

February 2010

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<http://www.starastronomy.org>

Edited by: Bob Fowler

# THE SPECTROGRAM

**Newsletter for the  
Society of Telescopy,  
Astronomy, and Radio**



## February's Meeting

The next meeting of S\*T\*A\*R will be on Thursday, February 4th, 2010 and will feature our S\*T\*A\*R Winter Social and Equipment Demos. All are welcome. The meeting will begin promptly at 8:00pm at the Monmouth Museum on the Brookdale Community College campus.

## Editor's Corner

Many thanks to Dave Nelson, Randy Walton, & Steve Fedor for contributing to this month's Spectrogram.

Reminder to pay membership dues \$25/individual, \$35/family. Donations are appreciated. Make payments to our treasurer Rob Nunn at a club meeting or mail a check payable to S\*T\*A\*R Astronomy Society Inc to:

**S\*T\*A\*R Astronomy Society  
P.O. Box 863  
Red Bank, NJ 07701**

## March Issue

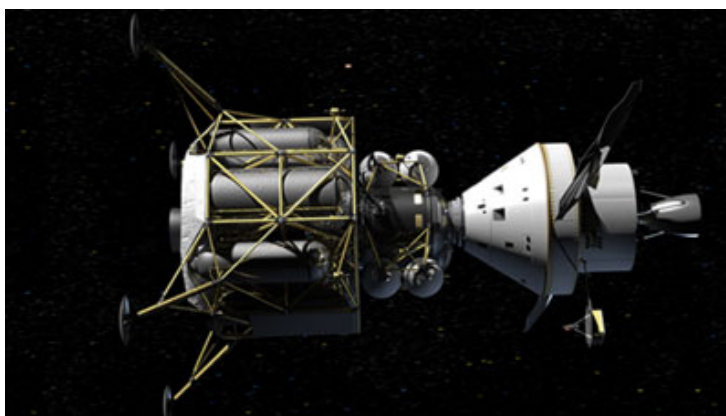
Please submit articles and contributions for the next *Spectrogram* by February 26. Please email to [fowler@verizon.net](mailto:fowler@verizon.net).

## Calendar

- ❖ Feb 4, 2010 – Winter Social
- ❖ Mar 4, 2010 – Surveying the Universe with Supernovae
- ❖ Mar 19, 2010 – Pine Brook School Star Party
- ❖ Apr 1, 2010 - TBA
- ❖ May 6, 2010 - TBA
- ❖ Jun 3, 2010 – Annual Business Meeting

## Got Pix? Like to Write?

Have you been out observing with your friends? Have you made any great astro-images? How about a story and pictures of your latest ATM project? If you have anything you'd like to share, email [fowler@verizon.net](mailto:fowler@verizon.net) and let us know what you've got!



*Orion flies in space while docked with a lunar lander in this NASA artist's rendering. See full story on page 6. Image credit: NASA*

# January Meeting Minutes

By Steve Fedor

The January 7, 2010 meeting of S\*T\*A\*R Astronomy club began at 8 p.m. The meeting was attended by about 26 people. President Nancy McGuire chaired the meeting and began by presenting the agenda, greeting one first-time attendee, and asking club members to read about the newly formed observing committee in the President's Corner of the January issue of Spectrogram.

Nancy then introduced our speaker for the evening, club member Ken Legal. Ken's talk, titled "Things to See," was an overview of astronomical observing. It included basic information for beginners, as well as some information about the night sky of interest to veteran observers. He began with a description of astronomical coordinates and types of telescope mounts, then went on to present information about stars and planets. He recommended Skygazer's Almanac from Sky and Telescope magazine as a source of information about the sky, such as darkness times and positions of planets. The highlight of the talk was a quiz about the solar system. He posed questions about planets such as rotation rates, eccentricity of orbits, and inclination to the ecliptic. He got an enthusiastic response, and usually more than one answer. Ken finished the talk with some very nice images that he made at Coyle Field, including images of Andromeda Galaxy and the Ring Nebula.

Frank Loso was not in attendance, so there was no Object of the Month presented.

