

STARSCAN

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Landing the Shuttle
A Story of the Shuttle Training Aircraft
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Howdy All,

Just a note here to express my appreciation for the generous contributions made towards Astronomy Day. Once again, a club that "doesn't really exist" was able to pull together \$200 dollars in one sitting!! This will certainly help in our efforts to advance Astronomical awareness this October. Volunteers are always welcome to come out to Brazos Bend State Park and help with the various activities. If you would like to do this, you can contact David or me and we can help coordinate with the A-Day planners. The Regional Astronomy All Clubs meeting will be held the night before A-Day and all are encouraged to attend as well. We are also nearing our Fort McKavett Star Party and planning efforts will begin soon. Reservations are being taken for use of the new restroom facilities adjacent to the showers!! Operators are standing by!!!!

Bob Taylor,
President

Notes From The Fort

Ken Lester

In case you haven't heard, your editor is now a Park Ranger at Fort McKavett. The end of June was a very busy time for the staff at Fort McKavett. We hosted the "*Old Stories, New Voices*" camp for children ages 9 to 12. The week long intercultural camp spotlights the contributions of African Americans, American Indians, Hispanics and Anglos to Texas' history and culture. The weather even cooperated with mild temperatures and no rain.

I was very pleased that astronomy was included in the program. On Wednesday, I set up my PST and let the children look at the Sun. Unfortunately, mild temperatures usually mean lots of clouds so viewing time was severely limited.

On Thursday the children traveled to South Llano State Park for some canoeing fun. Mark Stein, camp director, and volunteer Ken Fraley (both have attended our Fort McKavett star parties) pulled out their scopes that night to share the stars with the kids. Once again, clouds limited viewing time.



Solar viewing at *Old Stories, New Voices* camp
Image by John Cobb

Hopefully, if we have the same program next year, we can get some cloudless skies and do some real viewing.

We are gearing up for the October Star Party. We will soon be handing bookmarks out to our visitors. These will have the star party date, our logo, and a deep sky image and astronomy fact.

A recent newspaper article about fort activities even had a picture of kids observing the Sun at one of our star parties.

Hope to see you all in October!

Landing The Shuttle

Triple Nickel

This month's cover photograph shows a Shuttle Training Aircraft or STA, flying by the shuttle Discovery after mission STS 121 landed, July 17, 2006. This article is the story of this STA mission and all that went on in order to give the "Go" for landing of STS 121.

During the launch and landing of the shuttle, there is a mission requirement to fly shuttle approaches and check the weather in the launch and landing area. This is done on board an STA. The STA is a highly modified Gulfstream II corporate jet that can be made to fly like the shuttle. The left seat of the STA is modified to replicate the shuttle commander's left seat of the shuttle, while the right seat becomes the only seat from which the jet can be flown when not in the shuttle simulation mode. The left seat includes shuttle switches, displays, and flight controls. The official title of the mission of the STA during launches and landings is the "STA weather flight". The crew consists of an STA instructor pilot, a Flight Simulation Engineer or FSE, and usually the Chief of the Astronaut office or another astronaut shuttle commander who has landed the shuttle. On this particular flight, the STA instructor was myself, the FSE was Phil Vaughn, and the Chief of the astronaut office Kent Rominger was observing astronaut Mike Bloomfield while Mike made the "call" on the weather.



NASA Pilot Triple Nickel
Note the JSCAS cap!

The scheduled landing time was Monday, July 17, 2006, 0914 EST, with a back up landing one orbit later at 1050 EST. If the weather were not good enough for a landing on either of these attempts, then the shuttle would remain in orbit until the next day, and the back up landing sites would not be used on the first landing day.

It should be noted here that the shuttle has three primary landing sites: Florida's Shuttle Landing Facility or SLF, California's Edwards AFB, and New Mexico's White Sands Space Harbor.

On this particular mission, the SLF was the primary landing site, as it usually is due to the ease of reconfiguring the shuttle for another launch without having to ship it back to Florida atop one of the two NASA Boeing 747's. Edwards AFB was the secondary landing site with White Sands being considered as a tertiary site. Additionally, neither Edwards AFB nor White Sands were "called up" on Monday. This means we did not deploy an STA to these sites. If the shuttle had not landed on Monday morning, the plan was to try Florida again the next day, but additional STA's would have been deployed to Edwards AFB and the White Sands Space Harbor on Monday afternoon to be ready for a Tuesday landing if the weather were again too bad at the SLF. The interesting thing here is, the shuttle's path over the Earth moves West as the orbits continue, and if Florida was not good for landing, then New Mexico and California would be good just an orbit or two later (approximately 90 minutes per orbit). Actually, the Earth is rotating under the shuttle's fixed orbital path, thus moving the path over the ground westward.

At 1300 on Sunday, July 16, 2006, myself, my FSE Phil, and 9 maintenance people took off from Ellington Field, Texas, for Florida's SLF. We landed there two hours later, noticing that there was a lot of developing weather over Florida and particularly to the northeast, moving towards the SLF. My initial thoughts were of course about the mission the next morning, and how weather makes the flight more difficult. We had very little time to get the jet put up for the night and get ourselves checked into our hotel and rested for the early flight the next day. As stated, the landing was scheduled for 0914 EST, so our takeoff time was 0615 EST. This take off time meant that I would have to leave the hotel around 0500, thus needing to get up around 0415. Again, my thoughts

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about the mission made me realize that Florida was one hour later...so my 0415 'get up' would feel like 0315 to my body! So, off to the hotel to check in. We have always stayed in Cocoa Beach to support STA operations. It is about a 30-minute drive in good traffic, and I think the record time in "bad" shuttle launch traffic was one and a half hours. On that day, one crewmember missed the weather flight. Luckily there were two STA instructors to support that mission.

