

The Objective View      January 2001  
Newsletter of the Northern Colorado Astronomical Society

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Meetings first Thursday of each Month

**Next Meeting:**  
**January 4      7:30 PM**  
**Astronomical Image Processing, by**  
**Gerry Reynolds**

Gerry will bring a slide scanner, so bring a few slides you would like to digitize

Club business will precede the program at 7PM  
Elections for 2001 Club Officers

**January 4 NCAS Meeting Directions**  
Discovery Center Science Museum  
703 E Prospect Rd, Fort Collins  
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, enter the West Wing at its NE corner. From I-25, take Exit 268, West to Lemay Ave, continue West 1/2 mile, see Discovery Center on the left.

**Starwatch at at Discovery Center**

Scopes are appreciated at monthly evening starwatches. Set up in the South parking lot on the Friday nights near 1st quarter Moon. Contact Dan Laszlo if you can come, 498-9226, djlaszlo@aol.com. Weather cancellations will be posted at 472-3990. Events to come:

January 12	7 PM
February 2	7 PM
March 2	7 PM
March 30	7 PM
April 27	8 PM
May 25	8:30 PM

**NCAS Star Party Dates, January 19, 20, 26, 27**

Cactus Flats site is on undeveloped parcel of prairie about 6 miles west of Briggsdale. Take Colo Highway 14 East from I-25 (Exit 269). From there about 19 miles east to Ault. Continue 18 miles East of Ault, at County Rd 65 (milepost 170), turn North, go one mile. Site is through the gate on the

right (no road), close gate and set up. Beware of the cactus! Our standard nights are the weekend of the New Moon, sometimes a weekend before and after. If the weather is bad on a Friday night we will try the following night. The site is now officially wheelchair accessible, but there are no facilities so bring essentials. Call Tom Teters, tom@ezlink.com, with questions about the star party status, site or dates, 482-5702 or 482-0807.

**The First N.C.A.S. Invitational Star Party-**  
**May 17-19, 2001**

This will be the First Star Party of the 2001 season to be held in the M.A.R.S. area. It will be held at Virginia Dale, Colorado (Two Chicks Paintball), just South of the Wyoming border on Hwy 287. This is 40 miles north from the 'Y' in N. Ft. Collins, Colorado and approximately 28 miles South of Laramie, Wyoming at an elevation of 7560'. More to come from Tom T.

**Other Events**

Little Thompson Observatory Star Night, Berthoud 7 p.m.  
Jeff Rautus      Archaeoastronomy  
January 19      <http://www.starkids.org>

Denver Museum of Nature and Science 303 322 7009  
<http://www.dmns.org/space/current.htm>  
Solar telescopes on West Patio January 13 11 AM to 3 PM

Cheyenne Astronomical Society  
<http://users.sisna.com/mcurran/events.htm>  
January 19      7 p.m.

Open House, Chamberlain Observatory, dusk  
<http://www.du.edu/~rstencil/Chamberlin/>  
January 6      303 871 5172

Longmont Astronomical Society 7PM  
<http://laps.fsl.noaa.gov/cgi/las.cgi>  
January 18 Longmont Christian School 550 Coffman St

DAS Star Party at Deer Trail Site  
January 26 - 28 For more info:  
<http://www.denverastro.org>

### **January 4 Meeting: Solar Ultraviolet Astronomy, by Tom Woods, LASP**

From David Chamness. Our speaker was Tom Woods from the Laboratory of Atmospheric and Space Physics at the University of Colorado, Boulder. He launches sounding rockets to 200 miles altitude in New Mexico to measure solar ultraviolet (UV) irradiance.

#### **Solar Irradiance**

1370 watts per square meter total solar irradiance.  
16 watts per square meter UV solar irradiance.  
0.05 watts per square meter energetic particles.

Energetic particles from the sun come to earth in coronal mass ejections and the solar wind. Earth also gets 0.15 watts per square meter from joule heating, caused by the energetic particles bouncing from North to South magnetic poles above the Earth.

#### **Earth's atmosphere:**

0-20 kilometers Troposphere  
20-50 kilometers Stratosphere (and ozone)  
50-85 kilometers Mesosphere  
85 kilometers up Thermosphere

The temperature of the atmosphere at 200 kilometers altitude is 1000 degrees Kelvin due to extreme ultraviolet absorption. Solar light peaks at 550 nanometers wavelength, in the green. The solar spectrum contains absorption lines above 207 nm, emission lines below 207 nm.

