggest lunar features	Hundreds of lunar features	Thousands of lunar features