After checking into the hotel, Phil and I went out for one of our favorite dinners, grilled tuna steaks at a Port Canaveral restaurant. It was packed with tons of people drinking and listening to a live band, with a one hour-plus wait for dinner. NOT what we needed for our early evening. So, to our second favorite place where we got a table in no time and had grilled tuna and rock shrimp, a favorite delicacy of the local area. Back to the hotel to immediately go to sleep. That is sometimes the toughest part of the whole mission...getting to sleep the night before. To add to this difficulty, our hotel is next to the Cocoa Beach Pier where there is often a live band playing in an open-air oyster bar. The sound travels right into your room. Sweet! As it worked out, the music didn't bother me this night and I got a good night's sleep, even if it was only a little over 5 hours.

During the drive to the SLF the next morning at 0500, I could barely make out the condition of the sky. It was dark for sure, but I could tell that clouds were obscuring the stars. This was not a good start. Upon arriving at the SLF, I could see a T-38 flying around the landing area. This was astronauts Rominger and Bloomfield doing a pre-STA weather flight. They were wearing night-vision goggles to help them see clouds and any rain in the area. They soon landed and the two of them joined Phil and me to get a weather mission brief from Mission Control, and specifically, Mission Control's Weather CAP-COMM.

This mission's weather CAP-COMM was astronaut Tony Antonelli. As I listened to the briefing, I started to get a picture of what the mission was going to be like. There were major concerns about a thunderstorm cell that was due north of the SLF at about 40 miles. There are many rules about landing the shuttle and they are well thought out rules that become what we refer to as "violations" if they are broken. A thunderstorm within 30 miles of the SLF is a violation and would cause us to "wave off" the landing and go for another orbit or maybe another day. Now my thoughts turned to the take off time of 0615, and the possibility of having to stay airborne until the second landing opportunity at 1050. I turned to Phil and confirmed that the jet was loaded with a full tank of fuel, because we would need it! We were good to go there. After the brief, we visited with each other for a bit. It seems a good thing to visit before missions like this. There is a lot of pressure on us to do things right and the visiting reduces the tension associated with the pressure. We all realize the world is watching and everyone will judge our call!

Time to step to the jet. Phil is first to go to the jet. He starts the APU (Auxiliary Power Unit), gets all the computers on line, cools the jet down, and kills as many mosquitoes as he can so we don't get eaten alive! The SLF is surrounded by water, and sometimes the mosquitoes are terrible...like almost always. Then I follow Phil by about 15 minutes, and then the astronauts follow me about five minutes later. Outside it is dark, very dark. The cockpit is lit up with a kind of yellow glow from the many instruments. There is no other activity on the ramp, all personnel are watching us, and we realize we are the only flight planned and that something big is going on. With the four of us on board, I crank the engines and taxi for takeoff. No waiting for clearance today, we own the place. The landing lights come on full blast, the throttles run up to full thrust, birds and other creatures acknowledge our intrusion of the morning silence, and off we go.

As we get airborne, we see right away that there is some restrictions to visibility to the north. The sky is completely overcast except for a hole, right over the SLF! Could this be our lucky day? Not so fast. We all agree that this hole will most likely not be there in the three hours when the shuttle is due to land. We start out by taking wind direction and magnitude readings at 500', 1,000' and every

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thousand feet thereafter on up to 34,000'. We then get the STA configured for the first of two planned shuttle approaches, or "dives" as we call them, with this first dive to SLF Runway 33. We fly these approaches to determine which runway affords the shuttle the best possible energy for landing. Remember the shuttle is a huge glider, and energy equals life!

My biggest concern at this point is the actual weight of the STA. We are full of fuel, not a normal condition for practicing shuttle approaches. The jet can get too fast and too steep before you know it. We are right at the edge of the operating envelope for this G-2 made to fly like the shuttle. So I give a short additional brief to warn of the non-standard dangers of the upcoming approach.

This approach and the second one to the opposite runway go just fine. As it turns out, the energy state to both runways is equal. This proves a stroke of fortune as the morning unfolds. The weather guys now own us for checking the weather. Of course they have all the weather equipment available to man, but to have a jet poke its nose into the real stuff is worth more than a thousand RADAR sweeps. As predicted, we head for the thunderstorm to the north. The good news is that it is still about 40 miles away, but it is building, and visually building fast!

We fly right up to the edge of the over-hanging anvil, and make a note of our distance from the SLF, 39.5 miles. We then head out to the east, where there are more clouds and they are in the direction that clouds will most likely come from this morning. We climb and descend through layers of clouds and record the bottoms and tops of every layer. It is busy work with many distractions and concerns.

The weather people want us to go everywhere. The astronauts have their concerns. And I am supposed to take them to all these spots while staying within the confines of the NASA airspace and coordinating, on a separate radio frequency, any excursions outside the NASA airspace, and we have several of these 'excursions' this morning. We find that the layers of clouds, although now completely covering the sky, are high enough to not be a violation to landing. The bottoms are around 11,000' and the tops are up to 16,000'.

During the training for landing the shuttle, we simulate weather and obstructions to visibility by putting an artificial cloud in front of the astronaut, not letting them see the runway until around 5,000'. Knowing that this shuttle crew was well trained for weather approaches, the 11,000' ceiling was not a concern. In fact, one of the concerns that Houston Control had was Sun glare at landing time. The clouds removed this concern.

We are sent back to the cell north of the SLF on four more occasions. During all of these investigations, we find the cell has not only grown higher in altitude, but is actually blowing itself apart. Luckily, it is also splitting into two segments and both segments are moving tangent to the "30 mile" circle around the SLF. Great news!

On this mission, the shuttle's re-entry ground track brought it towards Florida from the southwest, from over the Panama Canal. We all agreed that an approach to runway 33, with a right hand flight path, would be the best. So, we give what we think should be our last "call" on the landing decision, that we feel we are a "Go for de-orbit burn, and we recommend runway 33". From this point on, our mission should only be to climb to 25,000' and assume a holding pattern west of the SLF over the Banana River, out of the way of the incoming shuttle.