Dennis O'Leary gave the meeting an update on NASA space exploration. The Spitzer Space Telescope has had recent success in finding exoplanets, and is expected to greatly increase the number of them known to astronomers. Dennis showed a recent image taken by the Mars Reconnaissance Orbiter of a channel on Mars that appears to have been a river bed connecting two lakes. And he noted that the refurbished Hubble telescope has produced images of galaxies at magnitude 27.

Following a break, Nancy introduced Ahmad Jrad, who has offered to lead the observing committee. Ahmad spoke of the objective of the committee, which is to get members and guests outside to do some observing. Ahmad said that he always learns more about the night sky when he observes with a group. He mentioned some ideas he has for observing sessions, such as comparing eyepieces, then reporting findings to the club. A club member noted that observing sessions would provide an opportunity to find the Objects of the Month.

Dennis O'Leary told the meeting that arrangements are now complete for the club to use Dorbrook Park as an observing site. We need to notify the ranger a day in advance, and will be able to use the park up to seven nights per month. Those

who wish to participate must complete a form that will be submitted to the park.

Dave Britz noted that the Astro Nova program is in need of volunteers. The program assigns an astronomer to a grade-school class. The astronomer is expected to present four in-school programs per year, and to arrange a star party.

There was no 50/50 drawing.

## Are you a S\*T\*A\*R Member?

**S\*T\*A\*R is the proud owner of a monstrous 25" Dobsonian Obsession reflector – which members can gain access to!**

Meetings are the first Thursday of each month, except July and August, at 8:00 PM at the Monmouth Museum on the Brookdale Community College campus. Meetings generally consist of lectures and discussions by members or guest speakers on a variety of interesting astronomical topics. S\*T\*A\*R is a member of United Astronomy Clubs of New Jersey (UACNJ), the Astronomical League (AL), and the International Dark Sky Association (IDA).

Memberships: ( ) Individual...\$25 ( ) Family...\$35

Name \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone \_\_\_\_\_

Email \_\_\_\_\_

Make checks payable to: S\*T\*A\*R Astronomy Society, Inc. and mail to P.O. Box 863, Red Bank, NJ 07701



# Building a Case Against Ozone

by Patrick Barry

When it comes to notorious greenhouse gases, carbon dioxide is like Al Capone—always in the headlines. Meanwhile, ozone is more like Carlo Gambino—not as famous or as powerful, but still a big player.

After tracking this lesser-known climate culprit for years, NASA's Tropospheric Emission Spectrometer (TES) has found that ozone is indeed a shifty character. Data from TES show that the amount of ozone—and thus its contribution to the greenhouse effect—varies greatly from place to place and over time.

"Ozone tends to be localized near cities where ozone precursors, such as car exhaust and power plant exhaust, are emitted," says Kevin Bowman, a senior member of the TES technical staff at the Jet Propulsion Laboratory. But the ozone doesn't necessarily stay in one place. Winds can stretch the ozone into long plumes. "Looking out over the ocean we can see ozone being transported long distances over open water."

Unlike CO<sub>2</sub>, ozone is highly reactive. It survives in the atmosphere for only a few hours or a few days before it degrades and effectively disappears. So ozone doesn't have time to spread out evenly in the atmosphere the way that CO<sub>2</sub> does. The amount of ozone in one place depends on where ozone-creating chemicals, such as the nitrogen oxides in car exhaust, are being released and which way the wind blows.

This short lifespan also means that ozone could be easier than CO<sub>2</sub> to knock off.

"If you reduce emissions of things that generate ozone, then you can have a quicker climate effect than you would with CO<sub>2</sub>," Bowman says. "From a policy standpoint, there's been a lot of conversation lately about regulating short-lived species like ozone."

