

# The Objective View

Newsletter of the Northern Colorado Astronomical Society

April 2009

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Cheyenne Astronomical Society April 17 7 pm

Cheyenne Botanic Garden.

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

Chamberlin Observatory Open House, 7 to 10 pm

Apr 4, May 2, May 30, 303 871 5172

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

Longmont Astronomical Society April 16 7 pm Dr Sean

Raymond, Earth-Like Planets FRCC 2121 Miller Rd

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

## Secretary's Corner, from Chad Moore

Tis the season to start marking your calendar for observing trips. While there is no substitute for observing with a few friends in a remote camp someplace, I've also enjoyed attending the major national star parties. We are lucky in Colorado to be a day's drive from quite a few good ones.

Billed as Colorado's Premier Star Party, the Rocky Mountain Star Stare will straddle the new moon and summer solstice, June 17-21 (<http://www.rmss.org/>). I've never been to this one, as I've run the Bryce Canyon Astronomy Festival that same period for the past 4 years. Perhaps there are some club members who have been to this nearby event and can recommend it.

Starting the days before the RMSS, the Grand Canyon Star Party stakes out its slot June 13<sup>th</sup>- 20<sup>th</sup>. The observing at the South Rim is more popular and features more visitors, but I have heard many positive reports from the North Rim- darker skies and a bit more laid back.

<http://www.tucsonastronomy.org/gcsp.html>,

On those light pollution maps of the USA, you will notice a dark patch sitting upon the Sand Hills of Nebraska. This is the realm of the Nebraska Star Party, held July 19-24. I'm hoping to go to this one, as the dark skies are often matched by good seeing, and it really isn't a far drive.

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

If you are willing to make a super long drive, the Texas Star Party is the granddaddy of astro nirvana. I attended two years ago and had a great time camping on site. Make sure to quickly make friends with someone with a shower, though, and bring Astroturf and stakes less you want to be observing with dust bunnies all week long. You can see the Centaurus A galaxy naked eye and the southern horizon will astound observers stuck up at 40 degrees latitude. The observing programs and guest speakers are an added bonus.

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

A few of my astro friends have grown tired of the 800 telescopes on the field at Fort Davis, Texas and have defected to the Okie-Tex star party, in the Oklahoma Panhandle. This is a great late season star party, and is held Sept 12-20 this year.

**Next Meeting: April 2 7:30 pm**

**Nitescapes 3-D. Comet and Aurora Landscapes  
by Bryan White**

<http://www.astro-photo.com/index.html>

**Doors open 7:00 pm; Club Business at 7:15 pm**

**Fossil Ridge High School, 5400 Ziegler Rd, Fort  
Collins**

<http://schoolweb.psdschools.org/frhs/pages/LocationandMap.htm>

**Club Brochure:** [http://www.ncastro.org/Contrib/2009\\_Brochure.pdf](http://www.ncastro.org/Contrib/2009_Brochure.pdf)

## NCAS Programs

May 7 William Possel Overview of LASP Space Missions

June 4 TBA

## Public Starwatch at Discovery Science Center, South Lot

Apr 3 7:30 pm

May 1 8:00 pm

## Dark Site Observing Dates

April 24, 25 Pawnee-RAC-Keota, ask FRAC

## Other Events

Little Thompson Observatory, Berthoud Matt Morgan:  
Meteorites. April 17 7:30 pm <http://www.starkids.org>

CSU Madison Macdonald Observatory Public Nights  
On East Drive, north of Pitkin Street  
Tuesdays after dusk if clear, when class is in session

It's skies are about as dark as at TSP, the crowds are smaller, and it is a shorter drive. One of these years I'll make it to Okie-Tex. <http://www.okie-tex.com/>

All of these events require some sort of advance registration and reservations. I know from my experience at the NPS astronomy events that are outreach (not hobby) focused, that there are orientation classes, volunteer forms, and other requirements you need to pay attention to. The days of dragging your Dob out of the back of your truck and plopping down unannounced are mostly over.