However, that would have been too easy. The decision to de-orbit burn and a "Go for landing" is given. Hearing this call over the radio sends a thrill through my whole body. I have heard this over 60 times now, but it still excites me. So, a sigh of relief, and we head up to our holding point. We have been flying for over two hours and are tired and hungry.

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Rominger and Bloomfield had brought us sandwiches and cookies from the crew quarters, and now was a good time to eat them. So 'they' all broke out the food and started eating, while I navigated the STA to the holding pattern. I finally got my chance to take a bite when I looked out the window and noticed a "hump" in the clouds, where there was previously nothing but smooth cottony layers below us. This "hump" was right in the flight path of a runway 33 approach! At this point, my pulse sky rockets. What on Earth? We have a shuttle going through re-entry burn with runway 33 all programmed into its computers and runway 33 is now, not looking too good. We have about 30 minutes until landing, and less time to make a new "call" if that has to be done!

I throw my sandwich onto the side console and tell Rominger and Bloomfield we have a problem. I know, I missed a prime chance to say those famous words..."Houston, we have...", but hey, we don't really do that...okay, we do, but I didn't at this time! I turn the jet out of the holding pattern and point it at the hump so all can see it. Bloomfield makes a radio call to weather CAP-COMM and tells them the problem and that we are heading to look at it. I dive right through the hump and find it is full of rain and for sure, right in the way of a runway 33 approach and landing. Underneath we can see a wall of rain pouring out of this cell.

This is not good. How could this be? It was perfectly good just minutes earlier! We all look north at runway 15, the opposite end of the SLF runway. It looks good. We make a mad dash to the north to check for sure, and with only about 10 minutes to spare, we re-designate runway 15 as the landing runway, suggesting a left turn to final. Remember we found the energy state to be equal on both runways? What a stroke of good fortune. Although rain will not bother the pilot of the shuttle, the rain will damage the heat protection tiles, and therefore we would like to avoid flying the shuttle through rain. The call is made to the commander of STS 121 and he acknowledges the change to runway 15 like it made no difference to him. What calm and cool. No questions, just a simple response of "Roger, runway 15".

We are now pressed for time to get out of the way and back to our holding point. We make it there with about 5 minutes to spare. The weather CAP-COMM is giving us great point-outs to the shuttle and sure enough, right on time, the shuttle flies 30,000' over the top of us and off to the east for its left hand turn to the final approach path. On past STA missions, I have maneuvered the STA and joined on the shuttle and flown down the final approach in close formation. But I made it quite clear to all on board this day that due to the layer of clouds, I wasn't going to try any join up on the shuttle.

They all agreed. The shuttle looked magnificent, nose pointing very low to the horizon, turning in a very lumbering and large circle through a heading of north and around to the west. I point towards the shuttle, but headed just a bit north of it so as to lag behind it. It hit the layer of clouds like a meteor through a white atmosphere, and was out of sight. We heard the commander make the radio call "Runway in sight" which told us he was below the clouds and below 11,000'. We flew in behind and started our approach. We always make an approach in the STA as close to the shuttle's approach time so as to gather energy data to compare with that gathered by the shuttle. As the STA broke out of the bottom of the clouds, we could see the shuttle touching down on runway 15, an absolutely breath taking sight. It rolled out to the end of the runway and we finished our approach with a pass along side of the shuttle in a kind of "welcome home" manor. We throttled back, climbed a bit, and made a landing at the Cape Canaveral Skid Strip a few miles away and to the southeast. A helicopter picked us up and flew us back to the SLF. What a finish to a long and stressful morning.

We didn't get to see the crew that morning, but knew we were flying them back home the next day. So we did our after mission 'paper work' and headed back to the hotel. Another day, another dollar.

Astronomical Oddities and Strange Stuff

I have always had the tendency to look up, but astronomy had stayed in the periphery of my interests until 1992 when I decided to delve more deeply into the subject and I joined JSCAS and actually built my first real telescope, an 8" Newtonian in a square tube on a Dobsonian mount. I also decided that not only would I learn the sky, but that I would learn a little history of the people that made astronomy the science that it is today. I quickly found some rather odd and strange things about astronomers and the astronomy field as a whole. I soon learned that these oddities were not rare and this became the basis for the series of "Astronomical Oddities" presentations at the JSCAS meetings. It is interesting that over this period of time, I have found that these oddities don't seem so odd or strange to me any more.

I have started a project to convert the "Astronomical Oddities" presentations from the abbreviated outline to a readable format with the intention of eventually forming a book that is, if not insightful, at least entertaining.

Tycho Brahe and His Artificial Nose

Hernán Contreras

Tycho Brahe didn't cut his nose to spite his face; the quarrelsome youth lost it in a sword duel two days before his 20th birthday. He fashioned a metal insert to cover the gap and frequently rubbed an ointment to salve the wound. No one knows for sure what type of metal he used for the nose prosthesis, some reported as looking as if it were made of gold, others silver. Apparently no one asked him. No matter what metal was used, judging by the quality of the instruments he made, we can be sure that it was well-formed and provided a good fit though still noticeable. If you look at portraits of Tycho, you will notice that his nose looks a bit deformed, but there is still the question if it is the tip or the bridge of the nose that is missing. And though Tycho Brahe accomplished many things, it is this incident that earned him a stanza in the anonymous *Astronomers' Drinking Song* (I'm not making this up.):

The noble Tycho places the stars,
Each in its due location;
He lost his nose by spite of Mars,
But that was no privation:
Had he lost his mouth, I grant
He would have felt dismay, sir,
Bless you! He knew what he should want
To drink his bottle a day, sir!

