

The Objective View

Newsletter of the Northern Colorado Astronomical Society

February 2012

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Next Meeting: February 2 7:30 pm

**What Time Is It? Timekeeping in Ancient and Modern Astronomy, by Dr. Suzanne Metlay
Front Range Community College**

Club Business at 7:15 pm

**Harmony Library Community Room
4616 S Shields St, Fort Collins**

NCAS Programs

March 1 Dr. Paul Lightsey HST and JWST
@ Coors Room, McKee Medical Center

City of Fort Collins Natural Area Program

Fossil Creek Reservoir 7 pm Feb 10
8 pm Mar 30

<http://www.fcgov.com/naturalareas/finder/bobcat>
<http://www.fcgov.com/naturalareas/finder/fcopenspace>

Dark Site Observing Dates

Feb 17, 18: Keota or other site, ask FRAC newsgroup

Other Events

Greeley History Museum First Friday 6pm Jan 6
Dr. Paul Lightsey, History of Space Telescopes

Chamberlin Observatory Open House, 7 to 10 pm
Jan 28, Mar 3, Mar 31, Apr 28, May 26, Jun 23, Jul 28
303 871 5172 <http://www.du.edu/~rstencil/Chamberlin/>

Cheyenne Astronomical Society 7pm Feb 17

<http://home.bresnan.net/~curranm/>

CSU Madison Macdonald Observatory Public Nights

On East Drive, north of Pitkin Street

Tuesdays after dusk if clear, when class is in session

Estes Park Memorial Observatory EVAS meeting,

7pm Feb 23 TBA <http://www.angelsabove.org/>

Little Thompson Observatory, Berthoud 7pm Feb 17

<http://www.starkids.org>

Longmont Astronomical Society 7pm Feb 16 Discovery of

Neptune, by Mike Hotka. <http://www.longmontastro.org/>

January 5 Program: Space Rockets – Men and Machines, by Jon Caldwell

In the 13th Century, the Chinese invented rockets. They remained a curiosity for hundreds of years. Writers and poets imagined space travel by balloons, sailing ships and horse-drawn carriages. Jules Verne in 1865 wrote “From the Earth to the Moon.” His research provided for a more realistic scenario. Launch was from Florida. The trip took 4 days. Rockets were used to maneuver to an ocean splashdown, all 100 years pre-Apollo. He inspired Konstantin Tsiolkovsky in Russia, Oberth and Von Braun in Germany, and Robert Goddard in the USA. Tsiolkovsky correctly interpreted Newton’s Third Law. He formulated the rocket equation in 1903. He wrote a series of essays in 1883. He was first to conceive the space elevator. Koroyov designed liquid O₂ and kerosene engines. Glushko designed liquid O₂/H₂ engines which were more efficient but more challenging to operate. Hermann Oberth independently derived the rocket equation, in his teens. His doctoral thesis in 1922 was rejected as nonsense. He was consultant for a 1929 movie, “The Girl in the Moon”. Von Braun never lost sight of his dream of going into space. He was almost executed the German Secret Service. Rudolph was in charge of V-2 rockets in WWII. He was instrumental in Saturn V development. Robert Goddard was also inspired by Verne, Percival Lowell and H.G. Wells. On Oct 19, 1899 he decided to build a machine that could travel to Mars. He also derived the rocket equation. He started his experiments on his aunt’s farm in Pennsylvania. He disliked publicity, and was mocked by an editorial in the New York Times in 1920. Charles Lindbergh supported him and helped arrange grants. He could then move to New Mexico, and went to Roswell to work in relative peace. Goddard had the first US patent for his multi-stage rocket. He had the first flight of a liquid fuel rocket, and first flight of a scientific payload. He developed pumps for rocket fuels. He invented the Bazooka. Jon showed images of A-1 Sputnik (280 tons), Juno 1 (40 tons), Vanguard, Redstone, Atlas, Titan, and Titan-Centaur. Juno and Redstone were developed from the V-2. Eisenhower did not want to provoke a space race, but it happened anyway. Atlas has to be pressurized or would