### **March 5 Program: Astronomer on a Mission: UIT, Rosetta, and LRO, by Dr. Joel Parker**

Professional astronomers enjoy the benefit of getting paid to go to mountaintop observatories. Joel's training included the 107 inch MacDonald reflector and the 4 meter in Chile. He studied supermassive stars in the 30 Doradus region. He next hunted for Kuiper Belt objects and showed images of 1995 DA2. He would blink compare images by eye, looking for magnitude 23.5 specks moving 3 arcsec/hour. Ground-based astronomers are often frustrated by the weather, and the solution is space-based platforms. He used HST to get above the weather and allow UV studies. He went from Boulder to Goddard Spaceflight Center and used the Ultraviolet Imaging Telescope. It had 50 cm aperture and film. Extremely hot objects show better in UV. STS was a platform for studying stars and galaxies in UV. He then shifted to comets. These ephemeral objects were erroneously labeled by Aristotle as hot dry exhalations in the atmosphere that burst into flame. In reality the largest objects in the solar system are comets. Joel wished to know what the surface is like. Comet sources are the Kuiper Belt and the Oort Cloud. They have an activity cycle in orbit, growing a coma at about 5 AU and a tail closer in. Comet debris is the source for annual meteor showers. Comet SL-9 produced sequential impacts on Jupiter visible from Earth. Jupiter's moon Ganymede bears the scar of a crater chain from a like event. Comet Hale-Bopp was target of 2 missions. The UV imaging system flew in 1997 and 1998-9. A UV transmissive window was installed in the space shuttle middeck hatch. Tracking relied on positioning the whole shuttle, so data was gathered at video frame rates and processed. He showed images of comet nuclei up close and personal. Comet craft included the International Comet Explorer, the Halley armada, Deep Space 1. EPOXI is for Comet Hartley. Rosetta was launched in 2004 and will rendezvous with Comet Churyumov-Gerasimenko. It is about 2 by 3 meters across. ESA is supervising the mission. A lander is to touch down on the comet on March 4 2014. It is a free fall with shock absorbers. Approach rate will be a few cm/sec. It will be 4.2 AU from the Sun, so the comet should not be very active. Alice the UV telescope only draws 4 watts. All instruments aim the same direction. Thrusters do rough aim and reaction wheels provide fine pointing. It did a self portrait with Mars in the background. The Lunar Reconnaissance Orbiter carries an instrument like Alice. It includes a Lyman-Alpha mapping project. It is exploring permanently shadowed regions at the lunar poles and the

Moon's atmosphere. Its objectives are to learn if humans can land there safely. It will image and characterize land forms. It will assess key in-situ resources, water in particular. The Moon's South Pole is home to the oldest accessible material in the solar system, 4.5 billion years old. The lunar atmosphere is very tenuous and hard to study. Sodium light can outline it. It is the product of solar dissociation and micrometeorites. Dust is a big problem for machinery. The permanently shadowed regions are a cold trap. Mars has this phenomenon. Ice absorbs Lyman-alpha light in a particular way. The camera will measure reflected starlight. A map with 50 meter resolution will be built from slices of successive orbits. The sensor is a microchannel plate. Sensitivity is a function of temperature. Joel is anticipating launch this spring.

### **About Our March 5 Speaker, Joel Parker**

Joel grew up in San Leandro, California. Undergrad was at U. California, Berkeley (1986 in Physics & Astronomy) Grad school was at U. Colorado, Boulder (1992, Astrophysics) - primary area of research is massive stars in the Magellanic Clouds, primarily using ground-based photometry and spectroscopy. He worked at NASA Goddard (1992-1996) as a National Research Council postdoc studying stellar evolution and later on the UIT project doing UV photometry of O and B type stars. Moved back to Boulder to work at Southwest Research Institute 1996-present, slowly changing focus to solar system objects (Kuiper belt objects, comets, asteroids). He still does some observing, ground- and space-based, but most time is now spent doing project management of space missions (New Horizons, Rosetta, and Lunar Reconnaissance Orbiter). He is the Assistant Executive Director at SwRI in Boulder The headquarters is in San Antonio, with about 3000 employees, and the Boulder office has about 60 scientists and engineers. He produces and hosts the show "How on Earth" on Tuesday mornings on KGNU radio, has been involved in theatre and film (acting, stage combat) for nearly 30 years, most recently doing Richard III with the Shakespeare Oratorio Society.