It takes about 27 days for the sun to rotate once, and the equator rotates faster than the poles. One active region or sunspot may last 1-5 months. There is an 11 year sunspot cycle and a 22 year magnetic cycle. Differential rotation draws material toward the equator. Sunspots migrate from poles to equator in the 11 year cycle. We are almost at solar max now. At solar minimum we see a few spots from the equator, and a few from the opposite magnetic cycle at the poles. A large sunspot may reduce solar light 1%, but solar max has more light due to bright faculae when sunspots decay. Sunspots come in pairs due to the north-south magnetic field loops. We can measure a small doppler shift in emission or absorption lines to tell north from south.

#### **Solar atmosphere:**

0-400 km Photosphere  
200-2250 km Chromosphere  
2250-2300 km Transition, a sudden jump in temperature  
2300 km up Corona

An aurora is red or green from atomic oxygen, blue from nitrogen. The rocket payload measures airglow UV nitrogen emission. UV dissociates O<sub>2</sub>, extreme UV ionizes atomic

oxygen, a free electron ionizes nitrogen, and the UV emission from nitrogen when an electron is recaptured is measured.

There are 3 instruments to measure UV. 125-160 nm Far UV is measured with CaF lenses, mirror, and grating. 25-195 nm Extreme UV is measured with mirrors and a grating. 0-35 nm XUV is measured with a foil filter and a detector.

The rocket is launched at local noon. The Terrier motor burns 5 seconds with a thrust of 10 g's at the end. The Black Brant motor burns from T+12 to T+44 seconds and pushes the rocket to Mach 7. Payload separation occurs at 84 km altitude, and it begins taking data at 127 km. Apogee is 290 km, and tumbling begins on descent at 100 km. Data taking ends at 84 km, the chute is deployed at 5 km, and it lands 50 miles downrange.

The rocket is 16 meters tall, there are 9000 solder joints, and the instruments are evacuated before launch.

Tom showed a video taken from the payload showing the rocket taking off, spinning during ascent, coasting higher, and then landing by parachute.

### **NCAS Business for December 7**

Nominees for NCAS 2001 officers are:

President: Jan Kok

Vice President: Jan Kok, Kimon Berlin

Treasurer: Gerry Reynolds

Secretary: Tom Teters, Doug Hunt

### **Scope For Sale**

For Sale: Celestron 8 inch telescope. Scope, wedge, tripod and digital setting circles, f/10 focal ratio, plus Telrad, solar filter and storage locker, all in excellent condition. Recently laser collimated. Asking \$700 or best offer. Call Patrick Earhart (970) 898-1057 days, (970) 204-9009 evenings.

### **Software For Sale** SkyMap Pro version 4. \$25.

By Chris Marriot of the UK. I have the complete printed manual for it too which would be helpful for the beginner. I also downloaded the last 'service pack' for the program which handles any bugs from its original release date. It is a powerful program comparable to the Sky. Current version is Seven which goes for \$95 these days. Contact Randy Moench, 7348 Poudre Canyon Hwy, Bellvue CO 970-491-8429

### **Magazine Renewals**

Members are entitled to discounts on Sky and Telescope, and Astronomy Magazine. Member rates are \$29.95 for S&T. Rate is \$29 for Astronomy Magazine. Please write a check to the magazine(s) of your choice, for the proper amount and forward to Dan Laszlo, 2001 S Shields St Building H, Fort Collins CO 80526.

## Best Looks

Moon	By Saturn & Jupiter 1/5,6 by Mars 1/17, by Venus 1/27, 28
Mercury	In WSW, eves, last week
Venus	Greatest elongation 1/17
Mars	High in SE at dawn
Jupiter & Saturn	In E at dusk

## Western US Favored by Quadrantid Meteors in 2001

Forwarded from Robert Lunsford

One of the strongest annual meteor showers will peak over North America during the morning hours of Wednesday January 3, 2001. The Quadrantid meteor shower has the capability to produce 100 meteors per hour at the time of maximum activity if viewed from dark rural sites away from any sources of light pollution. The name "Quadrantid" is derived from the obsolete constellation of Quadrans Muralis. It is actually located in a remote region of the sky near the intersections of Draco, Bootes, Hercules, and Ursa Major.

