



The MidAtlantic **ASTROPHOTOGRAPHY** **WORKSHOP**

Planning for Astroimaging

Bob Traube

Trauber@aol.com – Newnebula@aol.com

www.trauber.com

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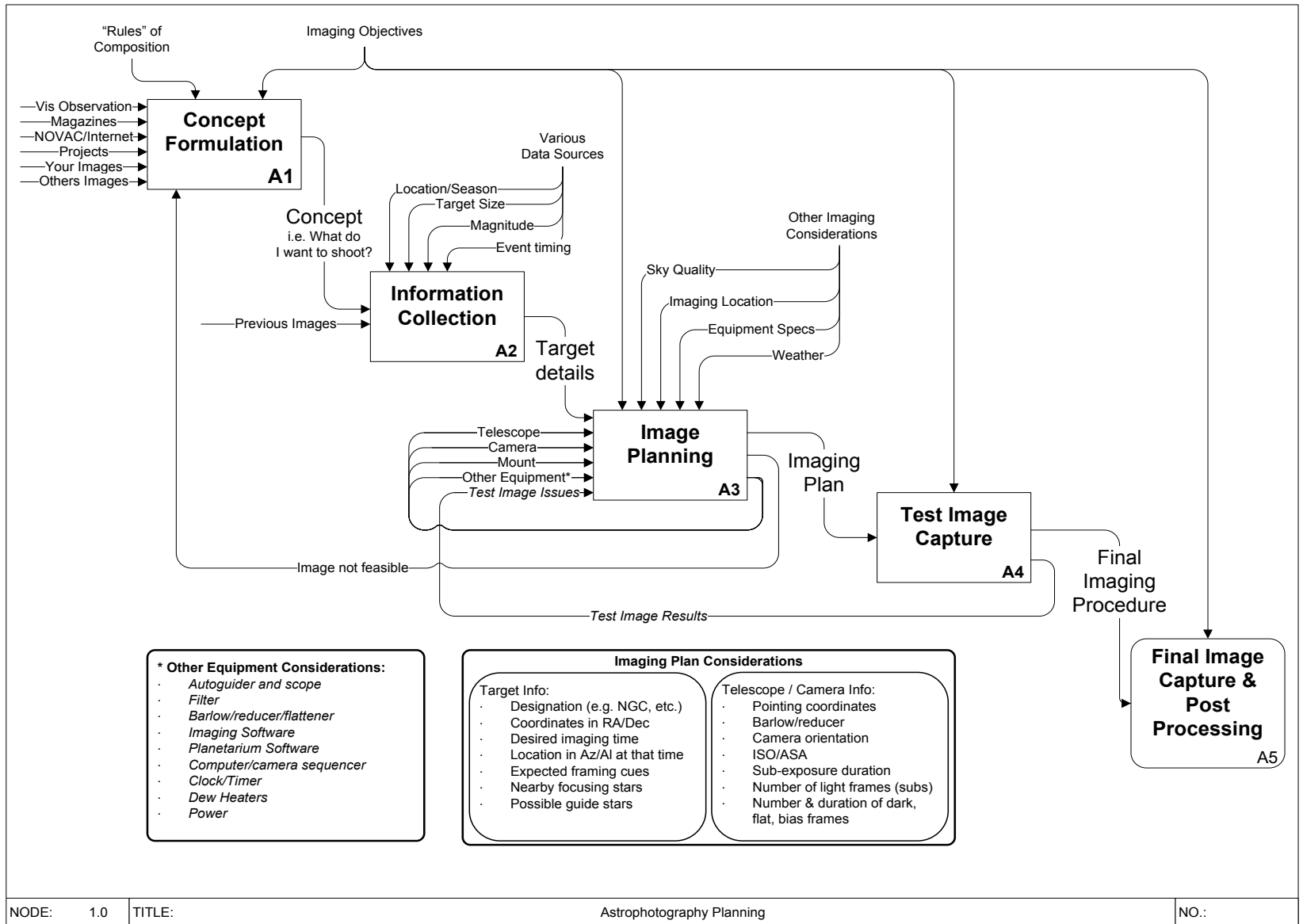
George Mason University

Fairfax, Virginia

Topics

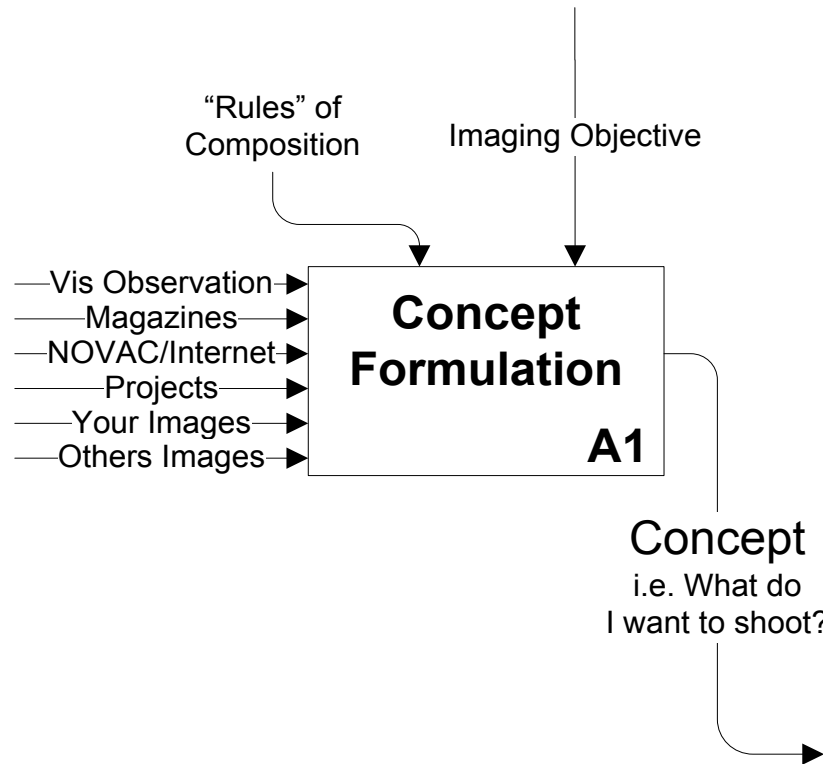
- Astro imaging process flow
 - Concept Formulation
 - Target Information Collection
 - Image Planning
 - Test Image Capture
- Thoughts on final image capture and post processing
- Questions?

Astroimaging Process Flow



Concept Formulation

□



Concept Formulation

What do I want to accomplish?

- Imaging Objective

- Interesting pictures
- Capture an event
- Supplement a previous image
- Scientific data
- Other?

- *Key Considerations*

- “Rules” of composition
- Timing
- Data needs
- Accuracy
- Your call

Concept Formulation

What do I want to shoot tonight?