Of course, his future subjects on the island of Hven near Copenhagen, would have preferred that he had suffered a mortal wound like losing his head rather than his nose or mouth and be spared having to live under such a mean and arbitrary feudal lord, a regime so oppressive that the islanders finally revolted. The arrogant Dane even dressed royally to make his celestial observations not out of respect for his avocation, but not to be mistaken for a commoner. Still, with all these faults, Tycho Brahe's contribution to astronomy was enormous. Not only did he make better and more accurate instruments for observations, he corrected the observed position to account for the refraction error. With his thorough study of a brilliant new star, he refuted the notion of the immutability and perfection of celestial spheres. His careful measurements showed that comets actually travel through interplanetary space and were not an atmospheric phenomenon as was commonly believed. But his most significant achievement was his great body of data of accurate positioning of heavenly bodies

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Tycho Brahe with metal insert on nose

over an extended period of time. He and his score of assistants took careful readings of planetary positions not only at key events, like opposition but through its whole orbit. It was Brahe's data on Mars that Johannes Kepler, one of Brahe's assistants, used to formulate the laws of planetary motion.

This is one instance where a great good comes in spite of mean-spirited intentions. Brahe immediately recognized Kepler's genius and fearing that he may be overshadowed by this brilliant youngster, he resisted giving him access to planetary data. Brahe finally relented and let Kepler study Mars. This, of course, was, since antiquity, the most difficult orbit to analyze. As Mars traverses its orbit, it seems at certain points to stop, travel backwards, stop again and then resume its course. In the Ptolemaic system, the orbit was reconciled with a series of epicycles, perfectly circular loops, placed at these locations in the orbit. Why a planet would suddenly change directions and go into a loop was never explained, but it was easier to accept an inexplicable change in direction than an orbit that was not a perfect circle. This fudging actually made the Ptolemaic model more accurate for predicting future

positions than the Copernican heliocentric model with circular orbits. It was this very difficulty that provided Kepler with the special insight to recognize that Mars' orbit was an ellipse and not a circle.

Though his data was used to show the viability of the heliocentric system with elliptical orbits, Tycho Brahe never accepted the Copernican system. Instead, he proposed a hybrid system with some of the planets revolving around the sun and everything else revolving around the earth that remained in the center of the universe. Tycho simply could not give up Aristotelian physics. The explanation for gravity in this system is that everything falls to its natural place, the center. Since everything observed falls to the earth, the earth must be the center, inescapable logic that fits nicely with the human ego.

On June 24, 1901, 300 years after Tycho died, the city officials of Prague opened his marble tomb in the Tyn church. I'm not sure why. Apparently the curiosity to know whether it was the bridge or the tip of the nose that was missing became unbearable. It was the bridge of the nose that had been injured. There was a narrow, curved mark on the skull at the upper end of the nasal opening rimmed with a bright green stain indicating that the insert was made from an alloy with high copper content. The mystery was finally resolved, but another more intriguing surfaced. Tycho was not alone in his tomb. With him was the skeleton of a woman with crossed hands. It wasn't his wife.

Ft Davis Vacation Snippets

Chris Wells

At the end of May, we had a great family vacation in Ft Davis. Since I went to the McDonald Observatory only last August I thought we'd skip it this year but Bea (my 7 year old daughter) insisted we go again (well trained:-).. I'm so glad we did since our tour guide this time really engaged the kids. The highlight was the tour of the 107" Harlan J. Smith Telescope – Bea got to stow the 107" while Ryan (my 4 year old son) got to rotate the massive dome. I also wanted to go but alas this kid was too big.

No McDonald Observatory trip would be complete without a picture of the JSCAS brick.

I know many of you are looking to recoat your big mirrors. They have the same issue at the Hobby-Eberly telescope where they are gradually updating the segment mirrors 1 at a time from Silver to an Aluminum Coating. Apparently all their recoating operations are conducted on-site at the Harlan J. Smith Telescope building, by our tour guides husband.

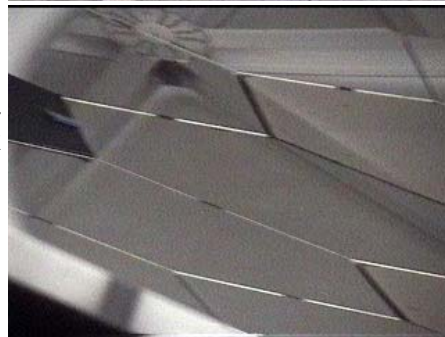
Each of the 1 meter segment mirrors (91 total) sum to form a massive 9.2 meter effective aperture. What I hadn't appreciated before was that the mirror is spherical and aberrations are dealt with by moving the secondary in various directions along a truss. This means that each of the 91 mirrors is totally interchangeable with each other. In the bottom picture you can see how one of the mirrors on the left has been replaced with a black insert and a couple of the mirrors still have the Silver coatings. With a telescope of that size I guess you can forgo some 1 meter segments and not even notice.

Being spherical reminds me of the Schmidt Camera design where the film plane is curved to compensate for fast spherical mirrors. Now if only CCD chips could be as bendable as film that would herald all sorts of possibilities— maybe one day.

Back to my own humble 8" Celestron, the seeing and transparency were below average at 3 on the local sky clock throughout the week but I did manage to get some viewing and CCD imaging in. It was great seeing some old favorites in Sagittarius and Cygnus again. I ended up imaging 3 globs and a galaxy:

M22 in Sagittarius
NGC5466 in Bootes
M13 in Hercules
NGC4631 (Whale Galaxy) in Canes Venatici

Please see the Member's Gallery for these images and their details.



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We also took numerous to the Ft Davis National Historic Site where Bea and Ryan became Junior rangers and we all enjoyed the numerous hikes around the encampment. The quote of the trip had to be from Ryan who asked "Is that a real horse".