Gary Kronk has provided a finder chart for the radiant at:

<http://comets.amsmeteors.org/meteors/showers/quadrantids.html>

The tricky part of watching for the Quadrantids is that the radiant must be high in the sky at the time of maximum activity to see this display at its best. Maximum activity only lasts 2 hours so only a small portion of the earth can see this shower at its best any one year. If that area happens to be cloudy, which is quite possible during this time of year, then no one sees high rates. Most observers have to settle for rates climbing toward maximum or falling from maximum activity. These rates are generally 25-50 per hour.

So when is the best time? The maximum is predicted to occur near 12:00 Universal Time on January 3. This corresponds to 7 am Eastern Standard Time and 4 am Pacific Standard Time. The east coast of North America will be in bright morning twilight at this time and may miss the best rates. The east coast should still see impressive rates rivaling the Perseids and Geminids just before the onset of morning twilight. Those located in the Midwest and onward toward the Pacific will have a better chance to witness the maximum activity in dark skies. Western Canada, Alaska, and northwestern Mexico are favored too.

I would suggest that serious observers set up an hour or two in advance of maximum activity. Set up in a lawn chair with plenty of blankets. The advantage of setting up early is that you could see a trickle of activity turn into a torrent of meteors of varying magnitudes. The longer one watches the better the chances of witnessing a Quadrantid fireball, a meteor that matches or exceeds the brightness of the planet Venus. My brightest Quadrantid fireball occurred in 1981 when a -10 Quadrantid shot high into the eastern sky and left a 4 minute persistent train. This fireball was bright enough to

cast shadows and rivaled the full moon. Those who just wish to peek at the display should watch near the time of maximum activity. Do not stand out in the cold straining your neck and expect to any activity. One needs to be comfortable whether you are out for 15 minutes or several hours.

The radiant lies low in the northwest at dusk and then low in the north during the late evening hours. Only after midnight does it begin to gain sufficient altitude to produce significant activity. It is best placed high in the northeastern sky before the onset of morning twilight. It is during these hours that one should maximize their efforts. I would suggest facing anywhere from due north to due east to see the most activity. Be sure to look upward at least halfway so that the horizon does not block any of your field of view. On the other hand there is no need to look straight up as more activity is seen a bit lower in the sky through the thicker portions of the atmosphere.

Sky & Telescope and all of the meteor groups and societies in the USA and abroad are interested in your Quadrantid counts. The basic information needed is your location, the time you watched, the number of Quadrantids seen, the number of other meteors seen, and the sky conditions (clouds, limiting magnitude). You may also try to estimate the brightness of each meteor by comparing it to stars of a known magnitude. Reports can be sent to me at: [lunro.imo.usa@home.com](mailto:lunro.imo.usa@home.com) and to Sky & Telescope at: [observers@skypub.com](mailto:observers@skypub.com)

For more information on observing meteors visit the Sky & Telescope Web Pages at: <http://www.skypub.com/sights/meteors/meteorwatch.html> Although this page is focussed on the Leonid shower it offers many good tips that can be used during any meteor watch.

A weekly preview of meteor activity is also published each Thursday at: <http://www.amsmeteors.org/lunsford/>

Clear Skies!

Robert Lunsford

Secretary General of the International Meteor Organization  
Visual Meteor Program Coordinator of the American Meteor Society, Coordinator of the Meteors Section of the Association of Lunar and Planetary Observers

## Major Meteor Showers Through The Year from George Zay

Jan 1/3	Quadrantids	80 per hour	bluish
Apr 20/21	Lyrids	10 per hour	rapid, 15% trails
May 4	Eta Aquarids		
Jul 29	S Delta Aquarids	18 per hour	
Aug 6	S Iota Aquarids	7 per hour	
Aug 12/13	Perseids	80 per hour	fast, 45% trails
Aug 13	N Delta Aquarids	18 per hour	

Aug 25 N Iota Aquarids 7 per hour  
Oct 8/10 Draconids  
Oct 21 Orionids 20 per hour fast  
Nov 4 S Taurids  
Nov 14 Leonids 18 per hour swift, high % of trails  
Dec 13/14 Geminids 80 per hour rapid, yellow, 4%  
trails  
Dec 21/22 Ursids

From:  
Dan Laszlo  
2001 S Shields St Building H  
Fort Collins CO 80525

TO:

International Space Station

Date	Mag	Starts			Max. Altitude			Ends		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
07 Jan	2.8	06:33:54	10	S	06:35:46	15	SE	06:37:39	10	E
09 Jan	2.0	05:59:05	10	S	06:01:26	21	SE	06:03:48	10	E
10 Jan	-0.7	06:28:42	10	SW	06:31:44	84	SE	06:34:45	10	NE
11 Jan	1.2	05:25:55	25	SSE	05:26:37	28	SE	05:29:16	10	ENE
12 Jan	-0.9	05:55:58	46	WSW	05:56:43	70	NNW	05:59:43	10	NE
13 Jan	0.6	06:25:33	18	WNW	06:26:57	24	NNW	06:29:30	10	NNE
14 Jan	1.5	05:22:58	21	NE	05:22:58	21	NE	05:24:09	10	NE
15 Jan	1.1	05:51:56	19	N	05:51:56	19	N	05:53:37	10	NNE
16 Jan	1.6	06:20:39	12	NNW	06:21:22	13	NNW	06:22:48	10	NNE
18 Jan	1.9	05:45:41	11	N	05:45:41	11	N	05:46:09	10	NNE
20 Jan	1.8	06:43:01	10	NNW	06:44:33	13	NNE	06:46:06	10	NE
21 Jan	2.1	05:37:57	11	N	05:37:57	11	N	05:38:25	10	NNE
22 Jan	1.7	06:05:42	11	NNW	06:07:06	14	NNE	06:08:50	10	NE
23 Jan	0.9	06:33:39	10	NW	06:36:15	26	NNE	06:38:49	10	E
24 Jan	1.7	05:29:09	15	NNE	05:29:09	15	NNE	05:31:02	10	ENE
25 Jan	0.7	05:56:36	20	NNW	05:58:00	30	NNE	06:00:39	10	E
26 Jan	2.5	04:52:17	12	ENE	04:52:17	12	ENE	04:52:43	10	ENE
26 Jan	-0.8	06:23:59	14	NW	06:26:28	85	S	06:29:24	10	SE
27 Jan	0.8	05:19:37	33	NE	05:19:37	33	NE	05:21:57	10	E
28 Jan	-0.8	05:46:54	55	W	05:47:22	68	SW	05:50:17	10	SE
29 Jan	2.8	04:42:27	12	ESE	04:42:27	12	ESE	04:42:44	10	ESE
29 Jan	1.1	06:14:10	16	WSW	06:15:07	18	SW	06:17:13	10	S
30 Jan	1.7	05:09:42	18	SSE	05:09:42	18	SSE	05:10:39	10	SE
31 Jan	2.0	05:36:55	10	SSW	05:36:55	10	SSW	05:36:59	10	SSW

Mir Complex

Date	Mag	Starts			Max. Altitude			Ends		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
01 Jan	-0.3	17:28:17	10	WSW	17:30:56	50	NNW	17:33:16	12	NE
02 Jan	0.9	17:40:34	10	W	17:42:51	24	NNW	17:44:43	13	NNE
03 Jan	1.6	17:53:00	10	WNW	17:54:36	14	NNW	17:55:52	12	N
10 Jan	1.6	17:35:20	10	N	17:35:39	10	NNE	17:35:59	10	NNE
11 Jan	1.2	17:43:57	10	NNW	17:45:28	14	NNE	17:46:12	13	NE
12 Jan	0.5	17:52:48	10	NNW	17:54:57	22	NNE	17:55:36	20	NE
13 Jan	-0.6	18:01:34	10	NW	18:04:06	43	NNE	18:04:58	29	E
14 Jan	-0.9	18:10:16	10	WNW	18:12:51	72	SW	18:14:25	21	SE
15 Jan	1.2	18:19:01	10	WNW	18:21:16	26	SW	18:23:31	10	SSE
16 Jan	2.7	18:28:27	10	WSW	18:29:19	11	SW	18:30:11	10	SSW
27 Jan	1.8	05:34:14	11	S	05:35:46	17	SE	05:37:30	10	E
28 Jan	0.1	05:40:30	34	S	05:40:55	39	SE	05:43:21	10	ENE
29 Jan	-1.2	05:46:10	75	N	05:46:10	75	N	05:48:32	10	NE
30 Jan	-0.0	05:51:22	31	N	05:51:22	31	N	05:53:15	10	NE
31 Jan	0.8	05:56:08	18	N	05:56:08	18	N	05:57:34	10	NNE