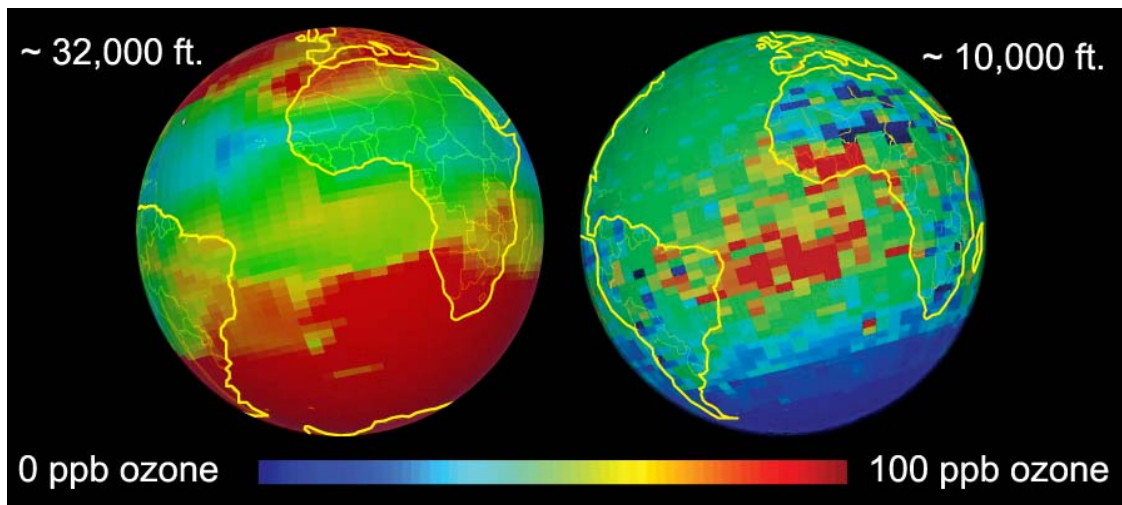
To be clear, Bowman isn't talking about the famous "ozone layer." Ozone in this high-altitude layer shields us from harmful ultraviolet light, so protecting that layer is crucial. Bowman is talking about ozone closer to the ground, so-called tropospheric ozone. This "other" ozone at lower altitudes poses health risks for people and acts as a potent greenhouse gas.

TES is helping scientists track the creation and movement of low-altitude ozone over the whole planet each day. "We can see it clearly in our data," Bowman says. Countries will need this kind of data if they decide to go after the heat-trapping gas.

Ozone has been caught red-handed, and TES is giving authorities the hard evidence they need to prosecute the case.

Learn more about TES and its atmospheric science mission at [tes.jpl.nasa.gov](http://tes.jpl.nasa.gov).

*This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.*



*These images are TES ozone plots viewed with Google Earth. Colors map to tropospheric ozone concentrations. The image on the left shows ozone concentrations at an altitude of approximately 32,000 feet, while the one on the right shows ozone at approximately 10,000 feet. The measurements are monthly averages over each grid segment for December 2004.*

# Suspected Asteroid Collision Leaves Trailing Debris

WASHINGTON -- NASA's Hubble Space Telescope has observed a mysterious X-shaped debris pattern and trailing streamers of dust that suggest a head-on collision between two asteroids. Astronomers have long thought the asteroid belt is being ground down through collisions, but such a smashup has never been seen before.

Asteroid collisions are energetic, with an average impact speed of more than 11,000 miles per hour, or five times faster than a rifle bullet. The comet-like object imaged by Hubble, called P/2010 A2, was first discovered by the Lincoln Near-Earth Asteroid Research, or LINEAR, program sky survey on Jan. 6. New Hubble images taken on Jan. 25 and 29 show a complex X-pattern of filamentary structures near the nucleus.

"This is quite different from the smooth dust envelopes of normal comets," said principal investigator David Jewitt of the University of California at Los Angeles. "The filaments are made of dust and gravel, presumably recently thrown out of the nucleus. Some are swept back by radiation pressure from sunlight to create straight dust streaks. Embedded in the filaments are co-moving blobs of dust that likely originated from tiny unseen parent bodies."

Hubble shows the main nucleus of P/2010 A2 lies outside its own halo of dust. This has never been seen before in a comet-like object. The nucleus is estimated to be 460 feet in diameter.



*A Hubble image of a comet-like object called P/2010 A2, which was first discovered by the LINEAR (Lincoln Near-Earth Asteroid Research program) sky survey on January 6. The object appears so unusual in ground-based telescopic images that discretionary time on Hubble was used to take a close-up look. This picture, from the January 29 observation, shows a bizarre X-pattern of filamentary structures near the point-like nucleus of the object and trailing streamers of dust. The inset picture shows a complex structure that suggests the object is not a comet but instead the product of a head-on collision between two asteroids traveling five times faster than a rifle bullet (5 kilometers per second). (Credit: NASA, ESA, and D. Jewitt (UCLA))*

Normal comets fall into the inner regions of the solar system from icy reservoirs in the Kuiper belt and Oort cloud. As comets near the sun and warm up, ice near the surface vaporizes and ejects material from the solid comet nucleus via jets. But P/2010 A2 may have a different origin. It orbits in the warm, inner regions of the asteroid belt where its nearest neighbors are dry rocky bodies lacking volatile materials.