- Sources of Inspiration

- Vis Observation—▶
- Magazines—▶
- NOVAC/Internet—▶
- Projects—▶
- Your Images—▶
- Others Images—▶

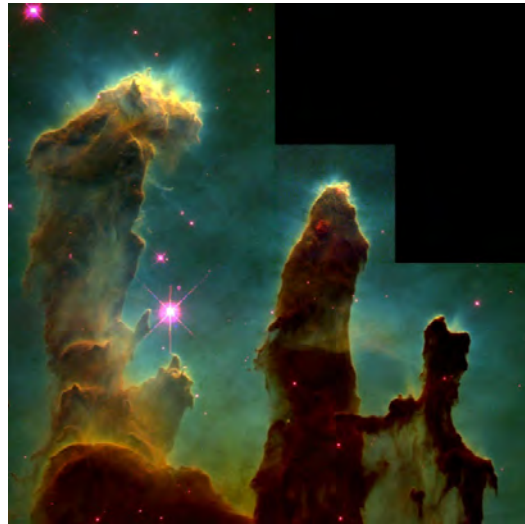
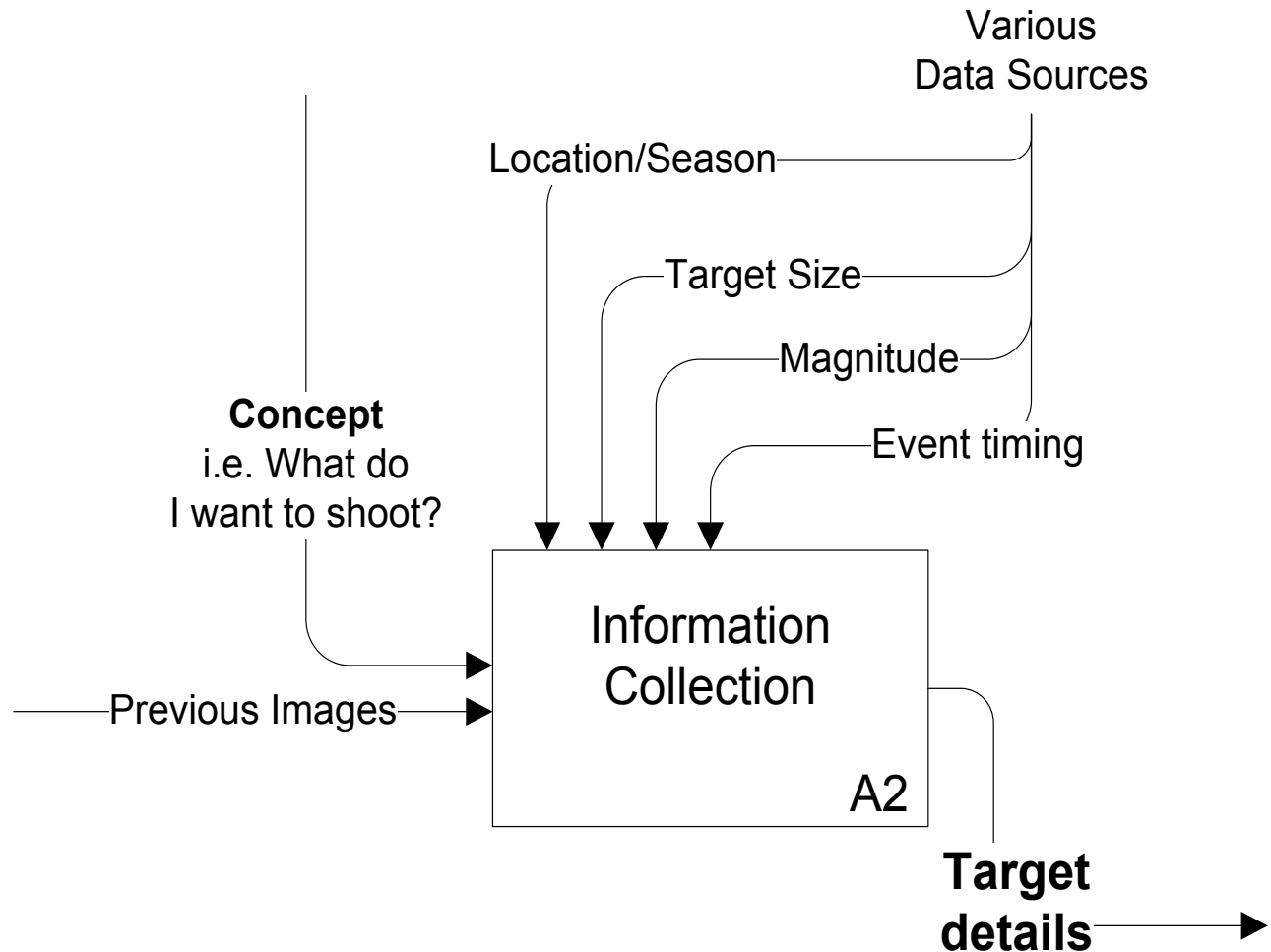


Image
Concept

Information Collection



Target Information Collection

- What do I need to know...
 - What is it called? (M/NGC/IC, etc.)
 - Where is it?
 - When is it visible?
 - How big is it?
 - How bright is it?
 - **How were other pictures of it taken?**
- Where can I find this information?
 - Various star charts & planetarium software
 - Google/Yahoo/Bing searches
 - NOVA/SEDS/User Groups and other useful links*
 - NASA
 - Your fellow astronomers

* See MAAWS handouts

Target Information Sources

- Internet
 - <http://tonightssky.com/> - from Earth and Sky
 - <http://www.pa.msu.edu/abrams/SkyCalendar/Index.html>
 - <http://www.phy.duke.edu/~kolena/sky.html>
- Imaging Related User Groups
 - SBIG/Images Plus/*Your Scope Here*
- Planetarium Software
 - The Sky
 - Starry Night
 - Cartes du Ciel

Information Collection

<http://tonightssky.com/>

This site is Beta testing. Feel free to report any problems.

Tonight's Sky

 [Support Tonight's Sky](#)

Helping the amateur astronomer plan their night by showing what you can see and what it will look like.

Current Moon Phase See the current moon phase based on your location. Add it iGoogle! www.google.com/ig

Used Saturn Sky Search Our Inventory for a Saturn Sky That Fits You! www.CarMax.com

Car Insurance - \$15 Month Get Super Cheap Car Insurance for Low Income Drivers - \$15 / Month! [Low-Income-Car-I](#)



Ads by Google

Where you are observing from tonight:

Latitude:

Longitude:


Local Horizon:

[Coordinates of World Cities](#)
[US & Canadian Cities](#)

All above values are measured in degrees.

TimeZone:

Date (MM/DD/YYYY):

Ads by Google 

Start observing at hour **for** **hours.**

Interested in the SKY?
Looking for a Saturn SKY?
Then Check Out the Chevy Camaro.
www.Chevrolet.com/C...

What you want to observe tonight:

Difficulty: ☐ All

- ☐ Naked Eye: limiting mag. 4.5
- ☒ Easy: limiting mag. 8.5
- ☐ Binoculars: limiting mag. 6.5
- ☐ Moderate: limiting mag. 9.5
- ☐ Small scope: limiting mag. 7.5
- ☐ Challenging: limiting mag. 10.5

Object Type: ☐ All

- ☐ Globular Clusters
- ☒ Open Clusters
- ☒ Nebula
- ☐ Galaxies
- ☐ Planets
- ☐ Comets
- ☐ Asteroids
- ☐ Double Stars
- ☐ Star Group

☐ Remember Settings

 What's in Tonight's Sky

Potential Nebula and Clusters

(Partial List of 65 objects found)

This site is Beta testing. Feel free to [report](#) any problems.

Tonight's Sky Observation Plan



Helping the amateur astronomer plan their night by showing what you can see and what it will look like.