If you're anything like me, I'm sure your wishing for the end of summer and thoroughly looking forward to the trip to my other favorite location, Ft McKavett in October.

If all goes to plan the next stop after that will be New Mexico in December to see some "snow, stars, aliens" and perhaps some emigrated JSCASers.



HOUSTON AREA ASTRONOMY CLUBS

Brazosport Astronomy Club

Meets the Third Tuesday of the month, 7:45 p.m.
At the Planetarium
400 College Drive
Clute, Texas
For more information, contact Judi James at the Planetarium
979-265-3376

Fort Bend Astronomy Club <http://www.fbac.org/>

Meets the third Friday of the month, 7:00 p.m.
First Colony Conference Center
3232 Austin Pkwy
Sugar Land, Texas

Houston Astronomical Society <http://spacibm.rice.edu/~has/>

Meets the first Friday of the month, 8:00 p.m.
University of Houston, University Park
Science and Research Building, room 117

North Houston Astronomy Club <http://www.astronomyclub.org/>

Meets the fourth Friday of the month, 7:30 p.m.
In the Teaching Theater at Kingwood College
20000 Kingwood Drive
Kingwood, Texas

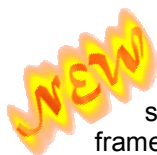
CCD Tutorials

Don Halter posted on the list server a link to a place to purchase CCD Tutorials on CDs. If anyone purchases one of these CDs, let us know if they are any good.

Meantime, I'd like to remind everyone that Al Kelly, with narrative contributions from Ed Grafton and editorial contributions by Bert Katzung, has written a very nice tutorial on the subject. Al has made the tutorial available on his web site at <http://www.ghg.net/akelly/index.htm>. Those wanting to get into CCD should check this free tutorial out.

Star Party News

Lisa Lester



Space Center Houston will be having a special event on Thursday, December 14, 2006. It is called "Superstar Day" and it's a day filled with educational programs for students. As a part of that day, they have asked JSCAS to share the Sun with the students through some of our solar scopes and telescopes with solar filters. The time frame is 9:00a.m. – 3:00p.m. and they are expecting between 300 – 400 students. Last year club members helped out with a similar two-day event in November and it was a big success. We touched the lives of a huge number of students and wowed some grownups too. Ken won't be here this year and as a teacher December is a crazy month to take a day off so I'm asking you to check your calendars to see if you could help during this busy time of year. Please let me know if you can help out this time by calling Lisa Lester at 281-479-1102 or emailing at lesteln@swbell.net

Because of a conflict with Astronomy Day, held at Brazos Bend State Park, the Moody Gardens star party scheduled for October 28th has been canceled.

Event	Date	Sun Set	Moon			Jupiter		Saturn		Mars		Venus	
			Illum.	Rise	Set	Rise	Set	Rise	Set	Rise	Set	Rise	Set
2006													
Moody Gardens	Aug 26	19:47	7%	09:17	21:18	12:13	23:12	05:40	19:03	08:20	20:45	05:37	19:02
Haak Winery	Sep 23	19:13	1%	08:05	19:48	10:44	21:37	04:05	17:20	07:53	19:45	06:28	18:52
Fort McKavett	Oct 19 - 22	19:02	6%	05:28	17:47	09:48	20:28	02:52	16:08	07:51	19:09	07:35	19:03
Astronomy Day	Oct 28	18:35	36%	13:31	23:46	08:59	19:42	02:02	15:12	07:22	18:30	07:30	18:38
Haak Winery	Nov 11	17:25	61%	23:17	12:33	07:18	17:54	00:11	13:20	06:12	17:04	06:58	17:38
SCH	Dec 14	Solar Viewing											

Gyptis Occultation

Chuck Shaw

Did anyone observe the Gyptis occultation the evening of July 12th? I had my 10" SCT out, using an f/6.3 FR and a 7mm Nagler. I found the correct star about 30 minutes before the event. The star field was sparse due to the bright sky, but I could see the star and the asteroid. I thought I had a collimation problem and was seeing double till I re-read the info from Maley and found the star was 11.5 and the asteroid was 11.4.

It noticeably dimmed for me by 9:55:08, and noticeably brightened by 9:55:31. The return was significantly later than what was predicted, so it may have been my eyes playing tricks on me since 11.5 was almost at the point I needed to use averted vision to see the target clearly due to the full moon and heavy haze that was almost "glowing" everywhere.

It was fun to give it a try however!

Visual Observing August 2006

Chris Randall

★ **SSO: (Solar System Objects)** Summary for the 15 Aug 06: Highlighted times denote daylight events.

Object	Const	Mag	% Ill	Rise Time	Transit	Set Time
Sun	Leo	-26.7	100	06:48	13:24	20:00
Moon	Ari	----	50	00:00	06:30	13:35
Mercury	Cnc	-0.9	73	05:37	12:24	19:15
Venus	CnC	-3.9	94	05:21	12:10	19:03
Mars	Leo	1.8	99	08:34	14:51	21:12
Jupiter	Lib	-2.0	99	12:52	18:20	23:53
Saturn	Cnc	0.9	100	06:17	12:59	19:44
Uranus	Aqr	5.7	100	21:01	02:46	08:31
Neptune	Cap	7.8	100	19:44	01:09	06:35
Pluto	Ser	13.9	99	15:54	21:23	02:47

Lunar phases for August 06 Central Daylight time

First 	Full 	Third 	New 	First 
2nd 03:46	9 th 05:54	15th 20:51	23rd 14:10	31st 17:54

★ **BSO: (Bright Sky Objects)**

CR 399 - Open Cluster (Brocci's Cluster) in Vul, Magnitude 3.6, Size 60', Stars 40.
 IC 4756 (Cr 386, Mel 210) - Open Cluster in Ser, Magnitude 4.6, Size 52.0', Stars 80.
 Stock 1 - Open Cluster in Vul, Magnitude 5.3, Size 80', Stars 40.
 Collinder 394 - Open Cluster in Sgr, Magnitude 5.6, Size 54', Stars 15.

