

The Objective View March 2003

Newsletter of the Northern Colorado Astronomical Society

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Next Meeting: March 6 7:30 pm

Jupiter and Saturn
Dr Roger Culver, CSU

NCAS Business at 7 pm

Meeting directions

Discovery Science Center
703 East Prospect Rd, Fort Collins
<http://www.dcsm.org/index.html>

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 the NE corner. From I-25, take Exit 268, West to Lemay Ave, continue West 1/2 mile, see Discovery Center on the left.

NCAS Star Party Dates

March 21, 22, 28, 29

Cactus Flats site is on undeveloped parcel of prairie about 6 miles West of Briggsdale. Take Colo Hwy 14 East from I-25 (Exit 269). Go 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 wire 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. The site is now officially wheelchair accessible, but there are no facilities so bring essentials. Call **Tom Teters**, starmon@jymis.com, with questions about star party status or dates, 482-5702 or 482-0807.

Discovery Science Center Starwatching

March 7	6:30 pm
April 4	7:30 pm
May 9	8:00 pm

Longmont Astronomical Society 1st Quarter Moon Public Viewing Nights, Flanders Park

March 8

Other Events

Little Thompson Observatory Star Night, Berthoud
March 21 Star Night 7 – 10 pm
<http://www.starkids.org>

Cheyenne Astronomical Society
March 21 Cheyenne Botanical Garden 7PM
<http://home.attbi.com/~curranm/>

Open House, Chamberlain Observatory, dusk to 10 PM
March 8 303 871 5172
<http://www.du.edu/~rstencel/Chamberlin/>

Longmont Astronomical Society
March 20, Longmont Christian School, 550 Coffman St
<http://laps.fsl.noaa.gov/cgi/las.cgi>

North Sterling Star Party April 26

February 6 Program

City of Fort Collins Lighting, by Kraig Bader and Ted Shepard

Kraig opened with a summary of street lighting standards. Street lighting is a compromise between police, attorneys, and neighborhood watch groups who promote more light, and developers and skywatchers who want less. Many cities follow Illuminating Engineering Society Guidelines, and the City for Fort Collins Guidelines call for about half as much light. Larimer County Urban Area Street Guidelines are available online at

www.larimer.org/engineering/GMARdStds/UrbanSt.htm

The light level for local streets is 0.2 to 0.4 footcandles, collector streets are 0.4 to 1.3 foot-candles, to a maximum of 3.5 foot-candles on College Avenue north of Harmony. IES classifies fixtures by wattage and optics type. Type 5 casts a circular pattern, Type 1 is a very confined strip. Most fixtures are Type III. The city specifies full cutoff, high-pressure sodium luminaries in cobrahead fixtures. It costs \$300 to \$400 to change a fixture. Utility series post top luminaries are used in neighborhoods. These are designed to give an oblong Type III distribution along the street. The fixtures are not full cutoff, but minimize light above 90 degrees. For residential lighting, the city recommends use of motion detectors and care in aiming lights. Commercial lighting designs often are presented with 4 to 5 times the light recommended in guidelines. Kraig sees area lighting as a work in progress, and understands the motivation of skywatchers to control lighting.

Ted Shepard then outlined his work with businesses to design lighting. The city actively works with designers to avoid poorly executed, dazzling lights. He pointed to the new Spradley-Barr lot and the Super Wal-Mart on Lemay as examples of appropriate outdoor lighting by businesses. Full-cutoff fixtures without glare are listed in the standards. Exceptions are made for sports facilities. Ted encouraged

The Objective View

March 2003
Newsletter of the Northern Colorado Astronomical Society

NCAS members to participate regularly at City Council, and develop influence on lighting in the community.

Observatory Park by Village Homes

Pat Elliott presented an overview of the Observatory Park neighborhood. The developer came to Fort Collins 2 years ago, with a desire to give something back to the community. An observatory was chosen as a unique resource. The facility was designed in cooperation with Little Thompson Observatory members, and is to be staffed by the Front Range Community College astronomy faculty. A 14" Celestron SCT is planned in the dome, controlled by TheSky software. The development is at Harmony and Ziegler Road, and has homes in the \$200K to \$300K range. There is an astronomy-themed park, bike paths and pool. The Grand Opening is planned in September 2003. Information on the builder is available at www.theplaceyouwanttobe.com **866 752 2322**

NCAS Business

President Dan Laszlo called the meeting to order. He encouraged members to attend the Destination Mars exhibit and assist with Discovery Science Center star parties. Vice President Max Moe announced programs to come. Steve Lee is scheduled for April 2003. Treasurer Nate Perkins gave a treasurer's report and encouraged members to stay current with their dues.