This leaves open the possibility that the complex debris tail is the result of an impact between two bodies, rather than ice simply melting from a parent body.

"If this interpretation is correct, two small and previously unknown asteroids recently collided, creating a shower of debris that is being swept back into a tail from the collision site by the pressure of sunlight," Jewitt said.

The main nucleus of P/2010 A2 would be the surviving remnant of this so-called hypervelocity collision.

"The filamentary appearance of P/2010 A2 is different from anything seen in Hubble images of normal comets, consistent with the action of a different process," Jewitt said. An impact origin also would be consistent with the absence of gas in spectra recorded using ground-based telescopes.

The asteroid belt contains abundant evidence of ancient collisions that have shattered precursor bodies into fragments. The orbit of P/2010 A2 is consistent with membership in the Flora asteroid family, produced by collisional shattering more than 100 million years ago. One fragment of that ancient smashup may have struck Earth 65 million years ago, triggering a mass extinction that wiped out the dinosaurs. But, until now, no such asteroid-asteroid collision has been caught "in the act."

At the time of the Hubble observations, the object was approximately 180 million miles from the sun and 90 million miles from Earth. The Hubble images were recorded with the new Wide Field Camera 3 (WFC3), which is capable of detecting house-sized fragments at the distance of the asteroid belt.

# Nasa Provides Inside Look At International Space Station With Streaming Video

HOUSTON -- NASA soon will provide Internet viewers an inside look at astronauts working in space by streaming video live from the International Space Station's laboratories. The internal views are set to begin Feb. 1 and will be available during all crew duty hours.

Since March 2009, NASA has provided streaming video online of Earth and the station's exterior as the laboratory complex orbits 220 miles above Earth at 17,500 miles per hour. The new in-cabin streaming video includes audio of communications between Mission Control and the astronauts, when available.

Television from the station is available only when the complex is in contact with the ground through its high-speed communications antenna and NASA's Tracking and Data Relay Satellite System. During "loss of signal" periods, Internet viewers may see a test pattern. When the space shuttle is docked to the station, the stream will include video and audio of those activities.



*Expedition 22 Commander Jeff Williams (center) and Flight Engineers Soichi Noguchi (left) and T.J. Creamer answer questions from students in the Troy, Michigan School District. Credit: NASA TV*

The station is a unique partnership between the space agencies of the United States, Canada, Europe, Japan and Russia. Construction began in 1998 and will be completed in 2010. Twenty-two crews have lived aboard the orbiting laboratory since 2000, including the current crew of five. Station residents have conducted important scientific experiments and gathered data to help assist future missions.

To view the streaming station video, visit:

<http://www.nasa.gov/station>

To find out when the station will be visible over your city, visit: <http://www.jsc.nasa.gov/sightings>

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## Prometheus: Over Easy

Looking for all intents and purposes like a celestial egg after a session in Saturn's skillet, Prometheus displayed its pockmarked, irregular surface for NASA's Cassini spacecraft on Jan. 27, 2010.

Prometheus is one of Saturn's innermost moons. It orbits the gas-giant at a distance of 139,353 kilometers (85,590 miles) and is 86 kilometers (53 miles) across at its widest point. The porous, icy-bodied world was originally discovered by images taken by Voyager 1 back in 1980. You could say this latest "egg-cellent" view has the Cassini science team licking their chops at the thought of future Prometheus images.



This raw, unprocessed image of Prometheus, taken in visible light, was obtained by Cassini's narrow-angle camera at a distance of approximately 36,000 kilometers (23,000 miles). The Cassini Equinox Mission is a joint United States and European endeavor. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the mission for NASA's Science Mission Directorate, Washington, D.C. The Cassini orbiter was designed, developed and assembled at JPL.

