

The Objective View

Newsletter of the Northern Colorado Astronomical Society

May 2011

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Next Meeting: May 5 7:30 pm

**Show and Tell
by NCAS Members**

Club Business at 7:15 pm

**Fort Collins Museum, 200 Matthews St
Fort Collins CO**

http://nightsky.jpl.nasa.gov/club-view-directions.cfm?Adress_ID=2810

NCAS Programs

June 2 Max Moe Cosmic Duos-When Binary Stars Interact

July 7 Dr. Bob Stencel Epsilon Aurigae: Exiting Eclipse

Aug 4 Bob Michael Atacama Desert: Earth's Exoplanet

NCAS Public Starwatch at Fossil Creek Reservoir

May 6 Fri 8:30 pm

June 18 Sat 9 pm

http://www.co.larimer.co.us/naturalresources/fossil_creek.htm

City of Fort Collins Natural Area Program at Sunset

Bobcat Ridge: May 19, June 23

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

Rocky Mountain National Park Skygazing

Upper Beaver Meadows Trailhead at dusk.

June 10, 27; July 8, 22; Aug 5, 19

Dark Site Observing Dates

May 6, 7, 27, 28: Keota, or RMNP, ask FRAC newsgroup

Other Events

Chamberlin Observatory Open House, 7 to 10 pm

May 14, June 11, July 9, Aug 6, Oct 1, Nov 5, Dec 3

303 871 5172 <http://www.du.edu/~rstencil/Chamberlin/>

Cheyenne Astronomical Society 7 pm May 20 TBA

Cheyenne Botanical Gardens

Weekend Under the Stars is confirmed July 28-30 2011

<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. 7 pm May 26

<http://www.angelsabove.org/>

Little Thompson Observatory, Berthoud 7 pm doors open;

7:30 program May 20. Dr John Ristvey, McREL, Dawn

probe at Vesta <http://www.starkids.org>

Longmont Astronomical Society 7 pm May 19. Bill

Tschumy, Seeing the Milky Way. IHOP 2040 Ken Pratt

Blvd <http://www.longmontastro.org/>

April 7 Program: All-Sky Camera Design and Construction

By Vern Raben

Vern's interest in all sky cameras was stimulated by Chris Petersen's system at his Cloudbait Observatory. Dr. Elkins at University of Colorado, Boulder offered a mountain site with power and internet access. This LAS project started with the goals of near real time images. They would monitor transparency and cloud conditions. Meteor counts and satellite passes would be recorded. A fisheye lens on a video camera is protected by a transparent dome. A cable connects the camera to a computer for compression and recording. There are limited camera choices, but several security models have sufficient sensitivity and resolution. Existing software ran on the Windows 95 OS, so Vern tackled new software. Images were stacked to integrate and a difference was calculated for each image for motion detection. A fan is needed to keep the dome from frosting. The unit has a temperature range from -15 to +120 F. Power resistors were added for heat. First camera was the PC164 EX2 Supercircuits camera. It runs on 12 VDC and detects 0.002 lux. Cost was \$160. Vern has since got a Samsung SD4000 for \$380. It is color, 0.0002 lux and 600 lines displayed. It uses 24 VAC or 12 VDC. The fisheye lens is \$140, or \$160 with autoiris which is good. The site is jointly run by CU

Boulder and NOAA. The camera went on a tower well above ground level. Approval took forever, due to trouble getting an IP address from CU. First image was on October 14 2010. The Milky Way was clear but there was a ton of noise. A better cable and RFI beads were needed. Vern showed a fine sample movie for the night of January 1 2011. Raw frames showed mag 2.5 stars, and stacking 20 seconds of images gave mag +4. Software combined 300 frames. In mid-February, noise in the camera went way up. It was able to get the pass of Discovery + ISS. It went dead on March 13, probably a simple thing like a cable. The site is inaccessible from November to April. A substantially better camera would be 3 times the cost. Vern then outlined his software. It calculates a moving average. This is done due to clouds. The mountain camera is 8 bit. Vern's latest camera is 14 bit so can process for more depth. He processes in real time, 40 frames per second. Field is cropped to 480 pixels square. It uses linux for operating system. It saves motion and average. It can output FITS files. One night creates a 300-400 Mb file. The image has some distortion. To analyze meteor paths, visible stars are detected and their locations compared to theoretical angles. Zenith distance is computed. The lens is good within 45 degrees of zenith, dicey below that. The local coordinates of meteors is determined and the altitude and velocity can be calculated. RA and Dec will give the radiant. You need multiple stations to calculate the ground path and altitude. Vern showed a diagram with the geometry of a meteor track. The process was significantly more difficult and interesting than expected. The site and the software were challenging. The Mark II unit will add a Peltier cooler for temperature control. He hopes his home unit will be operating soon.