bend. Titan uses hypergolic propellant. They ignite on contact. It was used for the Cassini mission. Saturn rockets were developed in response to JFK. Jon showed a series of Russian boosters. The rocket with most launches is the Soyuz, with over 900 and a high success rate. A Russian space shuttle was developed. It could fly unmanned. The Saturn V is the most powerful rocket to be successfully launched. It stands twice as tall as the US space shuttle. It is 58 feet taller than the Statue of Liberty. It weighs 10% more than a naval destroyer. This is about equal to 5 of the largest steam locomotives. Stage 1 has five F-1 engines. They are 19 feet tall and 12 feet in diameter. Each makes 1.5 million lb of thrust, and 32 million horsepower. The gas mileage is 5 inches per gallon. Fuel circulates around the nozzle to keep it from melting. He showed the G force profile vs time for Apollo 8. Max acceleration was 4G. Advantages of liquid fuel are the ability to throttle or shut off. Tanks for liquid can be thinner and lighter. Solid fuel burns until gone, and the tank has to withstand combustion pressure. Liquid fuel is harder to handle and store. It takes time for launch preparation. Solid is stable for long periods. It can be launched in minutes. The rocket equation for the Saturn 1st stage is $\Delta V = \text{exhaust velocity} \times \ln(\text{beginning mass}/\text{end mass}) = 8300 \ln(6.1 / 1/6)$. It reached 40 miles altitude at that point. Jon then noted the current rocket stable. The proposed Ares class rocket uses a shuttle main engine and solid boosters. Proton rockets are like Delta or Titan boosters. Ariane 5 is used by ESA. Jon then reviewed the near tragedy of Apollo XIII. Jim Lovell was the most experienced astronaut, fortunately in a desperate 3 days to improvise their way home. The problem O₂ tank was made by Beech Corp in Boulder. It was insulated so well it could keep ice from melting for 12 years. It was designed for 28 volts, but was subjected to a 65 volt test. It had a heater and fan but no thermostat. The temp gauge gave a maximum of 80 degrees. Prelaunch, the tank heater was run to boil off oxygen, rather than forcing it out with gas. The tank temp was probably 1000 degrees F, which fried the wire insulation. It was then prone to explode when partially full and stirred in flight. We can be truly grateful the intrepid crew and ground team pulled off the rescue.

January 2012 NCAS Business

Elected for 2012 NCAS officers are: President: Robert Grover; Vice President Tom Teters; Treasurer David Auter; Secretary David Chamness. Tim Antonsen showed his images of the new proposed NCAS logo. Outreach events reached a total of 70 for the year, and a total of over 4000 visitors! Next events are at the Waverly community night, then at Fossil Creek Reservoir. Night Sky Network pins should be here next month. The club account stands at \$422. Greg Halac moved for an increase in club dues to \$20 per year. The motion was seconded and approved.

From Mike Hotka: Cheap Cure for Aperture Fever

Bruce Heath (member of Denver Astronomical Society), Mike Roos (member of Northern Colorado Astronomical Society)

and myself just returned from a trip to Comanche Springs Astronomy Campus, near Crowell, TX (<http://www.3rf.org/sciences-2/comanche-springs>). It was a wonderful experience I invite EVERYONE to take advantage of. We observed under Texas skies Friday through Monday nights. We used their 18 inch, 20 inch and 30 inch telescopes. It was a fabulous experience. I looked at extremely faint flat galaxies, southern Arp galaxies and some Abell and Hickson Galaxy Clusters, Bruce was looking at Herschel objects and Mike was looking at everything else. The highlight of the trip was the warm hospitality the 3RF staff extended to us during our stay. They bent over backwards to ensure we could observe. The second highlight of the trip for me was using the 30 inch telescope, two nights in a row. Totally AWESOME!!! The pick object(s) was the Abell 426 galaxy cluster in Perseus. I walked the 30 inch up and down this cluster, counting over 35 galaxies over about a 5 FOV length of sky. Not only could you see lots of galaxies, they were obvious in this telescope. I highly recommend this facility for those with aperture fever and can't come up with the money to buy a bigger scope. If you have 18 inch fever, they can cure that. If you have 20 inch fever, they can cure that. If you have 30 inch fever, they can cure that also. Just an 8 hour drive from Denver and you will be cured...well at least for this episode of aperture fever. I plan to go back for I feel another fever coming in the fall ;-). If you have any questions and want to reserve some observing nights at this fine facility, contact Cady Alvarado (cadya@3rf.org). If you have any other questions, Mike, Bruce or myself can answer them for you.

On another note, my first observing buddy (mid 1980s) from the Dallas club (Texas Astronomical Society) was also at the 3RF ranch during this trip. He returned my Astronomical League's Messier observing guide I loaned him in about 1988. He still had it after all these years. In looking at the log in the back of the book, my first recorded observation for the Astronomical League was on July 12, 1986. I was looking at M57. That is when my madness started :-o Mike

This sounds quite interesting. Thanks for sending the post. I checked out their web site, and there's no information on rates (or accommodations) there. Before I try to contact them, I'm wondering if you could give me a ballpark cost for a night (or several hours?) on, say, the 30" scope. I left my observatory behind in Silver City, NM (SW corner of NM) about three years ago and now have a non-portable 16" scope I built (picture below) with no home (and no New Mexico-esque dark skies around here!), so I could use an aperture (and dark sky) fix(!). Michael Byorick

Hello...

