

The Objective View

Newsletter of the Northern Colorado Astronomical Society

February 2007

Nate Perkins, President

pres@ 970 207 0863

Greg Halac, Vice President, Web Editor

vp@ 970 223 7210

Dave Chamness, Secretary and AL Correspondent

sec@ 970 482 1794

Robert Michael, Treasurer

treas@

Dan Laszlo, Newsletter Editor

objview@ Office 970 498 9226

add ncastro.org to complete email address

Cheyenne Astronomical Society, Cheyenne Botanical Garden
February 16 7 pm

<http://home.bresnan.net/%7Ecurranm/index.html>

Chamberlin Observatory Open House, dusk to 10 pm

Feb 24, Mar 24, Apr 21, May 26 303 871 5172

<http://www.du.edu/~rstencil/Chamberlin/>

Longmont Astronomical Society February 15 7 pm
FRCC on 2121 Miller Road

<http://longmontastro.org/>

January 11 Program

Choice Images of the Messier Catalog, by Lee Gregory

In the 1774, Charles Messier published his initial list starting with 45 celestial objects. He was primarily interested in comets. Lee showed a plot of Comet McNaught, a recent unmistakable comet. Messier's list alerted other observers so they would not be fooled by star clusters and nebulae. His intent was that these objects be ignored. It comprises quite a variety, and not all the brightest objects made the list. Lee began by seeking HST images, was surprised to find that only 8 of the M objects have been covered in entirety. 23 objects are imaged in part. For each object, Lee showed a Palomar Digital Sky Survey image for scale, then proceeded to more detail. M1 is a supernova remnant. It has a blue-green glow visually in large telescopes due to synchrotron radiation. Observers don't typically see the filaments which emit longer wavelengths. Some objects have Sloan Digital Sky Survey images, just now available online. Its CCD images with 5 filters in 1 pass, and the middle 3 are mapped to red, green and blue. M 2, 3, 4, and 5 are globular clusters. The HST images show complete resolution. M6 and M7 have nice amateur images. The Lagoon Nebula, M8, contains a star-forming region, lots of complex structure. M11 is an amateur favorite, 682 stars, 6000 light-years away. M13 and its attendant galaxies were nicely shown by the NOAO telescope at Kitt Peak, an instrument available for rent to amateurs. Lee found an apparently unreleased HST image of M15, in a directory for video. It is home to planetary nebula Pease 1, which can be found with large amateur instruments. M16 is the cluster with the Eagle Nebula, the Pillars of Creation. This is the most famous HST image released. M17 is available in a massive, highly detailed file. M20, the Trifid Nebula, is a nice object visually. The IR DSS image reflects the eyepiece view well. Lee is attempting to spot a tiny pillar in the object. Its dust lanes are like stitches on a baseball. Dust and gas have condensed to clear the center. It is reminiscent of the Rosette Nebula. The HST image shows horns. M27 is easy in binoculars. It is 5.7 by 8 arcminutes, 1250 light-years away. The obvious portion is surrounded by a shell of gas twice the diameter. The structure was captured well by the CFH telescope in Hawaii. The HST image details globules of dust, trailing tails. M31 is the first galaxy on the list. It is huge in the sky, 3 by 1 degrees in extent. It is 2,900,000 light-years away. Zooming in allows viewing its huge H II regions. HST

Next Meeting: February 1 7:30 PM
Nitescapes 3-D: The Aurora in 3D Landscapes
Bryan White

Leshar Junior High Auditorium, 1400 Stover St
(NE corner, Stover and Prospect) Fort Collins

Doors open at 7:00 PM

Map:

http://www.psdsschools.org/documentlibrary/downloads/School_Services/Maps_to_Schools/map_lesher_jr_high.pdf

Please email: rsvp "at" ncastro.org
if you can come

Meeting directions:

In Fort Collins, from the intersection of College Ave and Prospect Rd, head East about 1/2 mile. See the Discovery Center sign to the South. Turn North on Stover Street, see Leshar Junior High on the right. Parking is on the North side. From I-25, take Exit 268, West to Lemay Ave, continue West 1/2 mile, see Leshar Junior High on right. N on Stover to lot.