For more information about the Cassini Equinox Mission visit: <http://www.nasa.gov/cassini> and <http://saturn.jpl.nasa.gov>

# Spaceship Mockup

Gray Creech

NASA Dryden Flight Research Center

NASA's Orion spacecraft now in development is America's first new manned spacecraft since development of the space shuttle 30 years ago.

It's the centerpiece of NASA's Constellation program, which aims to take the next generation of human explorers to the moon and beyond.

Orion's launch abort system, a "rocket on top of the rocket," is designed to ensure the safety of its astronaut crew by pulling the crew module away from its booster rocket in the event of a booster malfunction, either while on the launch pad or during ascent to orbit.

NASA's Dryden Flight Research Center in Southern California is leading the Orion launch abort system flight testing.



As part of this effort, NASA Dryden's Fabrication Branch constructed a mockup of the Orion crew module. More simplified than the actual spacecraft, the Orion mockup is the actual size of the real thing, inside and out.

Dryden is using the mockup to develop and verify integration and installation procedures for things like avionics, instrumentation, and wire harness routing in advance of the arrival of the first abort flight test article, called "Boilerplate 1."

Boilerplates, in this sense of the term, are flying simulators used in early tests designed to mimic the flight characteristics of the actual vehicle. They have the exact dimensions, aerodynamic and mass properties of the operational vehicle they will simulate in flight, in this case the Orion crew module.

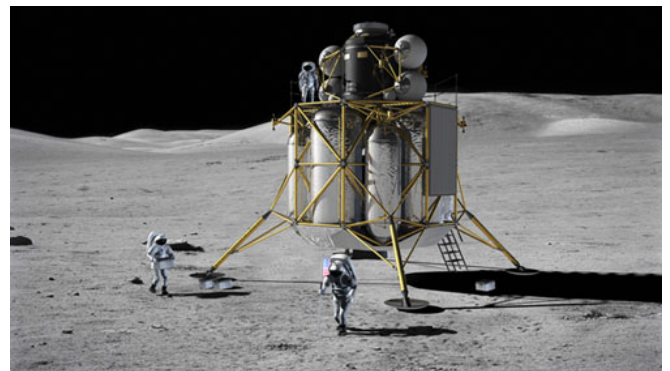
The mockup has no attached forward bay on its top, but

Dryden technicians are building one that will remain separate for parachute integration procedure development. Two pad abort and four ascent abort flight tests of the launch abort system are planned, all unmanned, with the first scheduled for 2008 and continuing through 2011.

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## NASA Chooses "Altair" as Name for Astronauts' Lunar Lander

NASA has selected Altair as the name of the lunar lander the Constellation Program will use to put humans on the moon. Altair will be capable of landing four astronauts on the moon, providing life support and a base for weeklong initial surface exploration missions, and returning the crew to the Orion spacecraft that will bring them home to Earth. Altair will launch aboard an Ares V rocket into low Earth orbit, where it will rendezvous with the Orion crew vehicle. Altair finds its origins in Arabic and is derived from a phrase that means "the flying one." Altair is the brightest star in the constellation Aquila and is the 12th brightest star in the night sky. In Latin, Aquila means "eagle," reminiscent of the historic lunar exploration module Neil Armstrong and Buzz Aldrin landed on the moon in 1969.



Altair is a key component in the Constellation Program, which is building the spacecraft, launch vehicles and surface support systems to establish a lunar outpost. This work will provide experience needed to expand human exploration farther into the solar system.

NASA currently is seeking input from industry experts and is developing conceptual designs for Altair. Between 2009 and 2011, the project plans to build hardware and test concepts.

The first crewed flight of the Orion spacecraft aboard an Ares I rocket is scheduled for no later than 2015, when it will fly to the International Space Station. Altair's first landing on the moon with an astronaut crew is planned for no later than 2020.

## In the Eyepiece

Here is a list of objects for this month. This is reproduced from [www.skyhound.com](http://www.skyhound.com) with the kind permission of its creator and author of SkyTools Greg Crinklaw.