★ **DSO: (Dark Sky Objects)**

NGC 6541 (C-78) - Globular Cluster in CrA, Magnitude 6.6, Size 13.0'
 NGC 6709 (Cr 392, Mel 214)- Open Cluster in Aql, Magnitude 6.7, Size 13.0', Stars 40.
 NGC 6540 (H-198-2) - Open Cluster in Sgr, Magnitude 14.5, Size 1.5'.
 NGC 6760 - Globular Cluster in Aql, Magnitude 9.0, Size 9.6'.

★ **CDMP: (Chris' Don't Miss Pick)**

NGC 6715 (M 54) - Globular Cluster in Sgr, Magnitude 7.7, Size 12.0'.

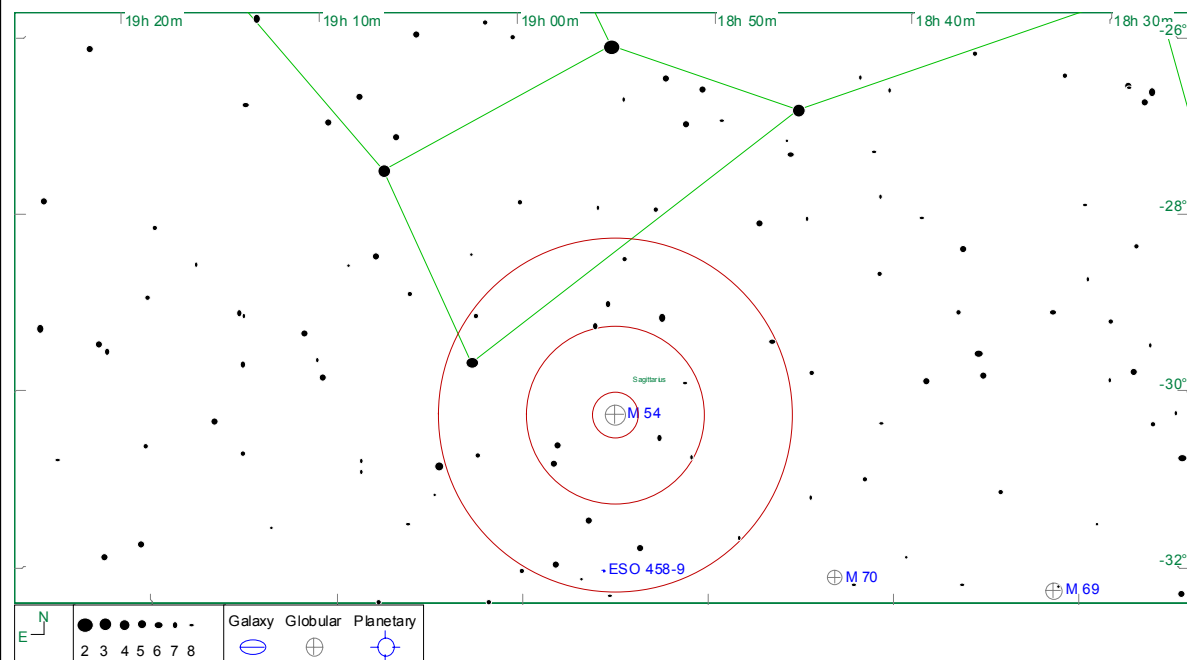
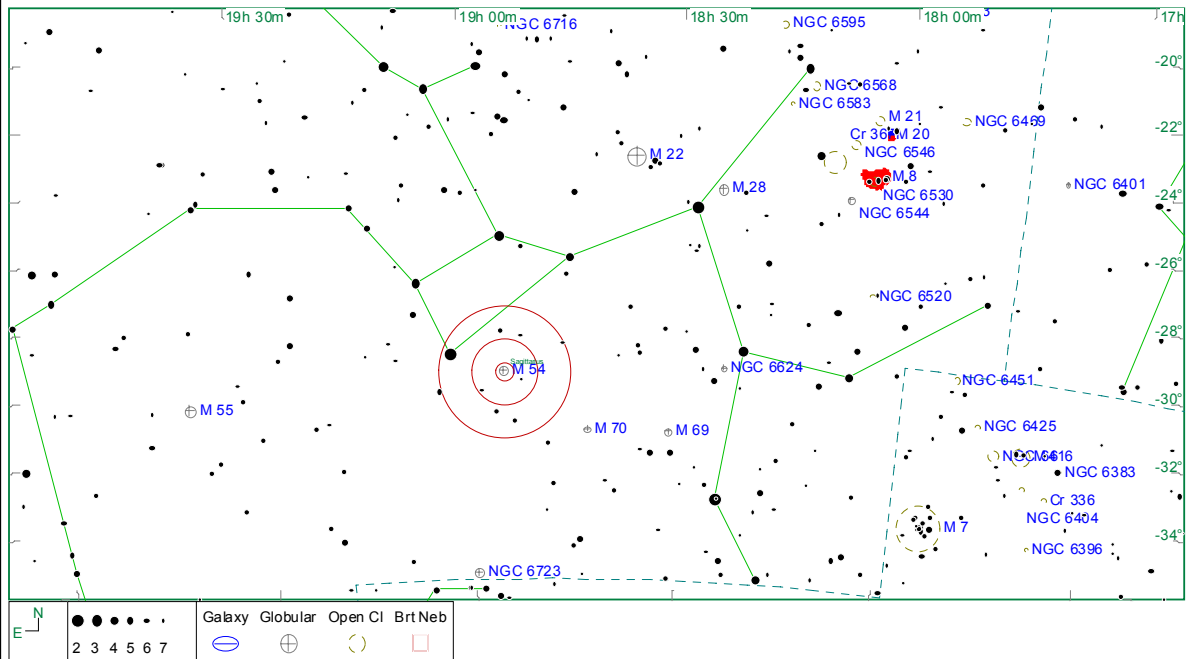
Its distance, for years, was estimated to be about 50-65,000 light years. However, in 1994, the exciting discovery was made that M54 was probably not a member of our Milky Way at all, but of a newly discovered dwarf galaxy! This galaxy is now called SagDEG, for Sagittarius Dwarf Elliptical Galaxy, and one of the most recently discovered of the Local Group of galaxies. Perhaps most interesting, this would make M54 the first extragalactic globular cluster ever discovered. Charles Messier found it on July 24, 1778, and thus add an extra first to Messier's list of fame.