May update:

As many of you know I've been playing with cameras to take all sky images for about a year now. I bought a new one about a month ago, a Samsung sbc-4000. Gary came over Saturday afternoon and helped me install it on the roof of our house here in Louisville.

The current generation of security cameras have "sense up" modes -- this appears to be a combination of time exposures merged with shorter exposures giving the video camera the ability to image very low light scenes and and still detect moving objects. This is great not only for surveillance applications but also for viewing the night sky.

Camera switches from color to black and white mode as the sky grows darker. I'm still experimenting with settings. Stars to magnitude 5.2 are visible in a 0.4 sec exposure. Camera can take up to 10 seconds exposures but light pollution is an issue longer than about 4 sec.

Camera is above most lights in the neighborhood but unfortunately there are still some visible. The Louisville rec center is the primary culprit. These are a problem as they affect the exposures the camera takes. I think I can set exposure zones in the camera settings to compensate though.

Camera should be live on the web in maybe a day or two - I still have some equipment to shuffle around.

Vern Raben is the Astronomical League Webmaster. He is Longmont Astronomical Society President. He started observing at 9 years old and has built a number of telescopes. He enjoys video imaging of comets, planets and the Moon. He completed a BS degree in electrical engineering and computer science, and an MS in computer information systems. The NASA Office of the Chief Engineer awarded him a tech brief award for his Solar Active Region Display System. It is used by NASA, NOAA, DHS, USAF and many others.

April 7 2011 NCAS Business

President Robert Grover called the meeting to order. Gerry Reynolds brought his telescope, which he has donated to the club for our new solar filter. He machined adapters to fit. Tom Teters has preliminary approval for NCAS events at the Soapstone Prairie Natural Area. Tom has received agreement from a Weld County inspector regarding lighting violations at oil rigs by the Keota observing site. Treasurer Dave Auter gave his report. Opening of the new Fort Collins Museum and Discovery Science Center in 2012. The outreach event schedule was announced by Greg Halac. Monroe Elementary had over 200, Odea Elementary had over 200, and Lopez Elementary had about 100 visitors.

From Bill Tschumy: New All-Sky Mosaic

This new all sky mosaic by an amateur is pretty amazing. Nice detail as you zoom in. Click on the "Interactive 360" picture to play around with it. Clicking the Info button will display constellations in case you're lost.

<http://skysurvey.org/>

Bill Tschumy

Think Astronomy -- Longmont, CO

<http://www.thinkastronomy.com>

From Tom Teters: Dawn Craft Approaches Vesta

News release: 2011-130

May 3, 2011

Dawn Reaches Milestone Approaching Asteroid Vesta

The full version of this story with accompanying images is at:

http://www.jpl.nasa.gov/news/news.cfm?release=2011-130&cid=release_2011-130

PASADENA, Calif. - NASA's Dawn spacecraft has reached its official approach phase to the asteroid Vesta and will begin using cameras for the first time to aid navigation for an expected July 16 orbital encounter. The large asteroid is known as a protoplanet a celestial body that almost formed into a planet.

From Andrea Schweitzer: Rotating Sunspots Power Solar Flare

19 April 2011

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** Additional contacts appear below. **

Text & Graphics:

<http://www.ras.org.uk/news-and-press/217-news2011/1958-rotating-sunspots-spin-up-a-super-solar-flare>

ROTATING SUNSPOTS SPIN UP A SUPER SOLAR FLARE

The largest solar flare recorded in nearly five years was triggered by interactions between five rotating sunspots. Researchers at the University of Central Lancashire studied observations of the flaring region of the Sun taken by NASA's Solar Dynamics Observatory over a period of five days. Dr. Daniel Brown will present the findings at the RAS National Astronomy Meeting in Llandudno, Wales, on Wednesday 20th April 2011.