### **March 5 NCAS Business Meeting**

Club President Bob Michael called the meeting to order. He just returned from Anza Borrego State Park which has geological sites and dark skies. John Caldwell presented the treasurer's report, and the club funds total \$541.89. We just experienced a near approach by an asteroid 2009 DD45 only 0.2 lunar distances away. Andrea Schweitzer announced IYA events.

## **Wyoming Infrared Observatory Accepting Applications From Leonard Sitongia**

I just saw the following announcement and am passing it along. I don't know the details.

### **PUBLIC OBSERVING TIME AT THE WYOMING INFRARED OBSERVATORY**

As the recipient of an NSF PREST grant, the Wyoming Infrared Observatory is offering time to the community on the 2.3 m telescope between 2009 July and 2012 June. Currently available instruments include an optical prime-focus camera and an optical longslit spectrograph. Both service and visitor observing modes are available. We are also willing to entertain the possibility of visitor instruments. Although we cannot provide funding for travel or subsistence, we can offer visiting astronomers free lodging at the observatory. Proposers should consult the WIRO web page at <http://physics.uwyo.edu/observatories> and are encouraged to contact observatory director Chip Kobulnicky ([chipk@uwyo.edu](mailto:chipk@uwyo.edu)) for additional information prior to the quarterly proposal submission process.

## **Club PST and St. Patrick's Day 2009 From Tim Antonsen**

I took it to Old Town last Saturday after the St. Patrick's Parade. I set up where the Old Town Plaza meets Mountain from about 1:30PM to 3:30PM, wearing my IYA2009 pin. I guess I had 50 or so people take a look with it, ranging from interested kids to an elderly Japanese grandmother whose 12 yr. old granddaughter translated for her. There were two very good prominences that day, and several smaller ones. Thanks to Dan for loaning that 12mm EP; it's about perfect for that sort of situation.

The only trick was finding some reasonable approximation of polar alignment, but people catch on quick: "Turn this big knob to move the sun as close as you can to where you want it. If it's still off-center, use this other big knob."

I got a lot of good comments, and some expressed interest in NCAS. One fellow in particular wants help with a 6" reflector that he'd been given; he wrote down the ncastro.org web-site, and seems likely to show up for "amnesty night." I only had one mid-day St. Patty's drunk stagger by, and he was blearily cheerful, not troublesome (he didn't ask for a look, thankfully, and I didn't offer!).

Meanwhile, I'm trying to build a right-angle bracket to support the PST in a more convenient (upright) position on that small GEM. I say "trying" because I'm accustomed to working with aluminum, and steel is a whole different ball game. The stock I'm using is kinda tough to bend, so I'm looking for someone with a brake (or failing that, good tips) to help me get a good bend. My design includes nice padding to prevent scratches, and I plan to paint it all a matching black.

## **100 Hours of Astronomy April 2 to 5 From Andrea Schweitzer**

100 Hours of Astronomy: worldwide astronomy marathon set to break records

30 March 2009, Paris:

The International Year of Astronomy 2009 Cornerstone project, 100 Hours of Astronomy, is on track to be the largest single science public outreach event ever. More than 1500 events have been registered in over 130 countries and this number is increasing every day. 100 Hours of Astronomy is a truly global project; an event on a scale never attempted before, with more than one million people expected to participate!

100 Hours of Astronomy (100HA) is a Cornerstone project of the International Year of Astronomy 2009 (IYA2009). It is a worldwide celebration composed of a broad range of activities aimed at involving the public. 100HA will take place over four days and nights, from 2–5 April 2009. During this period, people from around the globe will share the experience and wonders of observing the sky. For many, it will be their first glimpse of the marvels of the heavens through a telescope. For others, it is the perfect opportunity to impart their knowledge and excitement, helping unveil the cosmos to fresh and eager eyes.