They have a bunkhouse that is very nice. The bathrooms are currently in a trailer just outside the bunkhouse about 100 feet. The cost to use the bunkhouse is \$10 per night. The cost to use of the scopes is FREE!!! They ask for a \$100 deposit just in case you break something. I don't know when you would get the \$100 refunded, for I was so impressed with the facility, I

donated my \$100 to them. They are a 501(c)3 organization, so the \$100 is tax deductible. They have a kitchen area, with a small microwave, a refrigerator and freezer, plastic bowls, plates, forks, spoons and knives. All you need to bring along is astronomical references, lists of objects, sleeping items, toiletries, etc. The showers are winterized right now, but in a month or two, they will be turned back on. We took a shower at Copper Breaks State Park for \$3. Very nice. The State Park is between Crowell and Quantinah, TX. Mike

From Robert Arn: Fall, Not Autumn

Went out a few week ago - about an hour after our last snowfall and I got really lucky. I was shooting Horsetooth Reservoir and caught a meteor that was bright enough to leave a reflection in the still water.

<http://www.astroarn.com/nightscape/h3b52b8ee#h3b52b8ee>

Thanks for looking, Robert

From Andrea Schweitzer: 2012 Hoaxes and Resources for Teaching About Them

I think we all need to brush up a bit on this, so that we can answer the questions likely to come from the public in a friendly and informed way, and also be able to throw in some good science as well!

The Astronomical Society of the Pacific recently published a special issue of "The Universe in the Classroom" focused on 2012 hoaxes and what to say from a useful, educational perspective. It also has several good diagrams to help explain the actual science and astronomy.

I hope this is helpful to you -- it was to me!
Andrea Schweitzer (from the Little Thompson Observatory)

2012 Hoaxes from "The Universe in the Classroom"
<http://www.astrosociety.org/education/publications/tnl/79/79.htm>

2012 has become the kitchen sink of hoaxes. What with the non-existent planet Nibiru, the rollover of the Maya Long Count, a long-expected and non-existent conjunction of planets, some sunspots, a lack of reversal in the Earth's magnetic field, and the continued alignment of the Earth, Sun, and galactic center, 2012 has a lot that has been sensationalized as part of its apocalypse story. This hoax rolls pretty much every astronomy-related doomsday thread into one.

From Tom Fay: SDSS Viewer

I finally got off my couch and put together a viewer web page for SDSS images.

Our web master has been kind enough to add it to the NCAS web site (under "What's New"). To jump right in, here's the link:

<http://www.ncastro.org/SdssViewer.htm>

The images are retrieved from the Sloan Digital Sky Survey database, rendered on the fly by their data pipe line. All I did was provide a way to select the coordinates and scale (arcsec/pixel) to that image rendering tool.

The primary source is their data release 8, which covers 14000 square degrees of the sky. (coverage picture attached)

There are two 'play lists' of images you might find interesting: the SDSS Messier list covers the Mxx's that are in the image coverage of SDSS. The other is a list of images collected by Galaxy Zoo users as their 'breathtaking' list.

You can use one of the lists with 'next' and 'previous', or type coordinates or object name in the entry box to view other objects. There are buttons to move the image around and zoom in/out. I hope to add more lists over time: there are quite a few lengthy Galaxy Zoo forum topics nominating best spirals, collisions, etc.

You'll notice that stars often turn out red: that's because of trying to get the rest of the image life-like with a combination of the non-visual filters used by SDSS. Also, since SDSS has to stitch together various native images to produce the composites you see, there are sometimes variations in saturation in parts of the image. Sometimes that's interesting, sometimes its annoying. The blue/green/red lines are typically caused by satellites wandering through the image for a particular filter exposure. If you find a red-green-blue stop light effect, that's probably an asteroid.

From Rob Grover: M42 Test Shot – (Autoguider Setup)

Was out in my driveway last night, in the middle of Ft. Collins, figuring out a new (to me) toy. Wanting to eliminate the need for a laptop for imaging, I mentioned to my cousin last summer @ WUTS that I was curious about the old ST-4. He said he had a very lightly used one and was willing to part with it. Not much happened until I went to Texas for the Christmas holiday to visit my aunt, uncle & cousins. Dennis gave me the ST-4 as a Christmas present. Thanks, cousin!