Scope for Sale

Coulter 10 inch Dobsonian. Like new. Includes Kellner eyepiece, eyepiece rack, red-dot aiming device, aperture stop, dustcap. \$600. Call Gene, 970-568-0545.

Clear Sky Clocks for Colorado

http://cleardarksky.com/csk/prov/Colorado_clocks.shtml

Best Looks

Moon	by Saturn 3/10, by Jupiter 3/12 by Mars on 3/25, by Venus 3/27& 28
Mercury	Too near Sun
Venus	low in ESE predawn
Mars	In SSE predawn
Jupiter	Opposition Feb 1-2, highest at midnight
Feb 10	1928 to 1940 Europa occults Ganymede 2016 to 2025 Europa eclipses Ganymede
Saturn	Visible from early evening through night
Uranus	By Venus 3/28
Neptune	Low in SE predawn

From Jim S: Best Moon Site I've Seen:

<http://www.moon-phases.com/>

Desert Sunset Star Party - May 1-4, 2003

Registration is now online for the Desert Sunset Star Party. Please check our website <http://chartmarker.tripod.com/sunset.htm> for details about this new star party and to get your registration forms. EARLY REGISTRATION ends March 15. The Star Party will be held at Kartchner Caverns State Park May 1-4, 2003. In addition to scheduled tours for Friday and Saturday, there are many places to visit in southern Arizona, many within a 1-hour drive. Vendors will be on hand in the afternoons along with several demonstrations. Dinner will be catered in for those who order it, followed by speakers, door prizes, and some great star gazing. Get your registrations in soon to take advantage of the early registration rates. And don't forget to order your T-shirts.

Chart Markers and More
Pat and Arleen Heimann
<http://chartmarker.tripod.com>

Pioneer 10 Sends Last Signal

Pioneer 10 explored Jupiter, traveled twice as far as the most distant planet in our solar system, and as Earth's first emissary into space, is carrying a gold plaque that describes what we look like, where we are, and the date when the mission began. Pioneer 10 will continue to coast silently as a ghost ship into interstellar space, heading generally for the red star Aldebaran, which forms the eye of the constellation Taurus (The Bull). Aldebaran is about 68 light-years away. It will take Pioneer 10 more than two million years to reach it. Its sister ship, Pioneer 11, ended its mission September 30, 1995, when the last transmission from the spacecraft was received. Information about Pioneer 10 is on the Internet at:

http://spaceprojects.arc.nasa.gov/Space_Projects/pioneer/PNhome.html

Comet LINEAR Animation
From: john gleason
Sent: Thursday, February 20, 2003 2:55 PM
To: SBIG@yahoogroups.com
Subject: [SBIG] Comet LINEAR anamation

Go to the SOHO web site:
<http://sohowww.nascom.nasa.gov/data/realtime-images.html>

Go to LASCO C3 (blue image) and click on the anamated gif. You will see a cool anamation of Comet LINEAR cross the field.

On Columbia

AERcam Remote Camera flown by STS-87

The Objective View March 2003

Newsletter of the Northern Colorado Astronomical Society

Here's a site with a couple of videos of the real thing in action on STS-87... clearly showing that it would have been useful for inspection.

http://vesuvius.jsc.nasa.gov/er_er/html/sprint/index.htm

They clearly have the control issues in hand. It responds pretty crisply. Oh well... hindsight.

JCA

>Do any of you know why this was abandoned?

As a proof-of-concept thing it did work to some degree, but it was too cost intensive (also a tad bit too complicated, needing an astronaut to precisely control it) for being "merely" a free-flying camera platform, as such it didn't really serve a proper purpose, neat as the idea though was. Also it is never regarded as a good idea to have free-floating stuff around your sensitive spacecraft hardware, some engineers surely are nervous about that. There are a few ideas along the line of such a device in many creative heads, such concepts pop up every now and then and there is always some research going on somewhere in the robotics community. Could well be that the Columbia accident sparks more interest in that field, also regarding the development of more sophisticated, autonomous and "intelligent" free-flyers/robots. And I've already wondered whether we might see a revival of the MMU, or maybe something like an "Enhanced SAFER Mark II", but I'm not exactly holding my breath in that regard.