These are the objects you selected for your observation plan. The values are based on your Latitude of 38 and Longitude of -78. These objects will be above your horizon of 20° on 3/10/2011 starting at 20:00 and for 4 hours. **This page is safe to print!**

Cat. 1	Cat. 2	Type	RA	Dec	Mag.	Size/Sep	Const	Common Name(s)
NGC957		OC	2:33	57° 34'	7.6	10.00	Per	
NGC1664		OC	4:51	43° 41'	7.6	18.00	Aur	
NGC2483		OC	7:56	-28° 06'	7.6	9.00	Pup	
NGC2506	C54	OC	8:00	-11° 14'	7.6	12.00	Mon	
NGC2533		OC	8:07	-30° 07'	7.6	6.00	Pup	
NGC1778		OC	5:08	37° 01'	7.7	8.00	Aur	
NGC1817		OC	5:12	16° 41'	7.7	20.00	Tau	
NGC2252		OC	6:35	5° 22'	7.7	20.00	Mon	
NGC2345		OC	7:08	-14° 48'	7.7	12.00	Cma	
NGC3242	C59	NB	10:25	-19° 21'	7.7	1.07	Hya	Eye Nebula, Ghost of Jupiter

Evening planet: Saturn is in SE to S at dusk, halfway to overhead by month's end. At mag. +0.5 to +0.7 in Virgo, Saturn outlines a 1.0-mag. Spica 13°-14° to its lower left. Moon passes Saturn May 13. Watch Saturn drop in on Spica-mag. Gamma Virginis until early June. A telescope reveals planet's rings 7.8° to 7.3° from edge-on, north face visible.

Dawn: Venus rises ~1 hour before sunrise from lat. 40° N; at midnight (when Sun is 9° below horizon) it's ~2° up in E to ENE. Saturn on May 1 sets ~3° S of W just after Venus rises. By May 31, Saturn sets ~2.5 hours before sunup. Bright Venus (mag. -3.8) helps locate three other planets nearby. All drawings showing Venus-Mercury-Jupiter-Mars on this month's calendar are for observers at lat. 34° N, where gathering rises in darker sky and climbs higher in morning twilight than from northern U.S. (Farther south is even better.) We recommend binoculars for viewing May's clustering of planets low in bright morning twilight; stay out past sunrise to enjoy the birds! Follow these two tris (three planets within a 5° field): Mercury-Venus-Jupiter during May 7-15, and Mercury-Venus-Mars during May 15-25. Mercury has its poorest apparition of this year for northemars. Although 22° W of Sun on May 7, it rises in bright twilight. On May 1 find Mercury at mag. +0.8 and ~3° LL of Venus. During May 6-20, Mercury brightens through zero mag. and fingers within 1.5° of Venus, with least separations of 1.4° on May 8 and 18. On May 11, Venus and Mercury pass 0.6° S and 2.1° S (lower right) of Jupiter, making the trib Me-Ve-Ju tightest, just 2.1° across. From May 11 onward, Jupiter, rising over 3 min. earlier daily, is highest member of four-planet gathering Ju-Ve-Ma-Me. Faint Mars (mag. +1.3), after passing just 0.4° N (upper left) of Jupiter on May 1, is lowest member of foursome until mid-May, when Mercury drops lower. A spectacular quartet — Venus within a triangle of fainter planets — fits into a field just over 6° across on May 12. Watch faster planets overtake Mars: On May 21, Mercury passes 2.1° S of Mars, making the trib Me-Ve-Ma tightest, 2.1° across; and on May 23, Venus goes 1.0° S of Mars. Waning crescent Moon near planets: April 30, May 1, 29-31.

This issue may be reprinted for free distribution in early May.

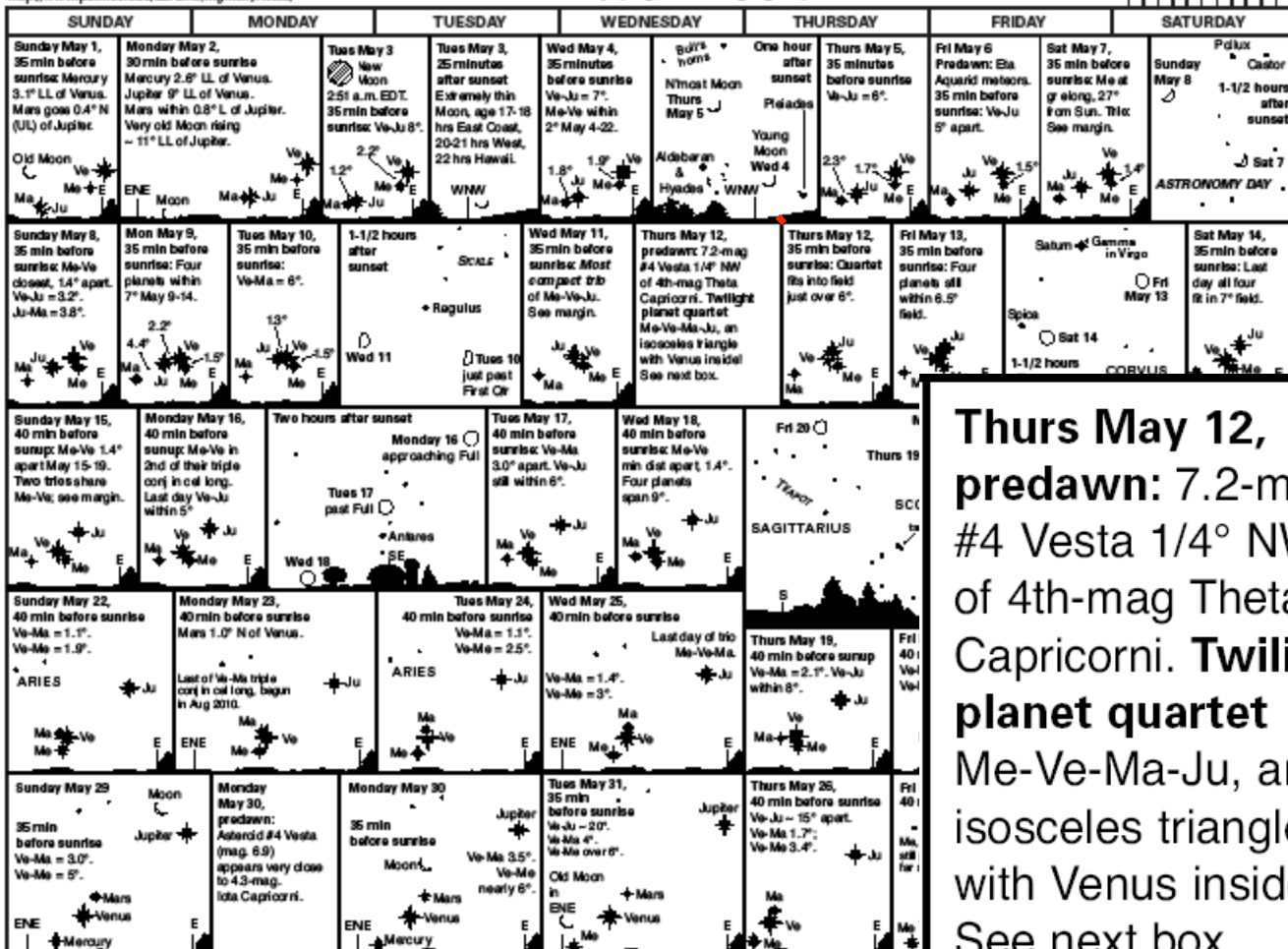
Planetarium business office:
(517) 365-4676
Night Sky Notes on World Wide Web:
<http://www.pa.msu.edu/abrams/nightsskynotes/>

ABRAMS PLANETARIUM SKY CALENDAR MAY 2011

An aid to enjoying the changing sky

Use this scale to measure angular distances between objects on diagrams below.