NCAS Programs

March 1 Dan Durda, SwRI Near-Earth Asteroids

April 5 Lee Gregory, NCAS Choice Messier Images Part II

NCAS Public Starwatch

February 23 6:30 pm Discovery Science Center

Other Events

Little Thompson Observatory Star Night

February 16 7:30 pm Mysteries of Venus Dr Mark Bullock

<http://www.starkids.org>

CSU Madison Macdonald Observatory Public Nights

On East Drive, north of Pitkin Street

Tuesdays 8 pm if clear, when class is in session

gave highly magnified views of its globular clusters. M31's companion M32 also has globular clusters. The Triangulum Galaxy, M33, is fairly bright but spread out. At times a bright knot, NGC 604, can show when the galaxy is not obvious as a whole. The HST image shows central clearing of this massive star-forming area. Nearby is M34, which was covered by Comet Hale-Bopp in its journey. M35 is a favorite. It has 434 stars and is 2800 light-years away. Lee's favorite shot is by the Canada-France-Hawaii Telescope. In the field is NGC 215, six times more distant. This direction is directly opposite the center of the Milky Way Galaxy. The Auriga trio M36, M37, and M38 vary in richness, with M37 exceptional. M40 has only a binary star at its location. It is the product of mistaken coordinates supplied by Hevelius. M41 is the heart of Canis Major, readily found south of Sirius. M42 is the subject of a recently released HST mosaic. A 100 Mb image is available, could be printed to cover a wall. M43 is part of the complex, separated by a dust lane. M44, the Beehive Cluster, was passed by Comet Neat. The Pleiades, M45, is not a difficult object. Perhaps Messier was aiming for a round number in his list. It is impressive in binoculars. It is 380 light-years away. Lee showed a fine image with Comet Macholz. The cluster is shrouded in nebulosity which can be a challenge to see. Dark skies are recommended. An HST image shows an especially bright dust wisp, Barnard's Merope Nebula, IC 349. It is 36 arcseconds south-southwest from the star. It is only 3500 AU, or 0.06 light year, from Merope. An occulting bar in the eyepiece has allowed several amateur astronomers to detect it. It is a dust cloud shaped by radiation pressure from the star. Johannes Schedler imaged it with his 16 inch Cassegrain, <http://panther-observatory.com> in October 2005. M46 is an attractive open cluster with a planetary nebula, NGC 2438, in the field, either a foreground or background object. Nearby M47 is sparse by comparison. The next galaxy on the list after M33 is M49. M51 had a recently released HST mosaic. It has extremely high resolution. Light between it and an adjacent smaller galaxy is not a physical bridge. M54 is a globular cluster which is part of the Sagittarius Dwarf Galaxy, reported in the 1990s. M55 is far south, could be dimmed by obscuring dust. M56 is a neglected globular, due to proximity to M57. The Ring Nebula is 2300 light-years away. The ring shape has high surface brightness. It has been found to have an extensive dim halo. Recommended books for Messier List observers: The Messier Objects, Stephen J. O'Meara
Messier's Nebulae & Star Clusters, Kenneth Glyn Jones
Messier Marathon, Don Macholz, or Harvard Pennington
Best technical reference:
Concise Catalog of Deep Sky Objects, W.H. Findlay.
(Springer)
Other references: Burnham's Celestial Handbook; The Night Sky Observer's Guide, Kepple and Sanner; Star Clusters by Archinal and Hynes..

NCAS Business, January 11 2006

Vice President Nate Perkins called the meeting to order. New officers for 2007 were elected. Congratulations to: Nate Perkins, President. Greg Halac, Vice President. Robert

Michael, Treasurer. Dave Chamness, Secretary. The meeting schedule and observing nights were announced. Members were alerted to Comet McNaught and potential for daylight viewing.

Comet McNaught, Great Comet of 2007

From: vern@raben.com
To: members@longmontastro.org, front-range-tac@seds.org
Subject: * FRAC * Another comet this weekend (C/2006 P1/McNaught)
Date: Wed, 3 Jan 2007 4:53 PM

For those of us working on our comet certs, there is a possibility to observe another comet this weekend, Jan 6 and Jan 7. Comet C/2006 P1/McNaught is predicted to brighten to vmag 0 to -1 by then. Unfortunately, twilight will still be pretty bright and it will be very near the horizon (comet sets at 5:42pm, sun sets at 4:42pm). Around 5:20 to 5:30 is probably the best time to look. It will be just 10 deg south of west (azimuth 260) and at the bottom of Aquila. We should be able to spot Altair, drop down from there, and then scan the horizon about a binocular width to the south. I tried for this one early in the morning just before sunrise about a week ago but didn't find it. See <http://www.skyhound.com/sh/comets.html> for more info and charts.