>Do you know if NASA has rescue plans in place for each mission?

No, that was pure per-chance-speculation on my part. The scenario you laid out there was what if they knew for sure they're doomed. If they knew that for sure, they'd have started thinking about what can be done to get the crew back. The only thing they could have done in that case is be creative and reassign the next orbiter in line to a rescue effort, there's no other way to get the crew back, and if there is no orbiter (plus ET, plus SRBs, plus launch pad, etc.) available in time, you don't have a rescue mission, plain and simple. The next orbiter in line would have been Atlantis, which was (and still is) stacked in the VAB for the March 1st mission to the ISS.

Now, regarding that they couldn't have done anything about it, this is a slightly different scenario. First, they didn't know of a problem, because of all the evaluation and analysis going on post-launch. The conclusion that the debris impact on launch apparently wouldn't be a safety of flight issue wasn't reached until well over a week had gone by, it took that long to thoroughly analyze the incident. So this wasn't anything along the line of reaching orbit and knowing right from the start that you're in trouble. Could they have simply looked at it to determine possible damage? Hardly, because that's not an easy task at all (and also I doubt they'd have seen anything). Could the astronauts have done anything about all of that? Nope, not a chance. Couldn't have checked themselves, couldn't have repaired themselves, etc.

So let's consider what would have happened if, after analysing the launch incident for more than a week, they had come to the

conclusion that there might be a problem with the left wing preventing them from a successful reentry. This would have left them with the decision to either give it a shot and ride the orbiter down, or be safe and not try it. What then? Scrub the next ISS mission for a speculative guess, and design and launch a rescue mission? Tough call, isn't it? Also you'd have to be quick about it, since your astronauts in orbit are nearing the regular end of their already longer-than-usual mission at that point, and even with them safing all their consumables you'd still have to have a rescue vehicle rendezvoused within about a week, otherwise you could pretty much forget about it all. So from the point of figuring you have a safety of flight issue you're left with about a week or a bit more in which you have to decide that you're serious about such a rescue effort (funding? ISS schedule? ISS partners? etc.), unstack Atlantis, unload the precious ISS payload, modify the Shuttle for a Hail Mary rescue mission (at least by getting up to five EMUs and SAFERs (or some tethers), Columbia has two already; also better have an airlock and RMS ready), restack it and prepare it for launch while disregarding pretty much any safety procedures in order to save time, roll it out to the hopefully prepared pad, have a CDR and PLT and a proper mission profile ready, launch it, rendezvous, and then do what you intend to do (check and assess damage, either try to repair it somehow or if necessary rescue the crew and maybe also some equipment). And all that must happen successfully without further interruption, flaws, troubles along the way. Even if they had known for sure, that late into the flight, that there was serious damage and a possibly catastrophic reentry, that would have been an **enormous** effort in which you still might well have been running out of time. And then not to forget that, in the actual scenario, there is no way they could have foreseen the catastrophic reentry, that is, the assessment that the debris impact wouldn't pose a safety of flight issue still is valid. They couldn't have predicted this catastrophic reentry, absolutely not; and actually, bearing in mind that the investigation is still ongoing, it hasn't even been determined yet whether that piece of ET foam was the factor, or a factor among several others, or maybe even no factor at all. That's in a nutshell what NASA officials (and my humble self) mean when they say that they couldn't have done anything about it anyway.

You certainly now can expect future changes to better some of these problems in the wake of the Columbia disaster, but the general problem will not change (at least I can't see how it could be changed). You can get a stranded crew down with a makeshift rescue mission, but this requires certain mission and time constraints to be met, and if you have no orbiter available or supporting hardware blocked or just any other trouble of that kind, you don't have a rescue mission, period. This is simply one of the dead-end kind of things that make spaceflight the risky business that it is, there simply are some scenarios where you could end up unable of doing anything about your situation, and if that situation is fatal, you're boned. That's why it is so important to try to make sure beforehand that you don't potentially get into such situations in the first place, hence the extreme safety awareness in manned spaceflight.

CU! Markus Mehring

The Objective View March 2003

Newsletter of the Northern Colorado Astronomical Society

From Lee Youngblood

**** Shuttle mystery in the ionosphere ****

The space shuttle Columbia broke up in a little-understood area of the upper atmosphere called the ionosphere.
http://www.msnbc.com/modules/exports/ct_email.asp?/news/870915.asp

From Andrea Schweitzer

I was at NASA Headquarters this past week to help with a presentation. (Hqs is in downtown Washington, DC, in a big administration building. Not quite like visiting the big NASA sites like Houston!)

