The Morris Museum Astronomical Society

The
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INSIDE THIS ISSUE:

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Member of

THE MORRIS MUSEUM

MESSAGE FROM THE EDITOR

Anthony Pisano, Editor

NASA has recently updated and refreshed the Night Sky Network website. What is the night sky network? It is a all encompassing resource for amateur astronomy and amateur astronomy clubs. The MMAS has belonged to the organization for some time and we have been logging out outreach sessions with them for the past couple of years and have been using their programs to do our outreach.

As of December the site was completely revamped into an amazing resource tool for all amateur astronomy clubs. Organizations can utilize the site as a conduit for communications with members and the general public. Club events can be posted on a calendar visible to the entire country and can utilize the power and name recognition of NASA. Members now have a sign on (emailed to you when your account was created) that will give them access to a calendar, newsletter, forums, and educational information.

The MMAS plans on utilizing these resources to their fullest in the hope to better communicate events and information bout the club. I encourage you to visit the site, sign in with your account, and explore this amazing recourse.

CLUB MEETINGS

Jan. 14 - Video
Feb. 11 - Video
Mar. 11 - Reorganization Meeting (important for all members to attend)

Monthly Meetings are the second Thursday of each month at 7:30 p.m.
During July & August check the web site for specific information.

MIT Students Take Pictures from Space on $150 Budget

Two MIT students have successfully photographed the earth from space on a strikingly low budget of $148. Perhaps more significantly, they managed to accomplish this feat using components available off-the-shelf to the average layperson, opening the doors for a new generation of amateur space enthusiasts. The pair plan to launch again soon and hope that their achievements will inspire teachers and students to pursue similar endeavors.

Justin Lee and Oliver Yeh have always dreamed of seeing the earth from space, but until recently, they believed that they had neither the budget nor the technical expertise to get a camera into the stratosphere.

Astronomy Day 2010

Save the date!

March 20, 2010
10:00AM—4:00PM
7:00PM—8:30PM

Early September, in a moment of creative inspiration, the pair devised an innovative low-cost, low-effort method for space photography. The device they created cost less than $150, and they were able to build it without any significant modifications to out-of-the-box electronics.

The secret behind their success was figuring out which consumer-ready components to pick-and-match to solve the problems space photographers face. Their device had to: rise to an altitude high enough to capture space photographs, withstand extreme temperatures of the stratosphere, and be trackable/recoverable.

The students knew that helium-filled weather balloons were capable of reaching altitudes of 20+ miles, high enough to photograph the curvature of the earth. Weather balloons were also relatively inexpensive; a 300g latex balloon can be ordered online for $20 and can be filled with helium at a party store for $30. If they could keep their camera device light, then a 300g balloon would have enough lift to carry their device into the upper stratosphere.

Temperatures in the stratosphere can get as low as -55°C, and at that temperature, batteries stop working and electronics fail. To get around this problem without resorting to the use of expensive temperature-resistant hardware or heating devices, the pair used a styrofoam cooler and handwarmers pressed tightly against operating electronics to help keep their equipment functioning throughout the camera's flight.

Locating and retrieving a camera after a near-space launch is a difficult task. Typically, weather balloons are tracked using GPS radio modems which are heavy, cost in the thousands of dollars, and often require complex hardware configurations. In lieu of purchasing a radio modem for their space-bound camera, Lee and Yeh opted to use a $50 GPS-equipped cell phone. The cell phone was secured to the camera and constantly reported its GPS location via text message.

Lee and Yeh launched their balloon from the town of Sturbridge, MA on Wednesday, Sept. 2, 2009. Their balloon-camera-cell phone device reached an altitude of 18 miles before returning to earth. At that height, both the curvature of the planet as well as the blackness of space were photographed by the camera. Pictures taken show cloud formations speckling the blue earth below, and the edges of our atmosphere glow a brighter blue, reflecting the sun's radiance.

"We looked at these photographs and thought *wow, these are beautiful*—this is artwork," remarks Lee. "This inspired us to sit down and really think deep about the relationships between science and art."

After their launch, the duo have founded a website, http://1337arts.com dedicated to promoting the beauty of scientific art and bridging the science and art communities. This could be something big," remarks Lee. "Imagine if the art kids and the science kids in high school got together to do something like [a space launch]."

Yeh stressed the groundbreaking nature of their work. "The fact that we were able to accomplish space photography on such a low budget and with minimal electronic modifications proves that it's really possible for anyone—anyone at all—to do. Imagine how many students might be inspired if their high school science teacher took the time to give his students an out-of-this-world experience."

At a time when budget cuts are forcing NASA to get cut back on spending, and at a time when high school science teachers struggling to capture the interests of students, low-budget space launches could be just what we all need.

GO TO: http://www.ireport.com/docs/DOC-328198 TO SEE THE PICTURES

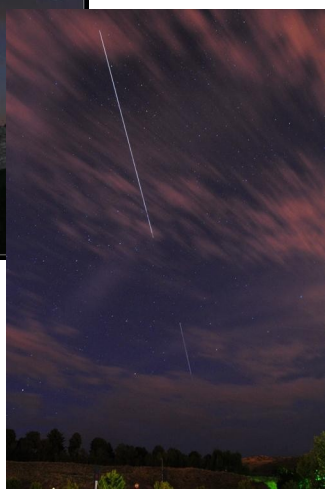
Space Shuttle Unleashes Magnificent Plume of Pee

To anyone who's ever pondered what urine looks like in space -- c'mon, don't be shy -- we say: wonder no more, because photos of the phenomenon have finally hit the internet.