Vern

*** FRAC had several reports of midday views of Comet McNaught as it passed perihelion. We then saw this intriguing report ***

From: torncomet@yahoo.com
To: front-range-tac@seds.org
Subject: * FRAC * Comet McNaught's Tail in a dark sky - in COLORADO
Date: Tue, 16 Jan 2007 11:29 PM

To all comet enthusiasts,

Tonight I managed to pull off an amazing observation: I saw McNaught's tail sticking up above the western horizon as twilight was ending!!!

It looked like a small growth out of the side of the Zodiacal light, with about the same surface brightness, and meeting the horizon where it joined into the Zodiacal light. It was on the north side and slanted toward the upper RIGHT. I know that seems contrary to where the comet is, but the tail lags seriously behind the antisolar line, as evidenced dramatically on the SOHO pictures. I have attached a diagram showing the stars, the outline of the Zodiacal Light and the outline of the tail. There were also a couple striations within the tail, as marked in the diagram. They looked like faint auroral rays.

I observed from a point just off Flagstaff Rd, a couple miles west of Boulder, CO, and with a breathtaking view of the Continental Divide. The sky was pristine. I had to hike about 100 yds in the snow, but fortunately there was a path of previous walkers in the snow, so I was lead to the rocky overlook by the path.

The tail was fairly obvious with averted vision after twilight ended, but the striations were only seen only, but very consistently. One main one was visible, but the southern edge of the tail seemed rather sharp too.

Wow !,

Paul

----- Original Message -----

From: "djlaszlo@aol.com" <djlaszlo@aol.com>
To: front-range-tac@seds.org; club-news@ncastro.org
Sent: Wednesday, January 17, 2007 8:21:19 PM
Subject: Re: * FRAC * Comet McNaught's Tail in a dark sky - in COLORADO

Did it look like the attached photo? Thanks for the heads up. This comet just doesn't quit.

Image taken north of Wellington CO at 18:30 on 1-17-2007, the streamers look like a faint distant searchlight beam, or aurora.

The Zodiacal light is seen in the image. Delphinus is towards the right margin.

Photo with Canon 20D, 17mm lens, ISO 1600, 20 sec at F/4

Dan Laszlo, NCAS

Yes!!

This is what I saw, but with naked eye, not with so much detail. The location is just right.

Great!,

Paul

Brian,

The tail is very curved, lagging behind due to the size of the grains of dust. The acceleration due to the solar wind is much less than for the ion tail gases, so the grains are moving largely as if in orbit around the sun. If you look at the SOHO movies of the comet passing the sun, you see how much the tail lagged the anti-solar line. Pictures of the tail from the southern hemisphere show this too as a strong curve. The tail we still see above the horizon consists of particles released last

week or even before when the antisolar line pointed toward the upper right, not to the left of the comet.

I hope this helps,

Paul

From: torncomet@yahoo.com
To: front-range-tac@seds.org
Cc:
Bcc:
Subject: * FRAC * McNaught's Tail tonight (Thurs)
Date: Thu, 18 Jan 2007 7:50 PM
To all comet enthusiasts,

I got another look at Comet McNaught's tail above our horizon this eve, and was joined by Andrew Laszlo and a friend of his later on.

I was surprised that the tail was easier to see than 2 nights ago! It was wider, brighter and longer. I first started seeing the rays 23 minutes before twilight ended, when I saw a bright ray near Venus. It was immediately noted then naked eye. Eventually, using 10x50's, I counted at least 8 rays. Naked eye the total length seen was 30 deg, running from near Venus to past Enif. Any one of the rays would have made a nice tail on a normal comet! The ray near Venus was particularly bright, and easy to see naked eye.

At the end of twilight, several thin, closely spaced rays could be seen with averted vision, embedded within the Zodiacal light.

Must be quite an amazing sight from the Southern Hem.