I was at Hqs to present a study about using astronauts to build larger telescopes in space. Right now, we're limited to the size of a shuttle cargo bay or rocket, and the telescopes have to go up in one piece. They can have parts (antenna, solar panels, etc.) which self-deploy, but sometimes the unfolding mechanisms don't always work properly. Thus, it can be good to have a handy astronaut to help get unfolding parts unstuck!

We could create even more amazing telescopes if the astronauts could build in space- taking several parts and assembling, the way they have done for the ISS. This could give much greater structural stability to the bigger telescopes than self-deployment, for example, which is especially critical as we use longer/larger pieces.

Just a few thoughts to share from my trip-

* The outside of the Hqs building had a row of flowers sent in memory of the Columbia astronauts. Since I was there a few days after the disaster, the flowers were getting a bit droopy, but that was fitting in its own way.

* Many people had sent cards with the flowers. One card encouraged "Faster, Better, Safer" as a motto for the future (a spin on Dan Goldin's previous "Faster, Better, Cheaper" philosophy).

[Note- for a commentary on this, visit the web site www.nasawatch.com/fbc.html.]

* There were also condolences from other countries, which was nice to see.

* I was working with people who provide direct support to the astronauts during EVA's (Extra-vehicular Activities, doing spacewalks). I didn't know any of the astronauts, but the others I was working with, and presenting to, had lost friends and colleagues. People were grieving for the astronauts, but also had an air of determination to find the problems (both mechanical and in leadership and process) and fix them. Granted, I wasn't working among the highest levels of NASA, but this was my sense from the people working "in the trenches."

Andrea

Forwarded from Arthur C Clarke -- Tribute to Columbia
11th Feb 2003

In a few months we will be celebrating the first centennial of heavier-than-air flight. It is now hard to believe that when the Wright Brothers started the revolution which has changed our world, most Americans papers never reported the event because they were sure it was a hoax. Leading scientists had "proved" that it would defy the laws of Physics. The conquest of the air took many lives though only a fraction of those lost during the millennia when the Oceans were opened up for navigation. As Kipling wrote: "If blood be the price of Admiralty, Dear God we have paid in full!"

Well, with Columbia and the earlier Apollo 7 and Challenger tragedies, we are starting to pay the price of Astronautics, and inevitably some are asking "Is it worthwhile?" A hundred years from now such a question will seem as absurd as criticisms directed at the importance of aviation, c1900.

No-one will deny the enormous value of space technologies for communications, weather forecasting, surveying and peace keeping. However, most, if not all, of these duties can best be performed by robot satellites: what useful work can men - and women - do in Space?

Lost satellites have been saved by an astronaut with a screw driver - and it is not easy to make robots perform this sort of feat. Whole new branches of medicine will be opened up in the weightless environment of space, while this will also attract countless tourists during the decades to come.

Although space travel is still extremely expensive, there is no reason why it should always be the case. One day the noisy, inefficient and dangerous rocket will be replaced by the Space Elevator, which is exactly what its name implies. It costs about \$1000 worth of electrical energy to take a human being up to Geostationary Orbit - and perhaps \$100 for the round trip, since most of the energy can be recovered on the downward journey! For years I have been saying that one day the chief costs of space travel will be for catering and in-flight movies.

More seriously, there is a vital reason why we must explore Space: the very survival of the human race may depend upon it. There were at least three major meteor impacts during the last century, and almost every week our atmosphere protects us from meteorites which could deliver kiloton blasts if they reached the earth's surface. Some 60 million years ago a comet or meteorite changed the course of evolution and gave an un-prepossessing little mammal a chance to replace the giant reptiles who were then lords of the earth.

In 1973 I opened "Rendezvous with Rama" (choosing the ominous date 9/11!) with a devastating meteor impact on Europe. In that novel I proposed the name "Spaceguard" for an organization which would watch out for dangerous celestial projectiles, and deflect or destroy them. I am happy to say that when Congress ordered NASA to look into the matter, the resulting report (Jan 25th 1992) was called the

The Objective View March 2003

Newsletter of the Northern Colorado Astronomical Society

"Spaceguard Survey", with due acknowledgement to the novel. As my fellow science-fiction writer Larry Niven summed it up: "The dinosaurs became extinct because they did not have a space programme." If the same thing happens to us, we will have proved our unfitness to survive.