A live 24-hour video webcast called "Around the World in 80 Telescopes" will take place from 3 April 09:00 UT to 4 April 09:00 UT, following day and night around the globe to some of the most advanced observatories on and off the planet. Viewers can find out what is happening at a research observatory in their home country or on the other side of the planet, send in questions and messages, see new images from the cosmos, and discover what astronomers are doing right now! Participating telescopes include the Hawaii-based telescopes Gemini North and Keck, the Anglo-Australian Telescope, telescopes in the Canary Islands, the Southern African Large Telescope, Chilean observatories such as ESO's Very Large Telescope, space-based telescopes such as the NASA/ESA Hubble Space Telescope, ESA XMM-Newton and Integral, and many more. In fact, "Around the World in 80 Telescopes" will take viewers to every continent, including Antarctica! The webcast itself will be hosted at the European Southern Observatory's headquarters in Munich, Germany with live streaming by Ustream.tv. Anyone with a web browser supporting Flash will be able to follow the show via the 100HA website and be a part of the project. TV stations, web portals, and science centres can also use the high quality feed, and the video player can be embedded on websites. Representatives of the media who wish to report from the "front-line" and interview the team should get in touch. The featured programme "Global Star Party", commencing at sunset on 4 April, is set to be an all-encompassing event of extraordinary scope. Amateur astronomers, clubs and other groups will be setting up telescopes in public places to allow as many people as possible to look at the heavens. Traditional

star party locations such as busy streets and shopping centres will be covered, as well as less conventional places including rest homes and military bases. Enthusiasts have been working hard to ensure that an incredible number of people will be able to look through a telescope during the Global Star Party.

These two headline initiatives are being supported by many more activities like the “Sun Day” (April 5) and “100 Hour of Astronomy Junior” and several “100 Hours of Astronomy Opening Events” around the world.

All this is, of course, in addition to the thousands of local events being planned by science facilities and astronomy enthusiasts around the world, including telescope observing sessions, exhibitions, special shows and more.

100 Hours of Astronomy is a venture of breathtaking scope that will involve people from all walks of life around the globe. Get involved, and be part of a record-breaking worldwide event!

#### Links

100HA website: <http://www.100hoursofastronomy.org/>

100HA programme:

<http://www.100hoursofastronomy.org/program>

100HA Ustream.tv channel:

<http://www.ustream.tv/channel/100-hours-of-astronomy>

IYA2009 website: <http://www.astronomy2009.org/>

#### Notes

The vision of the IYA2009 is to help the citizens of the world rediscover their place in the Universe through the day and night-time skies the impact of astronomy and basic sciences on our daily lives, and understand better how scientific knowledge can contribute to a more equitable and peaceful society.

The aim of the IYA2009 is to stimulate worldwide interest, especially among young people, in astronomy and science under the central theme, “The Universe, Yours to Discover”. IYA2009 events and activities will promote a greater appreciation of the inspirational aspects of astronomy that embody an invaluable shared resource for all countries.

The IYA2009 activities are taking place at the global and regional levels, and especially at the national and local levels. National Nodes in each state have been formed to prepare activities for 2009. These Nodes establish collaborations between professional and amateur astronomers, science centres, educators and science communicators in preparing activities for 2009. The International Year of Astronomy was proclaimed by the United Nations on 20 December 2007.

The IAU is the international astronomical organisation that brings together almost 10 000 distinguished astronomers from all nations of the world. Its mission is to promote and

safeguard the science of astronomy in all its aspects through international cooperation. The IAU also serves as the internationally recognised authority for assigning designations to celestial bodies and the surface features on them. Founded in 1919, the IAU is the world's largest professional body for astronomers.

Ustream.TV is the live interactive video broadcast platform that enables anyone with a camera and an internet connection to quickly and easily broadcast to a global audience of unlimited size. In less than two minutes, anyone can become a broadcaster by creating their own channel on Ustream or by broadcasting through their own site, empowering them to engage with their audience and further build their brand.

For more information and a list of contacts, please see the complete press release at:

[www.iau.org/public\\_press/news/release/iau0908/](http://www.iau.org/public_press/news/release/iau0908/)

#### **GALILEOSCOPE IN PRODUCTION: THE IYA2009 TELESCOPE IS NOW AVAILABLE!**

04 March 2009, Paris:

The Galileoscope — a high quality, easy-to-assemble and easy-to-use telescope at an unprecedentedly low price — is now available to order. A Cornerstone project of the International Year of Astronomy 2009 (IYA2009), the Galileoscope was developed by a team of leading astronomers, optical engineers and science educators to make the wonders of the night sky more accessible to everyone. Orders can now be placed through [www.galileoscope.org](http://www.galileoscope.org) for delivery beginning in late April.