Paul

From: nathan_perkins@comcast.net
To: front-range-tac@seds.org
Sent: Thu, 18 Jan 2007 10:26 PM
Subject: Re: * FRAC * McNaught's Tail tonight (Thurs)

Here's an image of the end tail rays on McNaught, captured on a lowly Canon A510 Powershot; 15" f3.2, ISO 400 tonight at around 6:30pm. This was an attempt to duplicate Dan Laszlo's observation from north of Fort Collins, as based on Paul Robinson's original posting. An image editing program was used to increase brightness, contrast, and remove digital noise. The streamers were easily visible in 8x42 binoculars. Also, spaceweather.com has a photo taken yesterday from S Africa that shows the end of McNaught's tail curving back. The end of that photo matches fairly closely with the image recorded by Dan L.

Regards,
Nate Perkins, FtC

From: albers@fsl.noaa.gov
To: front-range-tac@seds.org
Cc: members@longmontastro.org; fschaaf@aol.com
Sent: Thu, 18 Jan 2007 19:48:29 +0000 (GMT)
Subject: * FRAC * recent tail image by Rob McNaught

Greetings,

Interesting to see this recent image of the outer fringes of the tail right on Rob McNaught's homepage. If the stellar object in the photo is Venus, it would be consistent with Paul Robinson's drawing and Dan Laszlo's image...

<http://www.mso.anu.edu.au/~rnm/C2006P1.htm>

This suggests the tail may still be visible tonight (the 18th) for those in dark skies. I recall at an LAS meeting in the early 1990s, when Rob McNaught attended as a special guest.

Steve Albers

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www.spaceweather.com

See archived pages Jan 18 through 22, 2007

Tail images; also see page 12.

http://spaceweather.com/comets/gallery_mcnaught_page13.htm

Space.com:

Joe Rao's "Night Sky Friday" column, accompanied by Mary's image:

http://space.com/spacewatch/070119_ns_great_comets.html

Tony Flanders at Sky Tonight

<http://skytonight.com/observing/home/5268431.html>

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Astronomy Picture of the Day, Jan 24, by Marco Fulle
<http://antwrp.gsfc.nasa.gov/apod/ap070124.html>

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Thanks for the alerts you guys,

Words cannot describe the awesome spectacle that I beheld tonight. Shades of Chesheaux's comet. I was expecting to use averted vision and see something small in angular extent. Instead what I saw was 8 to 10 synchrons in a dark sky with the comet below the horizon. They spanned an arc some 35° across. I'll have to measure more precisely with the stars I recorded. But unbelievable. Totally blew me away. It was like seeing 8 to 10 comets with tails all at once! The tallest synchrons were 20° in extent. I can't imagine what this comet must look like below the horizon!

What's more. I made the observation at the 7,000 foot level of Mauna Loa (to escape clouds), which means that the broad shoulder of that mountain blocked much of the view! On

Sunday I may be up Mauna Kea. We drove up and up through clouds, then, in the last 100 feet or so, broke through the clouds. I stepped out of the car (not dark adapted) and saw what looked like dim searchlights in the sky. Anyway, here's a shot with my friend Amos Meyers in the foreground to show perspective; this shot is at about 35-mm! What you see is the perspective through Amos's eyes!

Steve O' Meara

Hi Dan,

Saw your call for observations, positive or not, for Mcnaught's tail. Following is a report I made to the Astro-Photo mailing list yesterday...

-Dean

Subject: OT: McNaught's Synchrones from Arizona

From: ketelsen@as.arizona.edu

Date: Sun, January 21, 2007 11:00 am

To: astro-photo@seds.org

Hi All-

With the waxing moon, and rumors that the synchronic bands might still be around, I headed west from an overcast Tucson in search of sucker holes. I got out to Kitt Peak National Observatory under a gap in cloud banks. The Observatory had a fog shroud on top, so I stayed at the turnoff from the main highway and set up the G-11 with the Canon 20Da, so I wouldn't have to worry about guiding.

The bands popped out even before the end of twilight, and I shot with a couple lenses with the little time available. First was with a Nikon 16mm fisheye. This is 60 seconds (all subsequent shots are 60s @ F/2.8):

<http://alice.as.arizona.edu/~ketelsen/Mcnaught16mm60sSM.jpg>

I moved to a Nikon 50mm. This is a stack of 2 exposures, so 2 minutes total exposure. There were thin clouds around...