Arthur C Clarke
Colombo. 10 February, 2003

Tucson Citizen Op Ed Piece: Space Matters **Michael J. Drake, Director, Lunar and Planetary Laboratory**

Since the earliest times, humans have wondered about our cosmic neighborhood. We have gazed in awe at the planets and stars. We have wondered about our origins and our destiny. The heavens beckon us. Even the seven days of our week are named for the seven ancient "planetes", or wanderers, visible to the ancient Greeks, the Sun, Moon, Mercury, Venus, Mars, Jupiter and Saturn.

Once the abode of gods, the heavens have slowly yielded their secrets to rational thought. By 300 BC the ancient Greeks, using nothing more than the naked eye, had determined that the Sun was much further away from Earth than the Moon. By 140 AD Ptolemy had determined the distance to the Moon and bequeathed us the Earth-centered Ptolemaic system of motion of the planets.

But it was technology that enabled great leaps forward. With the invention of the telescope, Galileo discovered sunspots, craters on the Moon, the Galilean moons of Jupiter, and Jupiter's Great Red Spot, in the process getting into trouble with the church for supporting the view that the Sun, not Earth was the center of the solar system.

The invention of space flight led to the golden age of cosmic exploration. In 1957 with Sputnik, we took the first tentative steps towards projecting ourselves into space, first robotically, then with humans. A destiny amongst the stars seemed to be within reach. In the ensuing 45 years, robotic spacecraft have explored to the far reaches of the solar system, revealing exotic new worlds to the wonderment of human eyes. We have landed robots on the Moon, Mars, Venus, and an asteroid. Powerful space telescopes have probed outwards into the universe and back in time to within a few billion years of the big bang. We have even detected the microwave residue of the big bang, 14 billions of years later. Earth orbiting spacecraft have predicted weather, surveyed natural resources, monitored crops, probed the oceans, provided us with navigation tools, TV and communications, and have contributed to our national defense. Because of space exploration, we are the first species in the 4.5 billion year history of our planet that can protect the planet against cosmic catastrophes like the impact of a 20 mile wide asteroid 65 million years ago that wiped out the dinosaurs and most species on the planet.

We have landed humans on the Moon, and built an Earth-orbiting space station. Americans are an exploring people, the frontier is a concept deeply embedded in our national consciousness, and we are excited and proud to see Americans performing extraordinary feats in space. Deep inside we believe our destiny lies among the stars, as popular culture reveals with the popularity of Star Trek and Star Wars.

The U.S. Space Program has enriched us emotionally and intellectually, has made our lives better, more convenient, and safer, and engages us culturally. But is it worth the cost at a time of massive budget deficits and a shaky economy, when so much needs to be done at home? NASA consumes less than 1% of the federal budget, down from about 4% at the time of Apollo. And most of that money is spent employing people here in the United States. Investing in NASA is investing in the Nation.

Every great society in history has spent some fraction of its national treasure on the arts, exploration, and discovery. The ancient Greek city states, the Roman Empire, the Islamic Caliphates, the Medicis, the British Empire, and now the United States have placed high value on expanding human knowledge and culture without demonstrable immediate tangible benefit, only to be richly rewarded by application of the discoveries.

In the 15th century, the Chinese Emperor Ming Chengzu made the fateful decision to stop exploring the oceans and burn his ships. Had he not done so, the great European voyages of discovery would perhaps never have been taken, and the world would be a very different place. A retreat by the United States from the exploration and development of space, from the expansion of human presence into the solar system, would be as short-sighted.

On February 1, 2003, the Space Shuttle Columbia was tragically destroyed during re-entry. Some may use this tragedy to question the purpose of human space flight. Some may ask if it worth the risk. But Americans have always explored, and space really is the final frontier. To retreat from the adventure of human space flight runs counter to the dynamic of American culture. The popular bumper sticker about the Stars and Stripes, "These Colors Don't Run," pervades all aspects of our society.

We should honor the fallen astronauts, not by building a replacement Space Shuttle, but by setting the grand goal of landing people safely on Mars by, say, 2030 to conduct scientific research, advancing once again into space with people after our retreat from the Moon to low-Earth orbit. Along the way, perhaps we would build an Antarctic-like base on the Moon as a way of learning to live permanently on another body. We would do astronomy from the Moon. We would explore the Moon's geology and natural resources. We would need to fly robotic missions to the Moon and Mars to advance scientific knowledge and ensure human safety. We would need a space plane that could fly a million miles from Earth to take people to the L2 point, where Earth's, the Moon's, and the Sun's gravity precisely cancel each

The Objective View March 2003

Newsletter of the Northern Colorado Astronomical Society

other out, providing an ideal staging post to the planets. That would be a fitting tribute to fallen astronauts and it would give America an affordable space program to inspire the world.