"Sunspots are features where magnetic field generated in the Sun's interior pushes through the surface and into the atmosphere," said Dr. Brown. "Twisting the Sun's magnetic field is like twisting an elastic band. At first you store energy in the elastic, but if you twist too much the elastic band snaps, releasing the stored energy. Similarly, rotating sunspots store energy in the Sun's atmospheric magnetic field. If they twist too much, the magnetic field breaks, releasing energy in a flash of light and heat which makes up the solar flare."

The flare occurred at 1:44 a.m. on 15th February 2011, when the Sun released the largest recorded solar flare since December 2006 and the first flare of the current solar cycle to be classified as the most powerful "X-class". Looking at five days of SDO observations that included this flare, Dr. Brown found that the active region that flared contained five newly emerged sunspots. All five of the sunspots rotated between 50 and 130 degrees, some in a clockwise and some in an anticlockwise direction, over the five days of observations.

"Rotating sunspots are an extremely efficient way to inject energy into the magnetic field of the Sun's atmosphere," said Dr. Brown. "With five sunspots rotating at the same time enough energy has been injected into the atmospheric

magnetic field to produce the largest solar flare seen for almost 5 years."

In addition to the large X-class flare, the same region also released over 40 smaller flares during the five days studied.

NAM 2011 Press Office:

(09:00-17:30 BST, 18-21 April only)
Conwy Room, Venue Cymru, Llandudno, Wales
+44 (0)1492 873 637, +44 (0)1492 873 638

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Image:

<http://www.ras.org.uk/images/stories/NAM/2011/images/brown.jpg>

Image caption: The Sun at 1:50 a.m. on 15th February 2011 using composite data of the Sun's surface from SDO/HMI and the Sun's million degree corona from SDO/AIA. The cutout region shows (bottom) the five rotating sunspots of the active region (AR 11158), and (top) the bright release of light from the X class flare.

Image credit: Image produced by D. Brown (UCLan). Data courtesy of NASA/SDO and the AIA, EVE, and HMI science teams.

A movie of the SDO observations to accompany this release can be downloaded at:

http://www.star.uclan.ac.uk/~dob/sdomovie/rss14_hmi_aia_cotext.mpg

(Movie in mpeg format, approx. 32 MB in size)

Caption: This movie shows the dynamics of the Sun's atmosphere over 6 days as seen by NASA's Solar Dynamics Observatory (SDO). It uses composite data from two instruments: the surface data is from SDO/HMI, and the atmospheric data (at around 1,000,000 degrees) is from SDO/AIA. The right-hand inset shows a close up of the active region (11158) from both of these instruments. The sunspots are seen to emerge and undergo a twisting motion in the solar surface. The response of the coronal loops in the atmosphere shows rapid brightenings throughout the movie which are the solar flares being released.

Movie credit: Movie produced by D. Brown (UCLan). Data courtesy of NASA/SDO and the AIA, EVE, and HMI science teams.

Eta Aquariid Meteors Peak May 6**Best Looks****Cluster of Mercury, Venus, Mars and Jupiter in May**

Moon By Mercury May 1; by Saturn May 13
 By Jupiter May 29; by Mars May 30
 By Venus May 31

Mercury
 Venus
 Mars
 Jupiter
 Saturn
 Uranus
 Neptune

By Venus and Jupiter May 11
 Bright in dawn E
 By Venus and Mercury May 21
 Low in E at dawn
 In S in evening
 Predawn in Pisces
 Predawn in Aquarius

International Space Station Passes for Loveland – Fort Collins

May 2011

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>
4 May	-3.3	21:02:47	10	WNW	21:05:37	56	SW	21:07:15	22	SSE
5 May	-1.3	21:27:25	10	W	21:29:19	16	SW	21:30:24	14	SSW
6 May	-3.1	20:15:23	10	WNW	20:18:13	54	SW	20:21:01	10	SE
7 May	-1.1	20:39:52	10	W	20:41:44	16	SW	20:43:35	10	S

ISS predictions from:

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