A number of skygazers were lucky to sight a mysterious flare in the night sky, that, as it now turns out, was a 150-pound cocktail of astronaut urine and waste water released from the shuttle Discovery.

According to NASA spokeswoman Kylie Clem, because space regulations bar astronauts from dumping waste water at the International Space Station, the Discovery astronauts had to wait until undocking before they could discard their pee -- which by that point amounted to a hefty ten days' worth.

Sad you missed the show? No need to worry:



you may get another chance, as it's actually a fairly common sighting, says Clem.

Article submissions for future issues please send to: anthonypisano@hotmail.com

Astronomers Clash with US Air Force Over Laser Rules

Could astronomers accidentally blind Earth-observing satellites? That seems to be the worry of the US air force, which restricts the use of lasers pointed at the sky to help focus telescopes. But some astronomers warn they will miss key observations under the rules, which have tightened in recent years.

Many of the world's largest observatories, including Lick, Gemini North, Palomar and Keck in the US, shine lasers into the sky to measure atmospheric turbulence, which distorts images.

The laser causes a layer of sodium atoms at an altitude of about 90 kilometres to glow, producing an artificial star whose twinkles reveal the turbulence. Shape-shifting mirrors on the telescopes, called adaptive optics, then correct for the blurring by adjusting their shape many times per second.

If such a laser were to hit the optics of an Earth-observing satellite, it could cause damage. So the air force's Space Command has for years restricted when and where US observatories can fire them, and the observatories have voluntarily complied, with little impact on astronomy.

Then about two years ago, just as kinks in the laser technology were being ironed out and interest in the lasers was growing, the rules were tightened. Now astronomers say the restrictions are beginning to chafe, according to a story first reported by the American Physical Society.

"Significant negative impacts of these new restrictions on scientific productivity are being felt," says a 2008 report (pdf) by the US Association of Universities for Research in Astronomy, which is based in Washington, DC.

Off limits

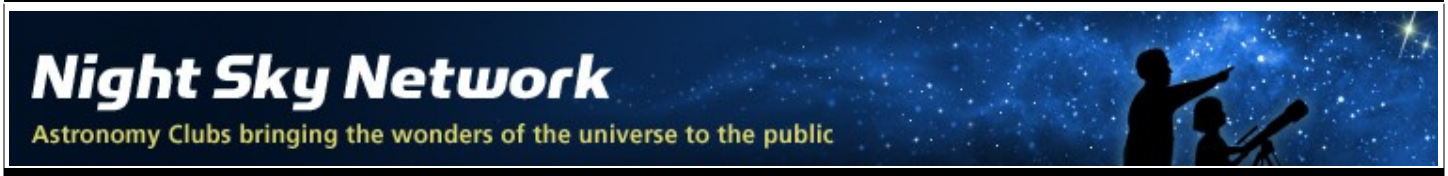
The restricted zones are now so large that they can rule out observations even when a satellite is below the horizon, the report says.

About half to two-thirds of the objects astronomers seek to observe have off-limits periods, or closures, in a given night, the report adds. These periods last a few seconds to a few minutes each.

"Typically we'd get a couple closures a night [before the changes], and now we get hundreds – sort of a dozen per target we submit," says Antonin Bouchez, who manages the laser adaptive optics system at the Palomar Observatory in California.

This means astronomers some-

Cont. on Page 4



THE MOON

DEC. 2009

Full moon	4
Last quarter	12
New moon	18
First quarter	26

JAN. 2010

Full moon	3
Last quarter	11
New moon	18
First quarter	25

FEB. 2010

Full moon	3
Last quarter	10
New Moon	17
First quarter	23

LINKS

www.badastronomy.com

www.heavens-above.com

www.nasa.gov/audience/forkids/kidsclub/flash/index.html

www.space.com

www.astronomycafe.net

www.amsky.com

www.skyandtelescope.com

www.scopereviews.com

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times have to interrupt long exposures of faint objects. It is possible to work around this by combining several shorter exposures, but this adds noise to the image, degrading its quality, Bouchez says.

Long lead time

But the biggest impact of the restrictions is that they prevent laser-adaptive-optics observations of one-off events like supernovae, which appear and fade away in a matter of days, and gamma-ray bursts, which have afterglows in visible and infrared light that often fade away in a matter of hours.

It is impossible to use the lasers for these sudden, brief events because under current rules, US observatories have to submit their proposed targets to the air force three days in advance.

Bouchez says he is not arguing to completely eliminate the restrictions. Satellites with optics pointed at the ground could in principle be damaged by laser beams pointing upwards, he says.

Unknown risks

But it is not clear how sensitive the satellites' optics are, or how likely a given laser is to directly hit a satellite's optics, since details on some US Department of Defense satellites are not publicly released. The air force simply takes astronomers' proposed laser-assisted observations and tells them when to turn the lasers off after crunching its own data on satellite orbits.

"None of us [astronomers] really knows what the risk is," he says. "The air force people are presumably the only ones who do, because we don't know what's up there."

Even if some restrictions are necessary, faster responses from the air force would make them less burdensome, he says. "If you could get an answer within minutes or seconds, then you could observe time-variable things like gamma-ray bursts" with laser-assisted adaptive optics, he says.

The air force did not immediately respond to New Scientist inquiries about the restrictions.