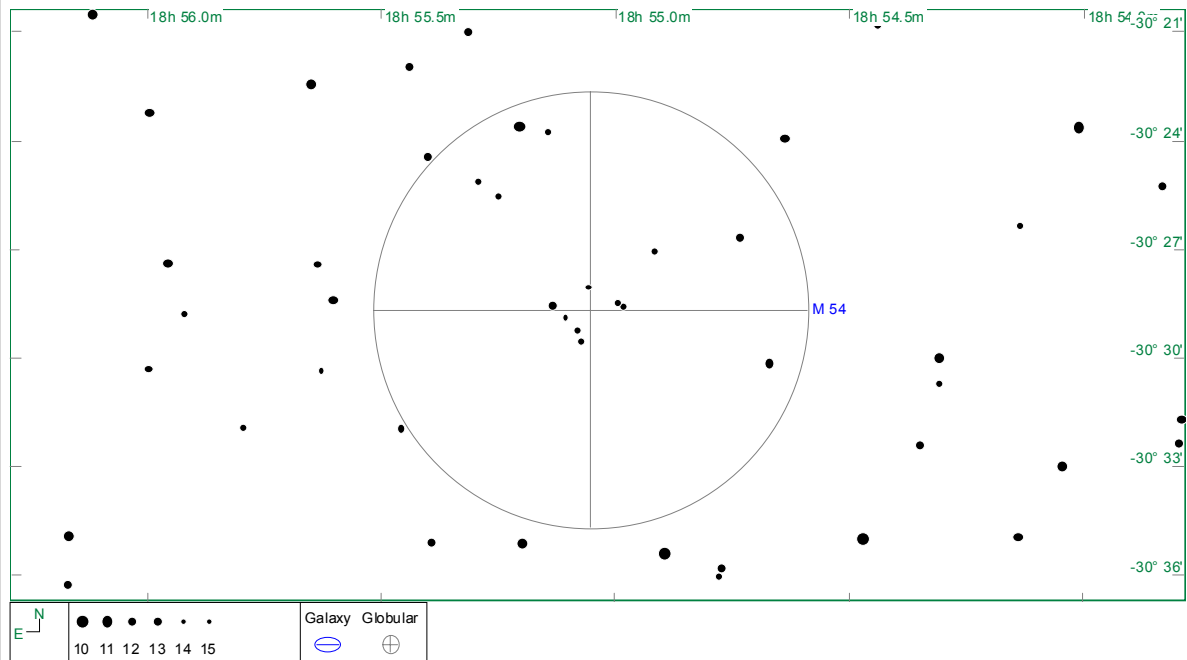
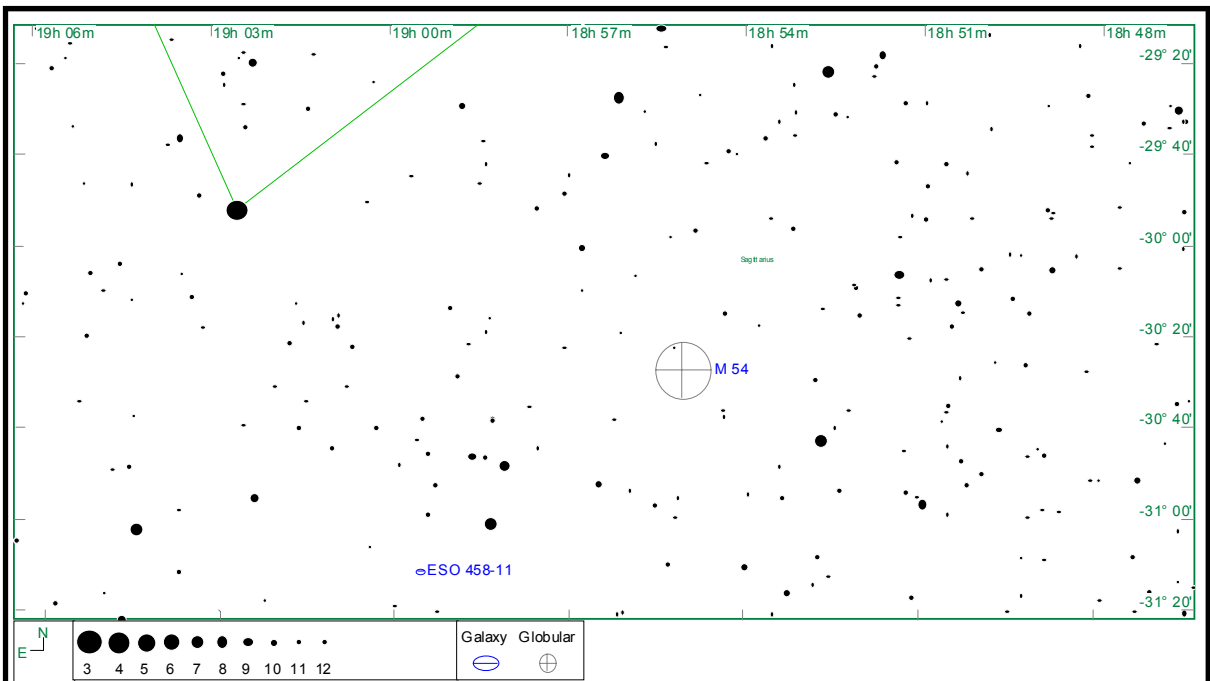
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This globular cluster is bright but small so that it may be overlooked in smaller binoculars or finder scopes (i.e. taken for a star). Because of its large distance, this globular cluster is difficult to resolve. Binoculars and small telescopes show it as a round nebulous object gradually fading toward the edges.