<http://alice.as.arizona.edu/~ketelsen/McNaught50mmAve2X60sSM.jpg>

I then wanted a wider view, so went for the Nikon 20mm for what turned into a sequence as the clouds moved in. Here is the first one:

<http://alice.as.arizona.edu/~ketelsen/Mcnaught20mm60sSM.jpg>

The clouds quickly moved in, though clear spots came thru once in a while, so I made a GIF out of the frames - 2 of them include a DPS helicopter... 60 second exposures every 150 seconds...

<http://alice.as.arizona.edu/~ketelsen/McNaughtSynchones.gif>

The bands made a much better impression than Jerry implied. The two brightest ones (left central and right) were readily visible, and with averted vision, they were all visible as an enhancement of the zodiacal light. They didn't take magnification well - the binocular view was just lumps of straited glows - no details visible... Anyway, I'm glad I made the effort to get out of town! Assuming they are in the same position tonight, the brightening moon will be smack among them!

-Dean Ketelsen

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Hi Dan-

I think I first heard of them from Brian Skiff of Lowell Observatory and about the same time saw your photos somewhere. Then Sky and telescope showed your photo and a call for observations I think on friday. I'm not sure if you were calling for observations or S&T was - I also sent the report to them, but haven't heard a thing. We've really been socked in here, but chased down some clear sky holes saturday. A couple hundred miles north of me, another observer was out too:

<http://www.perezmedia.net/beltofvenus/archives/000638.html>

Looking around, I think it was Jerry Lodriguss that first showed your pictures at:

<http://www.astropix.com/wp/>

I check it almost every day - he usually finds something interesting. Anyway, like I said in my report, the moon sunday would have been right in the middle of the bands. I was trying to shoot them from town tonight, averaging 8-30 second exposures, but no go with both the moonlight and Tucson glow. Not sure if it is worth going out tomorrow night. From a dark sky, the moon might be far enough away, and not yet bright enough to overwhelm them. What do you think?

-Dean

I did end up going out last night - what a spectacular night, even with the moon out - I thought I could occasionally spot M33 even though it was only about 30 degrees from the moon! Mercury was spotted too during twilight and visible for nearly 20 minutes.

So anyway, with the moonlight, I wasn't able to expose as long as last weekend when I easily caught the bands. I took a series of exposures, varying somewhat between 30 seconds and a minute. There ended up being 17 exposures and they are stacked into:

<http://alice.as.arizona.edu/~ketelsen/23Jan16mm17X40sSM.jpg>

I pretty sure all the streaks that are not coming out of the moon are synchronic bands from McNaught. In an attempt to see if there were any farther north, I moved to a 20mm lens and aligned the format N-S. This is a stack of 3X60 seconds (all shots at F/2.8, and ISO was on 800):

<http://alice.as.arizona.edu/~ketelsen/23Jan20mm3X1mSM.jpg>

I tried using a mask to keep the moonlight out of the camera, but I don't think this shot shows anything more than with the 16 fisheye. But note how bright the zodiacal light was, and even the North American Nebula is visible in the 3 minute exposure.

After that set of exposures, I drove up another mile up the observatory road and made a little GIF from about an hour's worth of exposures:

http://alice.as.arizona.edu/~ketelsen/4_meter.gif

I would have been happier if the domes moved around more, but I didn't have the choice of being choosy. I like making astronomical GIFs and can send links to more if you are interested, or just strip the filename off the links above and poke around - you will see some nice ones. Let me know if you have any questions...

Oh, one more thing - Chris Schur photographed the synchones monday night (23 January U.T. - note that mine above are labelled 23Jan, but were taken 24 January U.T.) and had his image posted on his site:

<http://www.schursastrophotography.com/xtiastro/mcnaught012207.html>

Keep looking up!

-Dean

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Animation of the China ASAT debris spread

I found the original video which is Hi-Def here:
<http://celestrak.com/events/asat.asp>

Nice soundtrack. Warning - 40.7MB file (but there are other things you can download there).

- George Roberts

<http://gr5.org>

**Comet McNaught with Longs Peak, Jan 9 2007
Dan and Andrew Laszlo, Boyd Lake by Loveland CO**

From Andrea Schweitzer

If a picture is worth 1K words, then a video is worth...
<http://haydenplanetarium.org/resources/ava/page/index.php?file=S1203strclust>
has a video of globular star cluster dynamics over time.