>From Dave Boll:

Nice piece & I'd agree with it... if we lost these 7 in the name of exploration. We didn't. They went to LEO for the zillionth time, to watch dust float. Ooooh, pinch me! That's gripping stuff. They were just a bit farther from Earth than I am from Pueblo, visiting a destination only a little more exciting. My hope is that the Columbia tragedy highlights the triviality of our current manned "exploration" effort, and impels us to change direction. It has now been over 30 years since any (living) human was even 1000km away from Earth. The next time we lose good people in space, I hope they are pursuing a worthy goal.

From Dave Chamness

I agree with your sentiments, and I have rarely heard this viewpoint expressed. Far more common are the romantics who idolize any space flight, no matter how useless. Versus the surrender-mongers who don't want to spend any money on space exploration when it could be used to fight AIDS, or do some earthbound good.

In many ways I admire the romantics, and do not wish to hurt their feelings by expressing my disagreement with them. I might be happier if I saw more beauty where I now see the mundane.

I see the space station as the approximate equivalent of the Chinese emperor burning his ships, except it is way more expensive. It has marooned us too close to earth, wading in the ocean up to our knees, getting smacked by breaking waves. We keep doing circular experiments on weightlessness, which is the unnecessary condition inside the space station. When humans really decide to go somewhere, they will do so with centrifugal gravity in their ship.

Where are the missions of exploration? They have been scrubbed because NASA's budget is wasted on the space station and the \$500 million per launch shuttle. The cost and weight of life support is better spent on robotics. One astronaut was a photographer for a dust experiment. I could automate that for the cost of one high end video camera with a laptop interface.

If your unmanned satellite fails to unfold its solar panel, you can launch another one for less money than it costs to send a human to fix it.

I am a cold analytic non-romantic engineer. I want the most science I can get for the money. Since 1970, the biggest bang for the buck has come from unmanned missions.

Dave

Andrea Schweitzer responds:

I agree completely with what you have written. For now, and into the foreseeable future, robotic missions have the best return of science per \$.

Here is what I value about humans in space: the political

stability we're giving worldwide by employing scientists, the educational inspiration that the astronaut program gives to kids and schools, as well as the "romantic" perspective you mentioned.

For myself, in my own mind, I don't debate robotic vs. human missions. I see a place for both, and different attributes for both. But for spending, I look at the entire picture of our economic spending. If I want to see more money available (and well spent) for robotic missions, I don't suggest taking it away from human spaceflight. NASA and the ISS is a small percentage of our country's spending. To me, humans in space is a hopeful program that I support in the midst of our massive government spending on war.

Why is there so much emphasis on debating the value of the ISS, and no debate of the value of SDI and some other massive programs, which are costing us far more money while giving even lesser return than the ISS?

Reducing some of these programs, even by a few %, would save more of my taxes than cutting the ISS.

Seems to me that a "cold analytic non-romantic engineer" would be more interested in shaving \$100 to \$98, than in debating \$1.

Andrea

From Tom (Sciteach) in Iowa:

Here are a couple URLs that some may be interested in checking out. I discovered them by doing a Google search using the words.... debris aerial Columbia satellite view... or something like that.

Satellite Imagery of Shuttle Debris Area

http://www.directionsmag.com/article.php?article_id=305

Geospatial Data for Space Shuttle Columbia Recovery Activities

<http://columbia.csr.utexas.edu/>

From Tom Teters

Greetings,

Finally got out and observed Friday, first time in....don't ask. It's a busy time at the Discovery Center this week, The Discover Mars Exhibition is in full force, we had the NCAstro meeting Thursday and Friday the Boy Scout sleep over and the star party in the parking lot. About 40 kids & adults & 4 scopes. The Gibbous Moon didn't help at all, but didn't effect the transit of Jupiter or the beautiful ringed planet. Atmosphere was VERY steady and it was quite easy to see the transit of IO, just couldn't stay awake long enough for Europa.

So what is the resolution of that view. I could have easily see a 1/2 IO diameter. 2630 mile diameter at.....