By encouraging the experience of personally seeing celestial objects, the Galileoscope project aims to facilitate a main goal of IYA2009: promoting widespread access to new knowledge and observing opportunities. Observing through a telescope for the first time is an experience that shapes our view of the sky and the Universe. It prompts people to think about the importance of astronomy, and for many it's a life-changing experience. Galileoscopes will open up a whole new world for their users and are an excellent means of pursuing an interest in astronomy during IYA2009 and beyond.

Galileoscopes are available at the incredibly low price of US\$15 per kit. Discounts are available for group purchases of 100 or more, bringing the price down even lower, to US\$12.50 each, reducing costs for schools, colleges, astronomical societies, or even parties of interested individuals. Never before has such a high quality and professionally endorsed scientific instrument been available for this price.

To further this aim, the Galileoscope Cornerstone project has initiated the “Give a Galileoscope” programme. Participants may buy Galileoscopes for themselves, their families, or their friends at the regular \$15 or \$12.50 price (depending on quantity) plus shipping, and/or donate as many

telescopes as they'd like for \$12.50 each, with no shipping charges. Donated Galileoscopes will go to less advantaged schools and other organisations worldwide, especially in developing countries. This will help bring a modern education to students in poor schools and empower them to pursue science and technology knowledge. Donating Galileoscopes increases the project's global impact and gives people who might otherwise never have the opportunity to look through a telescope the chance to join millions of skywatchers worldwide in a shared experience of astronomical discovery.

The Galileoscope is named after the Italian astronomer Galileo Galilei, who first observed the heavens through a telescope 400 years ago. His observations were nothing short of revolutionary and changed our view of the world forever. The Galileoscope is optimised to provide views of the very same objects that inspired Galileo all those years ago— including craters and mountains on the Moon, the rings of Saturn, the phases of Venus, a variety of star clusters, and moons orbiting the planet Jupiter. Sights such as these astounded Galileo and they are all visible, along with countless other objects, through the Galileoscope. Although, with its 21st-century optics, it will provide a much better observing experience than Galileo had!

Galileoscopes are also invaluable educational tools, tying in with topics such as mathematics, physics, history and philosophy. As practical instruments they can be used to demonstrate basic optical theory in a real-world scenario, a technique often praised by educators and pupils themselves. Free educational guides are available on the project's website, providing further information to teachers, students and enthusiasts. Experience has shown that the "Wow!"-factor that kids get from assembling their own fully functional, high quality Galileoscope is unsurpassed.

"The ability to experiment with lenses while building the telescope offers a much more powerful learning experience than receiving a preassembled telescope," says Rick Fienberg, Editor Emeritus of Sky & Telescope magazine and Chair of the IYA2009 Cornerstone project. "Users will learn many aspects of optics and even have a chance to construct two types of telescopes — a modern one and a more primitive one similar to Galileo's," adds Stephen Pompea, US IYA2009 Project Director and member of the IYA2009 Cornerstone project. "Building and using a Galileoscope gives kids the feeling that science is fun."

Galileoscopes are easy to use, sturdy, reliable and well-designed windows to the Universe. Orders are now being taken through the official website, [www.galileoscope.org](http://www.galileoscope.org). Build one and the stars will be within your reach!

Worldwide observing projects with small telescopes are a key part of the Galileoscope Cornerstone. The "You Are Galileo!" project, organised by the IYA2009 Japan National Committee, uses classroom telescopes along with worksheets and manuals to form part of a year-long observation programme.

These are designed for children and certificates are available for participants who send records of their observations to the "You Are Galileo!" team.

#### Notes for Editors

The Galileoscope is a high quality 50-mm f/10 telescope, with a glass doublet achromatic objective. A 20-mm Plössl-like eyepiece with twin plastic doublet achromatic lenses gives a magnification of 25x across a 1.5-degree field, and a 2x Barlow lens (also a plastic doublet achromat) gives a magnification of 50x. The Barlow lens can also be used as a Galilean eyepiece to give a magnification of 17x and a very narrow field of view to simulate the "Galileo experience". The standard 1.25-inch focuser accepts commercial accessories, and the standard 1/4-20 tripod adapter works with any standard photo tripod (not included).

In addition to the IAU, UNESCO, the IYA2009 Global Sponsors and the IYA2009 Organisational Associates, principal sponsors of the Galileoscope project include the American Astronomical Society, the National Optical Astronomy Observatory, the National Science Foundation, the Astronomical Society of the Pacific, Carthage College, Merit Models, Photon Engineering, Sky & Telescope, and Galileo's Place, home of Galileo-brand telescopes.