> And, while we're at it, why do clusters occur predominately in the "halo" surrounding a galaxy, rather than being dispersed relatively uniformly throughout the galaxy? After all, from the perspective of a galaxy overall, each cluster is a point-mass indistinguishable from any other point-mass within the galaxy's overall mass. And, the gas-clouds and dust-clouds (from which stars are born) certainly exist throughout a galaxy. So, what limits globular clusters to forming mainly in the galaxies' outer halo and not within its spiral arms or central bulge?

GC's do form in a relatively uniform distribution. However, we don't see many in the spiral arms and central bulge because: 1) dynamical effects are stronger there, which pull apart the old globulars over time, and 2) there are other brighter stars and glowing gases there.

Sorry I don't have time to write a longer response, but I hope you enjoy the video! For those who would like to delve further into this, google "dynamics globular star cluster" for research papers, because this is a big topic in astronomy research.

Best Looks

Moon By Saturn 2/2, 2/3; By Antares + Jupiter 2/11, 2/12;
By Mars 2/14; by Venus 2/19; by Pleiades 2/23
Mercury Very low in WSW first 2 weeks
Venus Low in WSW at dusk
Mars Low in SE at sunrise
Jupiter Low in S at sunrise
Saturn High in E by late evening
Uranus In Aquarius early eves. 1 degree from Venus 2/6, 7
Neptune Not visible in twilight

From:
Daniel Laszlo
2001 S Shields St Building H
Fort Collins CO 80526

TO:

International Space Station passes for Loveland – Fort Collins

February 2007

Date	Mag	Starts Time	Alt	Az	Max Altitude Time	Alt	Az	Ends Time	Alt	Az
29 Jan	1.6	05:40:22	14	N	05:40:49	14	NNE	05:42:30	10	NE
30 Jan	0.7	06:00:51	17	NNW	06:02:23	27	NNE	06:04:48	10	E
31 Jan	-0.9	06:21:22	13	NW	06:23:40	76	NNE	06:26:27	10	ESE
01 Feb	1.5	05:10:38	21	ENE	05:10:38	21	ENE	05:12:11	10	E
01 Feb	0.2	06:42:20	10	WNW	06:44:48	29	SW	06:47:14	10	SSE
02 Feb	-0.7	05:31:15	66	ENE	05:31:15	66	ENE	05:33:50	10	ESE
03 Feb	-0.1	05:51:55	32	SW	05:52:09	32	SW	05:54:39	10	SSE
11 Feb	0.2	18:41:22	10	SSW	18:43:59	30	SE	18:44:17	29	ESE
12 Feb	-0.9	19:01:49	10	SW	19:04:43	79	NW	19:04:52	76	N
13 Feb	1.0	19:23:02	10	W	19:25:18	28	NW	19:25:18	28	NW
14 Feb	-0.9	18:08:27	10	SW	18:11:24	88	NE	18:14:17	10	NE
14 Feb	2.3	19:44:47	10	WNW	19:45:38	14	NW	19:45:38	14	NW
15 Feb	0.7	18:29:32	10	W	18:32:12	32	NNW	18:34:34	12	NE
16 Feb	1.6	18:51:11	10	WNW	18:53:11	17	NNW	18:54:41	12	NNE
19 Feb	2.0	18:19:25	10	NW	18:20:35	12	NNW	18:21:45	10	NNE
21 Feb	1.9	19:02:20	10	N	19:02:46	10	N	19:03:05	10	NNE
22 Feb	1.9	19:22:09	10	NNW	19:22:55	13	N	19:22:55	13	N
23 Feb	1.9	18:08:38	10	N	18:08:50	10	N	18:09:01	10	N
23 Feb	2.0	19:42:12	10	NNW	19:42:46	14	NNW	19:42:46	14	NNW
24 Feb	1.6	18:28:17	10	NNW	18:29:46	13	NNE	18:31:17	10	NE
24 Feb	2.5	20:02:24	10	NW	20:02:39	12	NW	20:02:39	12	NW
25 Feb	0.8	18:48:15	10	NNW	18:50:35	21	NNE	18:51:19	19	NE
26 Feb	-0.5	19:08:21	10	NW	19:11:09	47	NNE	19:11:18	47	NE
27 Feb	-0.1	19:28:44	10	WNW	19:31:22	50	WSW	19:31:22	50	WSW
28 Feb	-0.3	18:14:13	10	NW	18:16:59	42	NNE	18:19:46	10	ESE
28 Feb	1.9	19:49:47	10	W	19:51:33	16	SW	19:51:33	16	SW
01 Mar	-0.4	18:34:29	10	WNW	18:37:21	62	SW	18:40:12	10	SE
02 Mar	1.8	18:55:19	10	W	18:57:29	19	SW	18:59:37	10	S