Think Cosmic,
tomt

The latest, breaking news for you Mars fans... Andrea

Images available at

http://www.gps.caltech.edu/~shane/swiss_press.html

The Martian polar caps are almost entirely

The Objective View March 2003

Newsletter of the Northern Colorado Astronomical Society

water ice, Caltech research shows

PASADENA, Calif.-For future Martian astronauts, finding a plentiful water supply may be as simple as grabbing an ice pick and getting to work. California Institute of Technology planetary scientists studying new satellite imagery think that the Martian polar ice caps are made almost entirely of water ice-with just a smattering of frozen carbon dioxide, or "dry ice," at the surface.

Reporting in the February 14 issue of the journal *Science*, Caltech planetary science professor Andy Ingersoll and his graduate student, Shane Byrne, present evidence that the decades-old model of the polar caps being made of dry ice is in error. The model dates back to 1966, when the first Mars spacecraft determined that the Martian atmosphere was largely carbon dioxide.

Scientists at the time argued that the ice caps themselves were solid dry ice and that the caps regulate the atmospheric pressure by evaporation and condensation. Later observations by the Viking spacecraft showed that the north polar cap contained water ice underneath its dry ice covering, but experts continued to believe that the south polar cap was made of dry ice.

However, recent high-resolution and thermal images from the Mars Global Surveyor and Mars Odyssey, respectively, show that the old model could not be accurate. The high-resolution images show flat-floored, circular pits eight meters deep and 200 to 1,000 meters in diameter at the south polar cap, and an outward growth rate of about one to three meters per year. Further, new infrared measurements from the newly arrived Mars Odyssey show that the lower material heats up, as water ice is expected to do in the Martian summer, and that the polar cap is too warm to be dry ice.

Based on this evidence, Byrne (the lead author) and Ingersoll conclude that the pitted layer is dry ice, but the material below, which makes up the floors of the pits and the bulk of the polar cap, is water ice.

This shows that the south polar cap is actually similar to the north pole, which was determined, on the basis of Viking data, to lose its one-meter covering of dry ice each summer, exposing the water ice underneath. The new results show that the difference between the two poles is that the south pole dry-ice cover is slightly thicker-about eight meters-and does not disappear entirely during the summertime.

Although the results show that future astronauts may not be obliged to haul their own water to the Red Planet, the news is paradoxically negative for the visionary plans often voiced for "terraforming" Mars in the distant future, Ingersoll says.

"Mars has all these flood and river channels, so one theory is that the planet was once warm and wet," Ingersoll says, explaining that a large amount of carbon dioxide in the atmosphere is thought to be the logical way to have a "greenhouse effect" that captures enough solar

energy for liquid water to exist.

"If you wanted to make Mars warm and wet again, you'd need carbon dioxide, but there isn't nearly enough if the polar caps are made of water," Ingersoll adds. "Of course, terraforming Mars is wild stuff and is way in the future; but even then, there's the question of whether you'd have more than a tiny fraction of the carbon dioxide you'd need."

This is because the total mass of dry ice is only a few percent of the atmosphere's mass and thus is a poor regulator of atmospheric pressure, since it gets "used up" during warmer climates. For example, when Mars's spin axis is tipped closer to its orbit plane, which is analogous to a warm interglacial period on Earth, the dry ice evaporates entirely, but the atmospheric pressure remains almost unchanged.

The findings present a new scientific mystery to those who thought they had a good idea of how the atmospheres of the inner planets compared to each other. Planetary scientists have assumed that Earth, Venus, and Mars are similar in the total carbon dioxide content, with Earth having most of its carbon dioxide locked up in marine carbonates and Venus's carbon dioxide being in the atmosphere and causing the runaway greenhouse effect. By contrast, the eight-meter layer on the south polar ice cap on Mars means the planet has only a small fraction of the carbon dioxide found on Earth and Venus.

The new findings further pose the question of how Mars could have been warm and wet to begin with. Working backward, one would assume that there was once a sufficient amount of carbon dioxide in the atmosphere to trap enough solar energy to warm the planet, but there's simply not enough carbon dioxide for this to clearly have been the case.

"There could be other explanations," Byrne says. "It could be that Mars was a cold, wet planet; or it could be that the subterranean plumbing would allow for liquid water to be sealed off underneath the surface."

In one such scenario, perhaps the water flowed underneath a layer of ice and formed the channels and other erosion features. Then, perhaps, the ice sublimated away, to be eventually redeposited at the poles.