0° 10° 20°



Robert C. Victor, Patil Tolonen
ISSN 0733-6314

Subscription: \$11.00 per year, starting anytime, 1 East Lansing, MI 48824 or on line

Thurs May 12,
predawn: 7.2-mag
#4 Vesta 1/4° NW
of 4th-mag Theta
Capricorni. **Twilight**
planet quartet
Me-Ve-Ma-Ju, an
isosceles triangle
with Venus inside!
See next box.

Image Planning

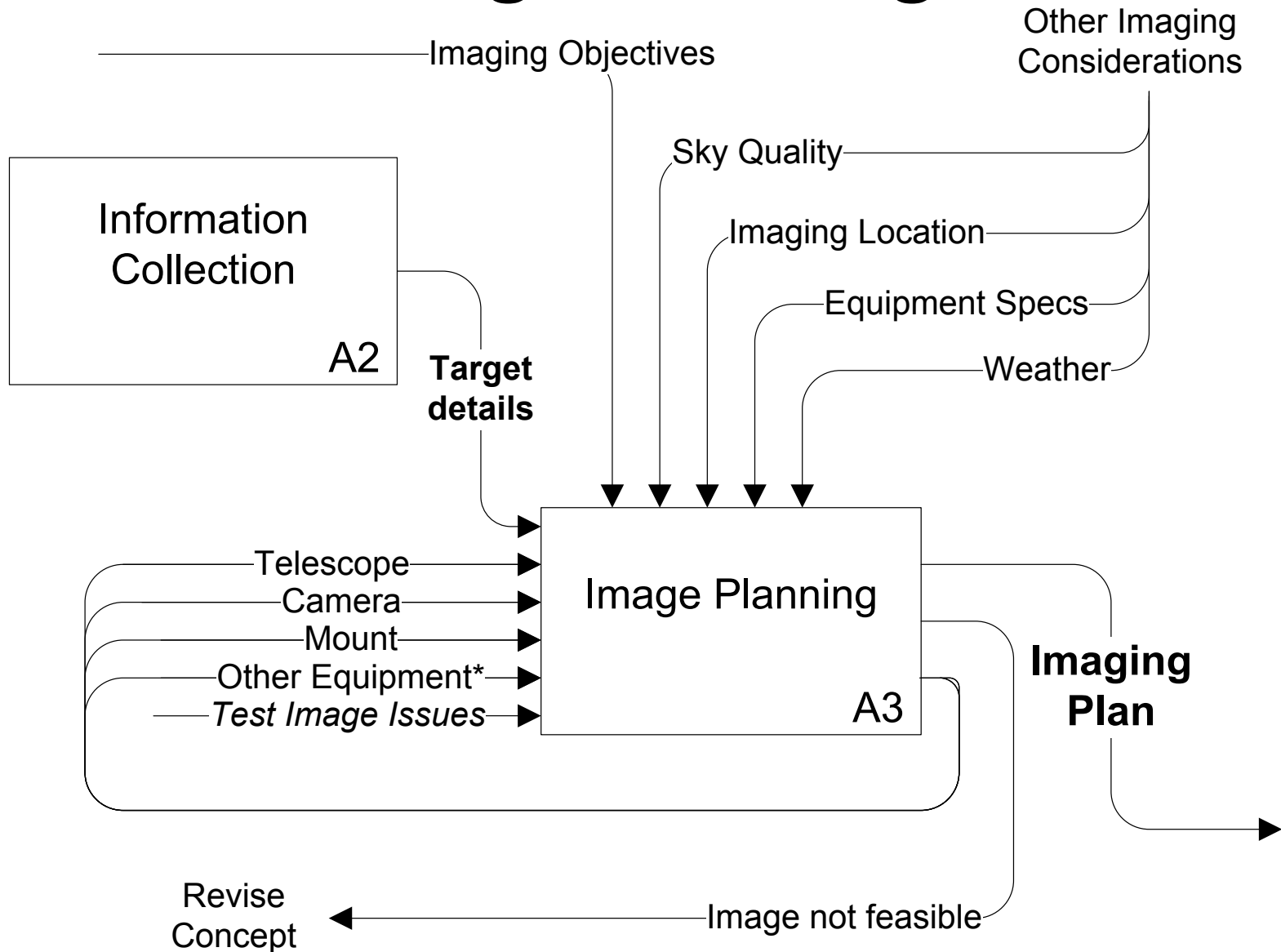


Image Planning

Imaging Plan Considerations

Target Info:

- Designation (e.g. NGC, etc.)
- Coordinates in RA/Dec
- Desired imaging time
- Location in Az/Al at that time
- Expected framing cues
- Nearby focusing stars
- Possible guide stars

Telescope / Camera Info:

- Pointing coordinates
- Barlow/reducer
- Camera orientation
- ISO/ASA
- Sub-exposure duration
- Number of light frames (subs)
- Number & duration of dark, flat, bias frames

* Other Equipment Considerations:

- *Autoguider and scope*
- *Filter*
- *Barlow/reducer/flattener*
- *Imaging Software*
- *Planetarium Software*
- *Computer/camera sequencer*
- *Clock/Timer*
- *Dew Heaters*
- *Power*

Image Planning

Starry Night Pro screen capture

M16 Info

Name: M16
Catalogue number: Eagle Nebula
Object type: Cluster with Nebulosity

More Options:

Logs: [Add Entry...](#)

Extended Info: [LiveSky.com...](#)

Export: [Save Info...](#)

Rises: [Tomorrow at 1:57:44 AM](#)

Transit: [Tomorrow at 7:15:37 AM](#)

Sets: [Tomorrow at 12:33:29 PM](#)

[Description](#)

[Position in Sky](#)