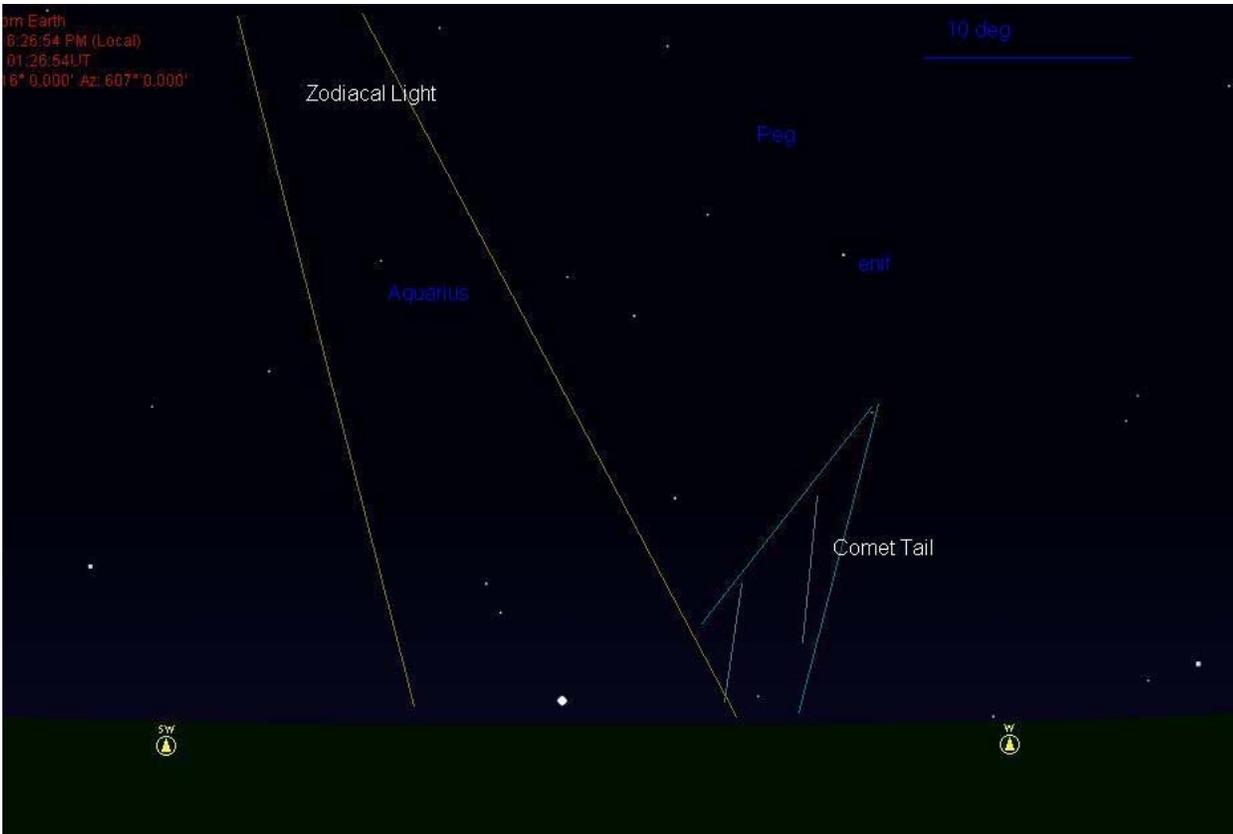
To check passes:

<http://www.heavens-above.com/main.asp?Loc=Fort+Collins&Lat=40.585&Lng=-105.084&Alt=1525&TZ=MST>



Comet McNaught C/2006 P 1 Dust Striae

Mary Laszlo 2007 Jan 18 1835 MST North of Wellington CO



Comet McNaught C/2006 P 1 Tail Streamers

Paul Robinson 2007 Jan 16 West of Boulder CO