At any rate, Ingersoll and Byrne say that finding the missing carbon dioxide, or accounting for its absence, is now a major goal of Mars research.

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The Objective View March 2003
Newsletter of the Northern Colorado Astronomical Society

TO:

Date	Mag	Starts			Max. Altitude			Ends		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
05 Mar	2.8	03:53:41	13	ENE	03:53:41	13	ENE	03:54:06	10	ENE
05 Mar	1.2	05:26:02	17	NW	05:27:18	21	NNW	05:29:52	10	NNE
06 Mar	1.4	04:31:24	24	NNE	04:31:24	24	NNE	04:33:09	10	NE
07 Mar	1.6	05:09:00	15	NNW	05:09:46	16	NNW	05:11:52	10	NNE
08 Mar	2.2	04:14:08	15	NNE	04:14:08	15	NNE	04:15:03	10	NNE
08 Mar	2.1	05:48:14	10	NNW	05:49:31	12	N	05:50:49	10	NNE
09 Mar	2.0	04:51:32	13	NNW	04:52:02	13	N	04:53:39	10	NNE
10 Mar	2.7	03:56:31	11	NNE	03:56:31	11	NNE	03:56:40	10	NNE
10 Mar	2.2	05:30:22	10	NNW	05:31:42	12	N	05:33:02	10	NNE
11 Mar	2.2	04:33:46	12	N	04:34:04	12	N	04:35:22	10	NNE
12 Mar	2.2	05:11:56	10	NNW	05:13:36	13	N	05:15:16	10	NE
13 Mar	2.3	04:15:47	12	N	04:15:52	12	N	04:17:09	10	NNE
13 Mar	1.5	05:50:16	10	NNW	05:52:53	23	NNE	05:55:32	10	ENE
14 Mar	2.0	04:53:06	10	NNW	04:55:13	16	NNE	04:57:20	10	ENE
15 Mar	2.4	03:57:42	13	NNE	03:57:42	13	NNE	03:58:59	10	NE
15 Mar	0.9	05:31:17	10	NW	05:34:16	34	NNE	05:37:14	10	E
16 Mar	1.7	04:34:49	15	NNW	04:36:31	21	NNE	04:39:05	10	ENE
17 Mar	2.6	03:39:39	14	NE	03:39:39	14	NE	03:40:40	10	NE
17 Mar	-0.1	05:12:07	10	NW	05:15:17	59	NNE	05:18:27	10	ESE
18 Mar	1.1	04:16:53	28	N	04:17:32	31	NNE	04:20:26	10	E
19 Mar	-0.7	04:54:13	24	WNW	04:55:59	73	SW	04:59:11	10	SE
20 Mar	1.1	03:59:21	32	E	03:59:21	32	E	04:01:20	10	ESE
20 Mar	1.2	05:31:55	10	W	05:34:02	16	SW	05:36:08	10	S
21 Mar	0.4	04:37:00	32	SSW	04:37:00	32	SSW	04:39:20	10	SSE
23 Mar	1.5	19:14:22	10	SSE	19:15:12	13	SSE	19:15:12	13	SSE
24 Mar	-0.1	19:50:38	10	SW	19:53:06	47	S	19:53:06	47	S
25 Mar	0.5	18:53:05	10	SSW	18:55:44	25	SE	18:58:21	10	ENE
25 Mar	1.6	20:28:47	10	W	20:30:41	27	WNW	20:30:41	27	WNW
26 Mar	-0.4	19:30:19	10	WSW	19:33:26	71	NW	19:35:37	18	NE
27 Mar	1.6	20:08:52	10	W	20:11:27	23	NNW	20:12:35	19	N
28 Mar	0.7	19:10:01	10	WSW	19:13:00	39	NNW	19:16:00	10	NE
29 Mar	2.0	19:48:50	10	WNW	19:51:02	17	NNW	19:53:14	10	NNE
30 Mar	1.4	18:49:40	10	W	18:52:22	26	NNW	18:55:05	10	NE
30 Mar	2.4	20:28:02	10	NNW	20:29:15	12	N	20:29:51	11	N
31 Mar	2.3	19:28:39	10	NW	19:30:24	14	NNW	19:32:09	10	NNE
01 Apr	2.4	20:07:30	10	NNW	20:08:33	11	N	20:09:37	10	NNE
02 Apr	2.3	19:08:13	10	NNW	19:09:33	12	N	19:10:53	10	NNE