Needed to get the rest of the setup together – an 80mm guide scope, rings and side by side adapter. Last bits arrived yesterday, so I set up primarily to get the ST-4 figured out and properly adjust the accessory flip mirror that came attached to the ST-4. Mirror has a reticle that gets the guide star centered on the chip. Reticle and chip needed to be realigned, since I changed the orientation of the mirror in relation to the

camera. The mirror also works to focus the camera. Quite handy. Just need to get a 12V power adapter to replace the transformer powering the ST-4 so I can plug it into a deep cycle instead of using 120V or an inefficient inverter.

Worried about flexure issues, I opted for mounting the imaging scope & guidescope on a side by side adapter instead of piggy-back. Shopped around and felt the ADM unit looked like the best option. When it arrived yesterday and I opened the package, I was not disappointed. What beautifully executed design and machining. It is fairly heavy @ 4+ pounds, but I'm sure it won't be the source of any flexure.

Seeing was atrocious (no surprise), but I did manage to get the ST-4 to calibrate. Took setting the scintillation factor up to 10. Good seeing should be around a 1 or 2, fair seeing about a 5. Recommendations for any higher settings are to pack it in and go visual for the night. Since this was a test session, the seeing quality wasn't very important – beyond getting at least decent tracking.

Tried various exposure settings on the imaging camera, ranging from 4 to 12 minutes. The long ones were very overexposed, but I was looking for star quality, not any usable data. Looks like the ST-4 will be great. All exposures exhibited nice, round stars. Control box showed the largest correction I observed over a two hour period as 2 pixels on the guider's tiny chip. Considering the seeing, great results. No wonder the ST-4 has such a good reputation.

Slewed over to M42 to take a stab at some usable data. Nice to use something big & bright when testing and under urban skies. The attached image is four frames of 4 minutes each, stacked and processed some in Nebulosity and Photoshop. I took no darks or flats for this. Didn't even plan to post it while I was imaging. The core is blown out (no surprise) and the wispy nebulosity at the lower right of the frame is really faint, but the remaining parts of the image looked OK to me. Even the Running Man came through the skyglow. Plan to do it right from a dark location sometime in the near future. Flats would have taken care of the vignetting. Cold enough that the noise isn't too terrible. However, the ST-4 cables became quite stiff – particularly the one for the camera, which is not all that pliable in the warm.

If I'm not hampered by the "New Astro Toy Curse", I'll be eagerly anticipating the upcoming new moon phase!

Robert Grover

Image & Equipment Details:

Camera	Canon EOS DIGITAL REBEL XSi Hap Griffin Modified
Date/Time	1/13/2012 10:09:40 PM

Shooting Mode	Manual Exposure
Shutter Speed	241
ISO	1600
White Balance	Custom
File Size	18645KB

Optical Path	Explore Scientific 102ED f/7 Apochromatic Triplet Refractor + Astro Tech Field Flatteners
Mount	Orion Sirius
Guidescope	Orion ST-80 f/5
Autoguider	SBIG ST-4
Miscellaneous	ADM Side by Side Adapter, Aperture Intervalometer & Homemade Bahtinov Mask

Lunar Straight Wall and Crater Birt Video, Kaguya Data

From SameOldFrank@Yahoo.com:

The "Straight Wall" and the crater "Birt" [and the fascinating surface features in the midst of that vicinity] have always been very favorites of mine. Of course, our Earthly view-angle and max mag have been unchanged for generations. But I recall a couple years ago a lunar orbiter [of Japanese origin, I believe] began photographing the lunar surface in close-up / high-res detail. Does anyone out there know if they've gotten any closer & higher-res images of the Wall/Birt region, ideally in various viewing-angles and solar lighting-angles, and - if so - the URLs of links to images? Frank

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Thanks for bringing this up. I also missed this from 2009.

Protect your computer if you startle easily, you might spritz a little coffee with this one. Dan Laszlo, NCAS Ft Collins

<http://www.youtube.com/watch?v=DyMG99zestE>

Best Looks

Moon	By Mars Feb 10; by Saturn Feb 12, 13; By Mercury Feb 22; by Venus Feb 25; by Jupiter 26
Mercury	Low in W at sunset, last week of month
Venus	Bright in SW early evening
Mars	High in S predawn
Jupiter	High in SW in evening
Uranus	Low in W at dusk in Pisces