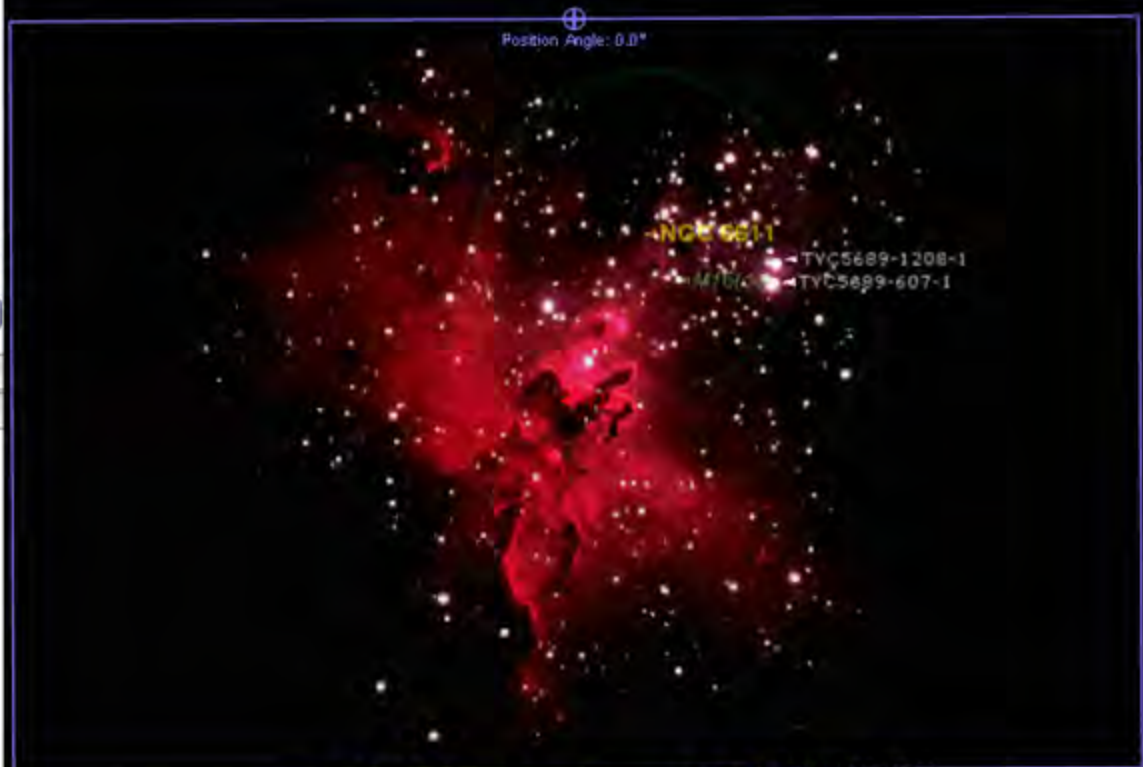
Constellation name: Serpens Cauda
Constellation common ... The Snake's Tail
Constellation possessi... Serpentis

Azimuth: 179° 38.061'
Altitude: 37° 29.382'
Hour Angle (JNow): 23h 58m 48.2s

RA (JNow): 18h 19.581m
Dec (JNow): -13° 50.246"
RA (J2000): 18h 18.927m
Dec (J2000): -13° 50.563"

Ecliptic longitude: 274° 48.868"
Ecliptic latitude: 9° 31.119"

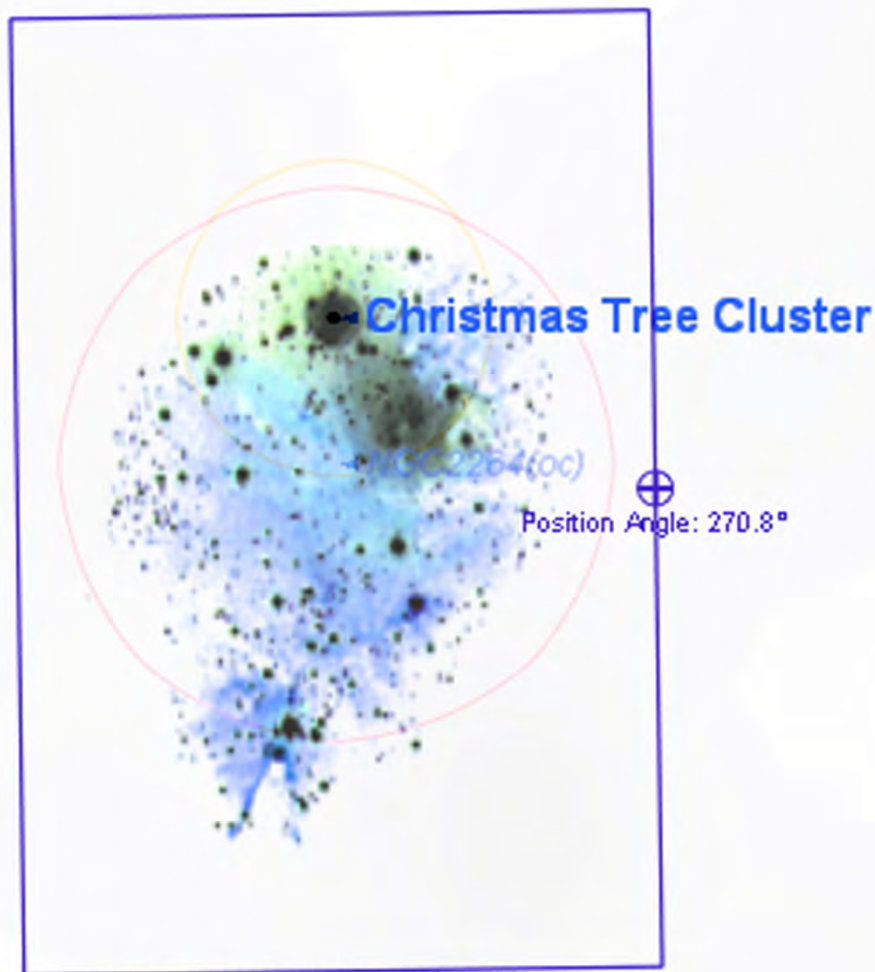
Galactic longitude: 16° 56.207"
Galactic latitude: 0° 44.957"



TEC-160 using Canon EOS-400

Image Planning Card

RA (JNow): 6h 41.595m
Dec (JNow): 9° 53.051'
RA (J2000): 6h 40.970m
Dec (J2000): 9° 53.733'