IYA2009 marks the 400th anniversary of Galileo Galilei's first astronomical observations through a telescope. It is a worldwide celebration, promoting astronomy and its contribution to society and culture, with events at regional, national, and global levels.

#### Links

- Galileoscope website: [www.galileoscope.org](http://www.galileoscope.org)
- IYA2009 website: [www.astronomy2009.org](http://www.astronomy2009.org)
- You Are Galileo! web site: [www-irc.mtk.nao.ac.jp/~webadm/Galileo-E/](http://www-irc.mtk.nao.ac.jp/~webadm/Galileo-E/)

**Saturn's Titan Shadow Crosses the Planet**  
April 12 2322 MDT to Apr 13 0551 MDT  
April 28 2222 MDT to Apr 29 0516 MDT

#### **Lyrid Meteor maximum April 22**

#### **Best Looks**

Moon	By Saturn Apr 7; by Antares Apr 13 By Mars Apr 18 by Jupiter Apr 19; By Mercury and Pleiades Apr 26
Mercury	In W after 1 <sup>st</sup> week
Venus	In E predawn; by Moon & Mars Apr 22
Mars	Low in SE predawn
Jupiter	In S in morning
Saturn	High in S late evening night. Rings very thin

Date	Mag	Starts			Max. altitude			Ends		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
<a href="#">31 Mar</a>	-1.4	20:45:44	10	WNW	20:48:32	41	SW	20:49:25	31	S
<a href="#">1 Apr</a>	-2.1	19:37:09	10	NW	19:40:04	59	NE	19:42:56	10	ESE
<a href="#">1 Apr</a>	0.6	21:13:54	10	WSW	21:15:03	12	SW	21:15:36	11	SW
<a href="#">2 Apr</a>	-0.9	20:04:04	10	WNW	20:06:47	35	SW	20:09:28	10	SSE
<a href="#">17 Apr</a>	0.7	06:02:49	10	SSE	06:04:28	14	SE	06:06:07	10	E
<a href="#">19 Apr</a>	0.3	05:20:02	10	S	05:21:56	16	SE	05:23:51	10	E
<a href="#">20 Apr</a>	-1.8	05:45:12	10	SW	05:48:05	56	SE	05:51:00	10	ENE
<a href="#">21 Apr</a>	0.0	04:38:22	16	SSE	04:39:20	18	SE	04:41:27	10	E
<a href="#">22 Apr</a>	-2.1	05:03:48	23	SW	05:05:27	66	SE	05:08:24	10	ENE
<a href="#">23 Apr</a>	0.2	03:57:32	18	ESE	03:57:32	18	ESE	03:58:56	10	E
<a href="#">23 Apr</a>	-1.3	05:29:07	11	W	05:31:48	36	NNW	05:34:36	10	NE
<a href="#">24 Apr</a>	-0.3	04:22:46	76	SE	04:24:00	31	ENE	04:25:42	10	NE
<a href="#">25 Apr</a>	-1.1	04:47:55	24	WNW	04:49:04	33	NNW	04:51:48	10	NE
<a href="#">26 Apr</a>	-0.1	03:41:25	26	NE	03:41:25	26	NE	03:42:54	10	NE
<a href="#">26 Apr</a>	0.1	05:13:36	10	WNW	05:15:36	17	NNW	05:17:37	10	NNE
<a href="#">27 Apr</a>	-0.8	04:06:25	30	NNW	04:06:25	30	NNW	04:08:55	10	NE
<a href="#">27 Apr</a>	0.7	05:41:18	10	NNW	05:42:17	11	N	05:43:17	10	N
<a href="#">28 Apr</a>	1.3	02:59:47	12	NE	02:59:47	12	NE	03:00:00	10	NE
<a href="#">28 Apr</a>	0.3	04:31:21	12	NW	04:32:45	16	NNW	04:34:40	10	NNE
<a href="#">29 Apr</a>	0.4	03:24:40	19	NNE	03:24:40	19	NNE	03:25:56	10	NE
<a href="#">29 Apr</a>	0.8	04:58:34	10	NNW	04:59:24	11	N	05:00:15	10	N

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