Object(s)	Class	Con	RA	Dec	Mag
<a href="#">M48</a>	Open Cluster	Hydra	08h13m46.1s	-05°47'08"	5.5
<a href="#">Castor</a>	Multiple Star	Gemini	07h34m35.9s	+31°53'18"	1.6
<a href="#">Struve 1127</a>	Multiple Star	Camelopardus	07h47m00.4s	+64°03'07"	6.8
<a href="#">M47</a>	Open Cluster	Puppis	07h36m36.0s	-14°28'45"	4.3
<a href="#">M67</a>	Open Cluster	Cancer	08h51m26.1s	+11°48'43"	7.4
<a href="#">M46 and NGC 2438</a>	Open Cluster + Planetary Nebula	Puppis	07h41m47.8s	-14°48'06"	6.6
<a href="#">Eskimo/Clown Face</a>	Planetary Nebula	Gemini	07h29m10.8s	+20°54'42"	9.9
<a href="#">NGC 2477</a>	Open Cluster	Puppis	07h52m16.8s	-38°31'48"	5.7
<a href="#">NGC 2440</a>	Planetary Nebula	Puppis	07h41m55.4s	-18°12'31"	10.8
<a href="#">Focus On Thor's Helmet</a>	Diffuse Nebula	Canis Major	07h18m36.0s	-13°12'00"	10?
<a href="#">Gemini Nebula</a>	Planetary Nebula	Gemini	07h25m34.7s	+29°29'26"	13.0
<a href="#">Hourglass</a>	Planetary Nebula	Monoceros	07h09m22.5s	-00°48'24"	11.8
<a href="#">NGC 2419</a>	Globular Cluster	Lynx	07h38m11.0s	+38°53'11"	11.0
<a href="#">The Integral Sign Galaxy</a>	Galaxy	Camelopardus	07h11m22.6s	+71°50'10"	13.1
<a href="#">Abell 31</a>	Planetary Nebula	Cancer	08h54m11.4s	+08°54'30"	12.2
<a href="#">The Medusa</a>	Planetary Nebula	Gemini	07h28m59.2s	+13°15'16"	11.3
<a href="#">M 1-18</a>	Planetary Nebula	Puppis	07h42m04.2s	-14°21'20"	14.0

Coordinates are epoch 2000.0





























## *February 2010 Celestial Events*

supplied by J. Randolph Walton (Randy)

Day	Date	Time (EDT)	Event
Tue	2	After 18:50	<b>Zodiacal Light</b> visible in W after evening twilight for next two weeks
Fri	5	10:18	Moon Sets
		18:48	<b>Last Quarter Moon</b>
Sat	6	05:55	Mercury Rises
		07:01	Mars Sets
		07:03	Sunrise
		10:57	Moon Sets
		17:25	Sunset
		17:55	Venus Sets
		18:47	Jupiter Sets
		21:05	Saturn Rises
Sat	13	06:05	Mercury Rises
		06:27	Mars Sets
		06:55	Sunrise
		17:24	Moon Sets
		17:34	Sunset
		18:10	Venus Sets
		18:25	Jupiter Sets
		20:35	Saturn Rises
		21:51	<b>New Moon</b>
Tue	16	18:20	Jupiter 0.5 deg. to right of Venus
Sat	20	05:55	Mars Sets
		06:10	Mercury Rises
		06:46	Sunrise
		09:28	Moon Rise
		17:42	Sunset
		18:10	Jupiter Sets
		18:25	Venus Sets
		20:07	Saturn Rises
Sun	21	10:08	Moon Rise
		17:43	Sunset
		18:00	<b>Lunar Straight Wall visible</b>
		19:15	Moon to the left of Pleiades (M45)
		19:42	<b>First Quarter Moon</b>
Sat	27	05:20	Mars Sets
		06:15	Mercury Rises
		06:36	Sunrise
		16:56	Moon Rise
		17:40	Jupiter Sets
		17:50	Sunset
		18:42	Venus Sets
		19:35	Saturn Rises
Sun	28	11:38	<b>Full Moon</b>
		18:13	Moon Rise
Wed	<b>Mar 3</b>	After 19:20	<b>Zodiacal Light</b> visible in W after evening twilight for next two weeks



## *Lunar Phases*

Sun	Mon	Tues	Wed	Thur	Fri	Sat
	1 	2 	3 	4 	5  Last, 18:50	6 
7 	8 	9 	10 	11 	12 	13  New, 21:53
14 	15 	16 	17 	18 	19 	20 
21  First, 19:44	22 	23 	24 	25 	26 	27 
28  Full, 11:40	<h1>February 2010</h1>					