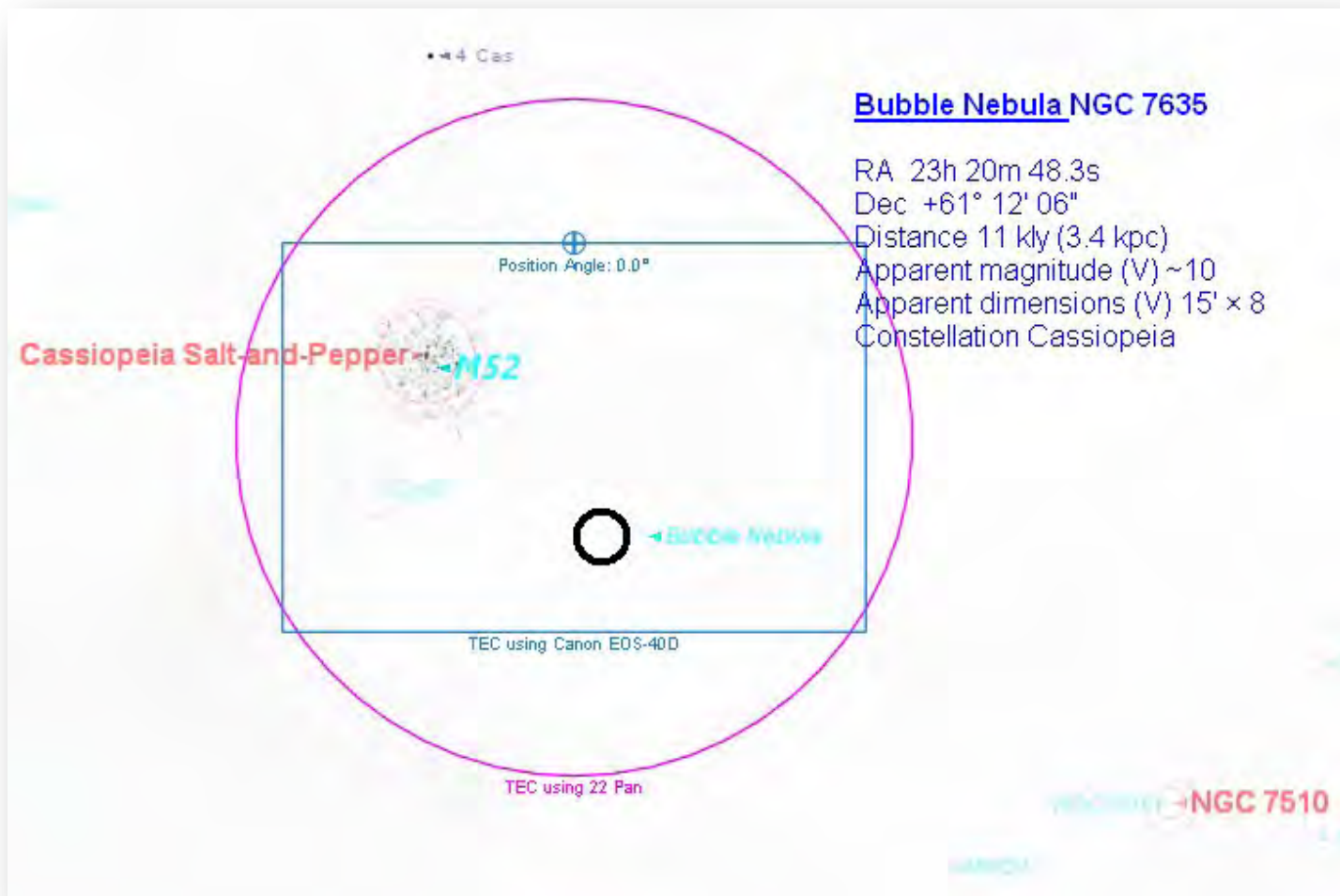


TEC-160 using Canon EOS-40D

Resulting Photo



Image Planning Card



Resulting Photo



Image Planning Card

Start Imaging Stop Imaging:

Pronto :12:30

5:30

TEC : 01:30

4:45

Mid Eclipse

03:17 Dec 21 2010

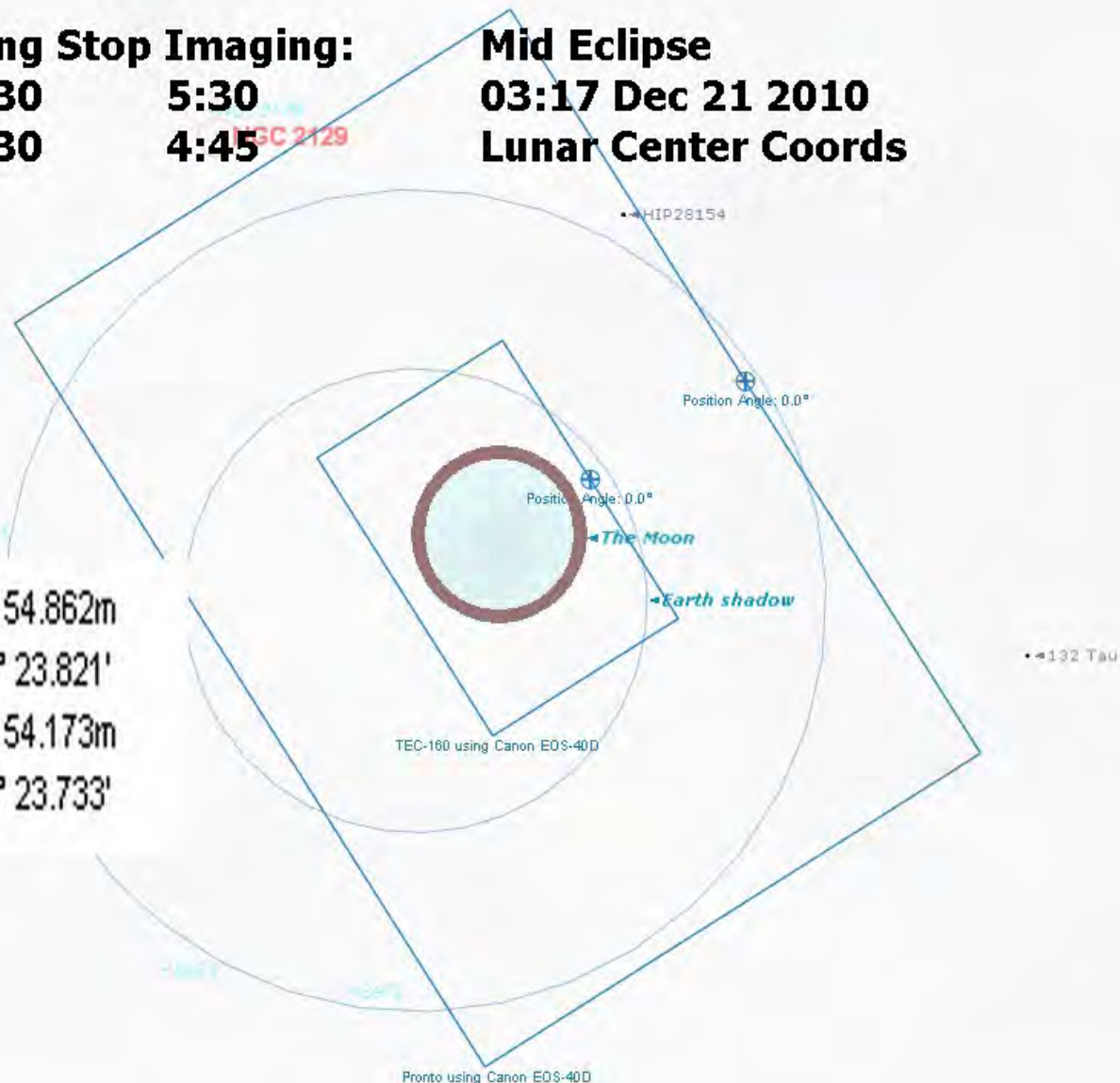
Lunar Center Coords

RA (JNow): 5h 54.862m

Dec (JNow): 23° 23.821'

RA (J2000): 5h 54.173m

Dec (J2000): 23° 23.733'