Rob Grover

International Space Station Passes for Loveland – Fort Collins

February 2012

Date	Mag	Starts			Max. <u>Altitude</u>			Ends		
		Time	<u>Alt.</u>	<u>Az.</u>	Time	<u>Alt.</u>	<u>Az.</u>	Time	<u>Alt.</u>	<u>Az.</u>
1 Feb	-2.0	05:27:03	31	N	05:27:34	33	NNE	05:30:33	10	E
2 Feb	0.0	04:33:05	12	ENE	04:33:05	12	ENE	04:33:32	10	ENE
2 Feb	-3.3	06:05:29	21	WNW	06:07:25	63	SW	06:10:37	10	SE
3 Feb	-2.5	05:11:34	49	E	05:11:34	49	E	05:14:12	10	ESE
3 Feb	-1.2	06:45:02	10	W	06:46:52	14	SW	06:48:41	10	SSW
4 Feb	-2.3	05:50:08	28	WSW	05:50:38	30	SW	05:53:29	10	SSE
5 Feb	-0.9	04:56:22	19	SE	04:56:22	19	SE	04:57:27	10	SE
6 Feb	-0.9	05:35:07	12	SSW	05:35:07	12	SSW	05:35:35	10	SSW
11 Feb	-2.3	19:00:41	10	SSW	19:02:54	31	SSE	19:02:54	31	SSE

12 Feb	-1.5	18:05:05	10	S	18:07:05	16	SE	18:09:05	10	E
12 Feb	-1.2	19:39:57	10	WSW	19:41:30	25	W	19:41:30	25	W
13 Feb	-3.6	18:43:13	10	SW	18:46:18	76	SE	18:47:33	33	ENE
14 Feb	-2.5	17:46:55	10	SSW	17:49:43	32	SE	17:52:32	10	ENE
14 Feb	-1.8	19:23:08	10	W	19:25:53	28	NNW	19:25:53	28	NNW
15 Feb	-2.8	18:26:03	10	WSW	18:29:04	52	NNW	18:31:42	13	NE
15 Feb	0.0	20:04:02	10	NW	20:04:05	10	NW	20:04:05	10	NW
16 Feb	-1.2	19:06:27	10	WNW	19:08:47	19	NNW	19:09:49	17	N
17 Feb	-1.9	18:09:04	10	W	18:11:50	29	NNW	18:14:37	10	NE
17 Feb	-0.3	19:47:32	10	NNW	19:47:51	11	NNW	19:47:51	11	NNW
18 Feb	-0.9	18:49:51	10	NW	18:51:40	14	NNW	18:53:26	10	NNE
19 Feb	-1.3	17:52:13	10	WNW	17:54:35	20	NNW	17:56:58	10	NNE
19 Feb	-0.6	19:30:50	10	NNW	19:31:20	11	N	19:31:20	11	N
20 Feb	-0.7	18:33:14	10	NNW	18:34:29	12	N	18:35:45	10	NNE
21 Feb	-0.8	19:13:31	10	NNW	19:14:30	11	N	19:14:39	11	N
22 Feb	-0.7	18:16:24	10	NNW	18:17:15	11	N	18:18:07	10	NNE
22 Feb	-0.3	19:52:20	10	NNW	19:52:28	11	NNW	19:52:28	11	NNW
23 Feb	-1.0	18:55:44	10	NNW	18:57:13	13	N	18:57:54	12	NNE
24 Feb	-0.8	17:58:59	10	NNW	17:59:56	11	N	18:00:52	10	NNE
24 Feb	-1.2	19:34:24	10	NNW	19:35:44	18	N	19:35:44	18	N
25 Feb	-1.3	18:37:46	10	NNW	18:39:47	16	NNE	18:41:13	12	NE
25 Feb	-0.1	20:13:16	10	NW	20:13:35	12	NW	20:13:35	12	NW
26 Feb	-2.5	19:16:26	10	NW	19:19:07	35	NNE	19:19:07	35	NNE
27 Feb	-1.8	18:19:42	10	NNW	18:22:12	22	NNE	18:24:41	10	ENE
27 Feb	-1.2	19:55:29	10	WNW	19:57:05	26	WNW	19:57:05	26	WNW
28 Feb	-3.5	18:58:28	10	NW	19:01:33	66	NE	19:02:46	33	ESE
29 Feb	-2.5	18:01:36	10	NW	18:04:27	33	NNE	18:07:18	10	E
29 Feb	-1.5	19:37:53	10	WNW	19:40:31	25	SW	19:40:57	24	SSW

ISS predictions can be obtained from:

<http://www.heavens-above.com/main.aspx?lat=40.4997&lng=-105.05736&loc=Fort+Collins+CO+USA&alt=0&tz=MST>