Resulting Photo



Image Planning Card

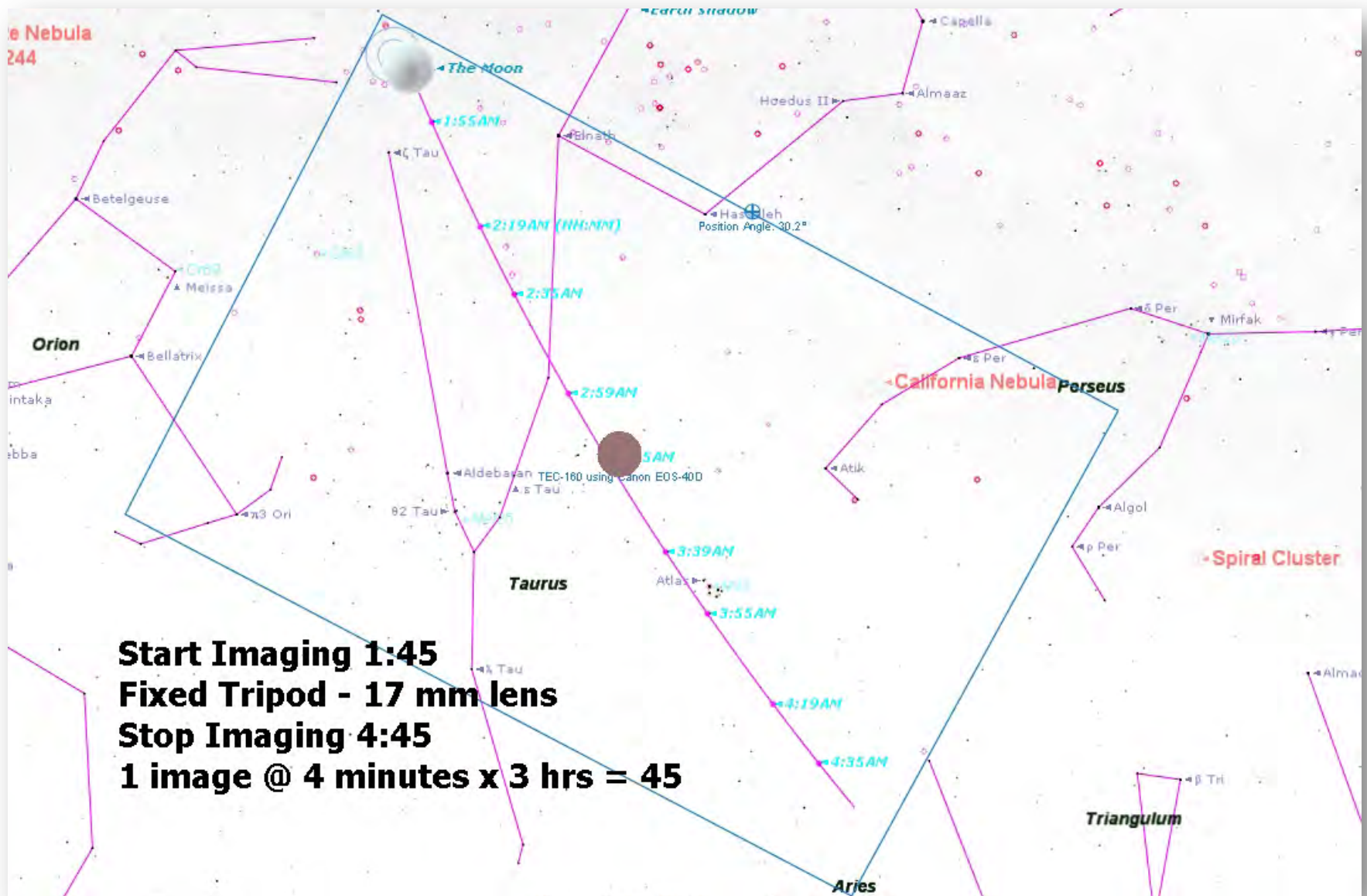


Image Planning

Imaging Plan Considerations

Target Info:

- Designation (e.g. NGC, etc.)
- Coordinates in RA/Dec
- **Desired imaging time**
- **Location in Az/Al at that time**
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- *Dew Heaters*
- *Power*

Desired Imaging time and Az-El

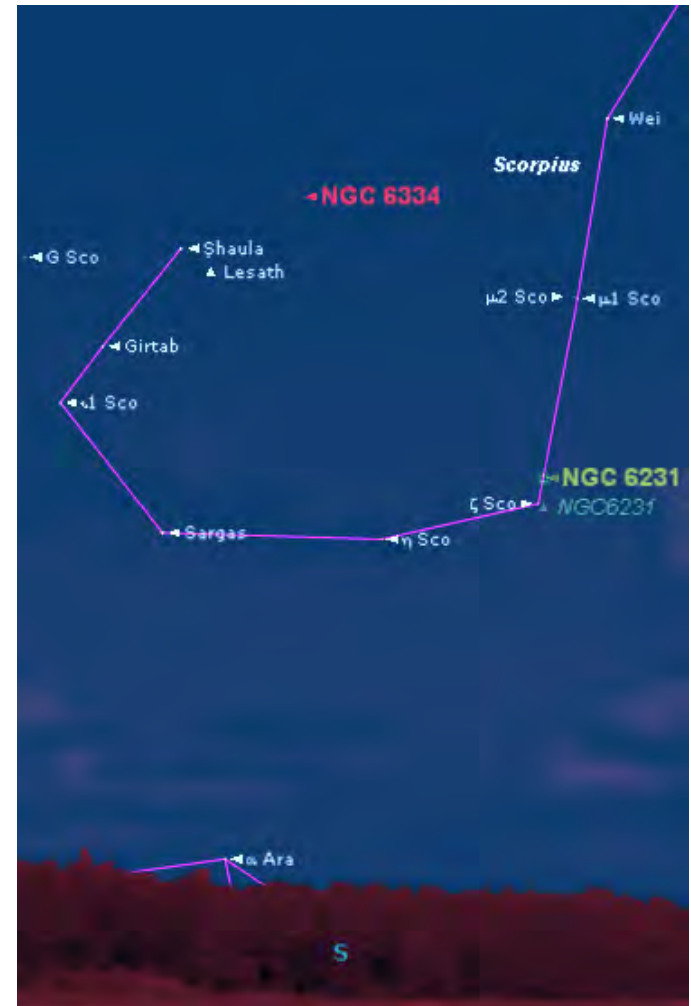
NGC 6334 – Cats Paw Nebula

- An object near the horizon is best imaged while it crosses the meridian

👍 Reduce atmospheric distortion

👍 Allows for better color capture

👎 But it limits the image duration



Desired Imaging time and Az-El

- Time specific event considerations
 - Pre sync time with official source
 - <http://www.time.gov/timezone.cgi?Eastern/d/-5>
 - <http://www.docgoerlich.de/utcdate.php> (for Gemini)
 - Set up earlier than usual, allow for contingencies
 - Take several test images if possible
- Examples

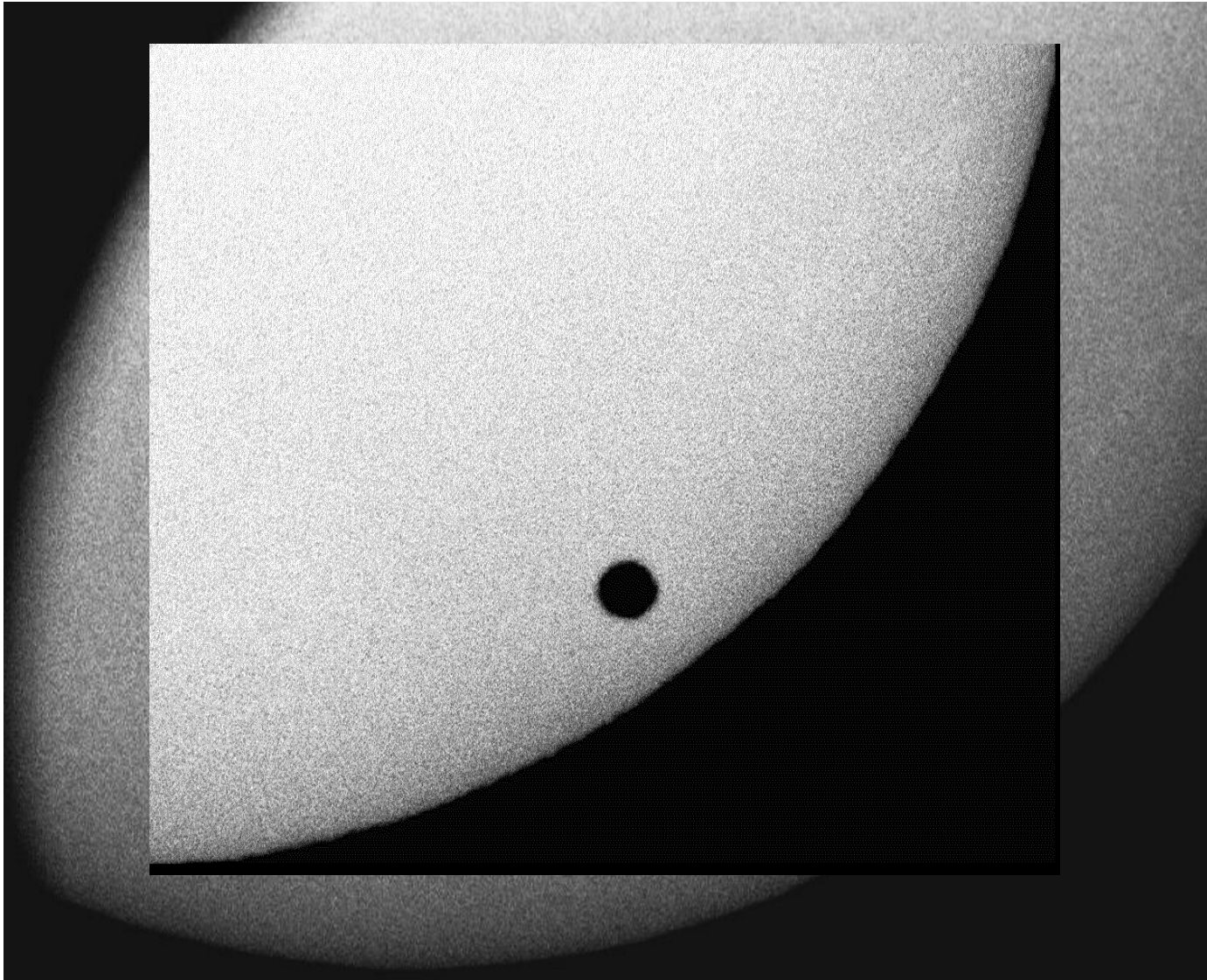
Double Iridium Flare



Lunar Eclipse Feb 20 2008



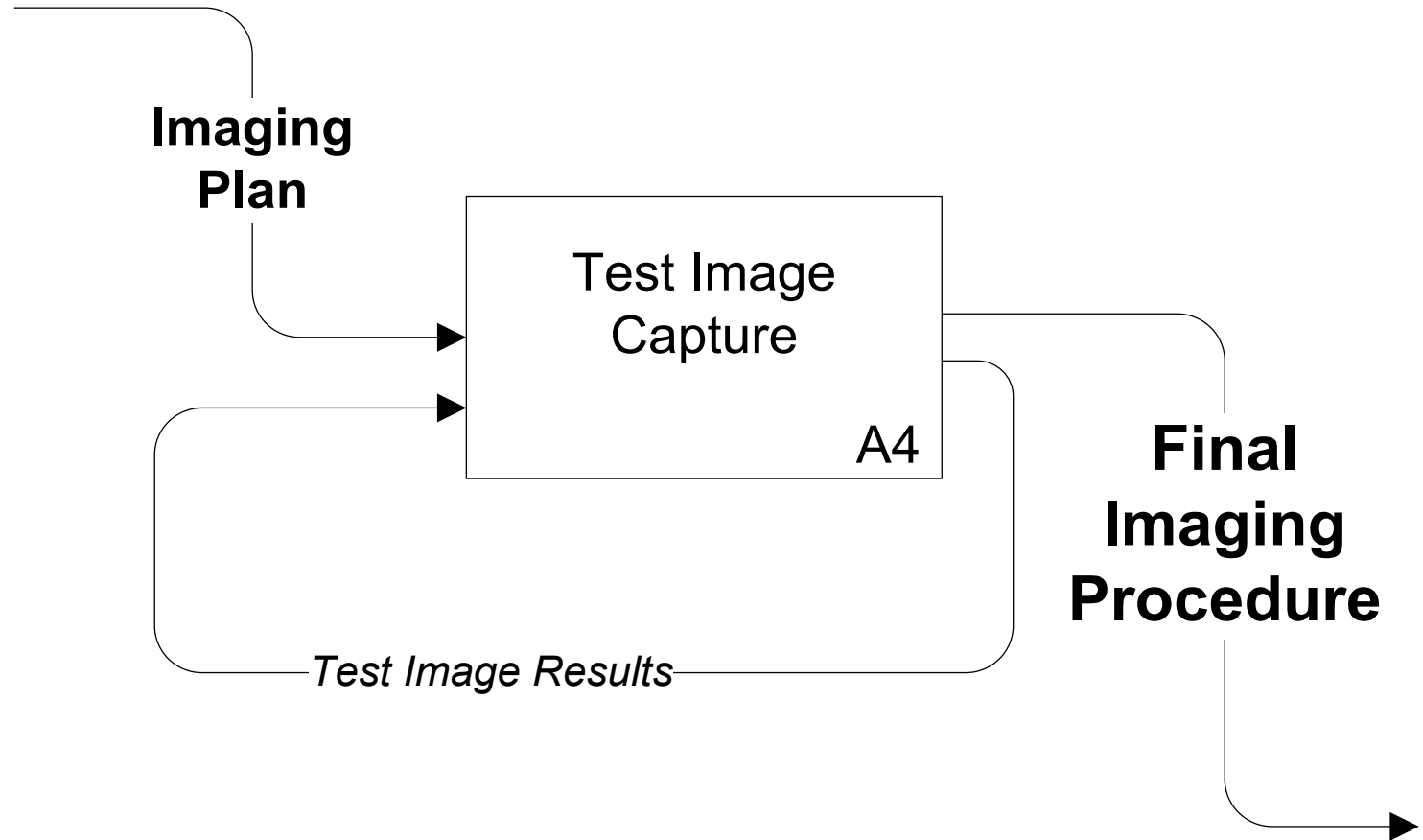
Venus Transit



Timed Events

- Other examples
 - Jupiter moon and shadow transits
 - Comets near other objects
 - ISS/Shuttle Passes
 - Solar Eclipse
- Potential Sources
 - Heavens-Above.com
 - <http://www.minorplanetcenter.org/iau/Ephemerides/Comets/index.html>
- Animated GIF Creator
 - <http://www.myspacegens.com/handler.php?gen=animatedimage>

Test Image Capture



Test Image Results

Check for Focus, Exposure and Composition

Test Image

- Focus
- Exposure
- Composition

- Zoom on nearby star
- Is histogram balanced?
 - No zero pixels
 - “No” saturated pixels
 - Reasonable sky glow
- 1st test image to confirm target and orientation (~3 min)
- Next test images shorter to confirm orientation adjustments (~1 min)

Adjustment

Refocus

Adjust sub image exposures

Re point telescope and rotate camera

Image Centering Example



On Camera Histogram



300"

00

100-8826



M



ISO1600

AWB

F0, 0, 0, 0

RAW

14.5MB

sRGB

168/332

03/02/2011 23:45:57

Final Thoughts on Image Planning

“No amount of planning will ever replace dumb luck.”

Jerry Lodriguss

- Plan the image but don't let the planning get in the way of a good picture!
- Learn from you previous images – apply it.
- Be flexible and creative, and above all...
- **Have fun!**



Questions?