For further information visit: <http://www.seds.org/> or <http://www.ngcic.org/>.



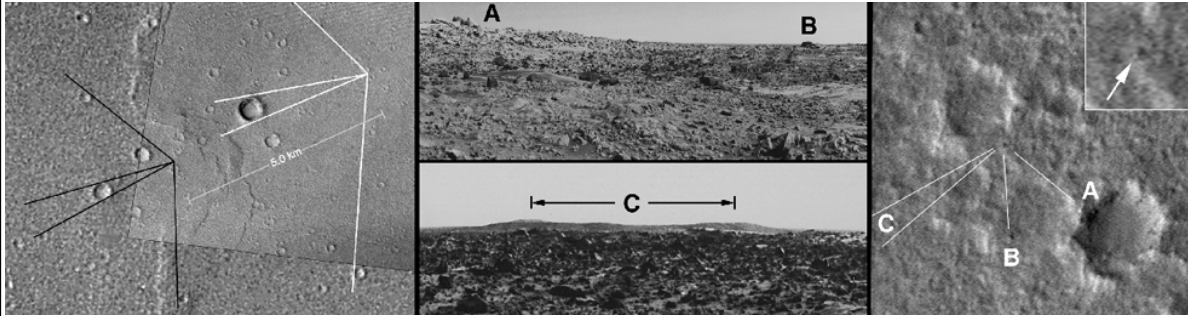


Viking 1's 30th!

Mars Global Surveyor

Mars Orbiter Camera

Release No. MOC2-1529, 20 July 2006



Viking 1 landed 30 years ago today, on 20 July 1976. It was the first U.S. landing on Mars and a very exciting time for Mars exploration. Since that time, four additional spacecraft have successfully landed on Mars and conducted their science investigations. Today, new missions to the Martian surface are in the works, with landings expected in 2008 (Phoenix) and 2010 (Mars Science Laboratory).

The Viking 1 lander is difficult to see in Mars Global Surveyor (MGS) Mars Orbiter Camera (MOC) images. The western Chryse Planitia landing site is often obscured by dust hazes and occasional storms, especially during northern winter, which would otherwise be the best time to look for the lander from orbit because the sun casts longer shadows in winter. When the atmosphere is clearest, in portions of the spring and summer, the sun is higher in the sky as seen from MGS's orbit. The spacecraft always passes over the landing site region around 2 p.m. in the afternoon. The suite of pictures shown here describes the best MOC view of the landing site. These were previously released in May 2005, but the MOC team felt that 20 July 2006 is an appropriate time to review this story.

The first figure (left) visually tells how the lander was found. The initial observations of the location of Viking 1, as originally determined by members of the Viking science team based on sightlines to various crater rims seen in the lander images (black lines), did not show the detailed features we knew from the lander pictures (middle) to be in the area. Using geodetic measurements, the late Merton Davies of the RAND Corporation, a MGS MOC Co-Investigator, suggested that we should image areas to the east and north of where Viking 1 was thought to be. Timothy J. Parker of the Jet Propulsion Laboratory (Pasadena, California), using sightlines to crater rims seen in the lander images (white lines), deduced a location very close to that suggested by Davies. The MOC image of that location, acquired in 2003, showed additional near-field features (rocks associated with a nearby crater) that closely matched the Viking 1 images (center and right frame, where B denotes "Volkswagen Rock"). The inset (upper right) is an enlargement that shows the location of the Viking 1 lander.

The MOC image of the Viking 1 lander site (right) was acquired during a test of the MGS Pitch and Roll Observation (PROTO) technique conducted on 11 May 2003. (Following initial tests, the "c" part of "cPROTO" was begun by adding compensation for the motion of the planet to the technique). The PROTO or cPROTO approach allows MOC to obtain images with better than its nominal 1.5 meters (5 ft) per pixel resolution. The image shown here (right) was map projected at 50 centimeters

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(~20 inches) per pixel. The full 11 May 2003 image can be viewed in the MOC Gallery, it is image R05-00966.

In addition to celebrating the 30th anniversary of the first U.S. robotic Mars landing, we note that 20 July is also the 37th anniversary of the first human landing on the Moon, on 20 July 1969. There are two dates that are most sacred in the space business (three, if you count the 4 October 1957 launch of Sputnik 1). The other date is 12 April, which celebrates the 1961 launch of the first human in space, and the 1981 launch of the first space shuttle orbiter.

Giant Gas Clouds Illuminate Universe's Largest Structure

Subaru Observatory News Release July 27, 2006
July 26, 2006
©Subaru Telescope

A team of astronomers using the Subaru and Keck telescopes on Mauna Kea has discovered giant, three-dimensional filaments of galaxies extending across 200 million light-years of space. These filaments, which formed a mere 2 billion years after the birth of the universe, are the largest-known structures ever discovered. They are studded with more than 30 large concentrations of gas, each up to ten times as massive as our own galaxy. These giant gas clouds are probably the progenitors of the most massive galaxies that exist in the universe today.

This finding is very important because it gives researchers new insight into the large-scale structure of the cosmos. Astronomers expect the universe to look relatively smooth 2 billion years after the birth of the universe. In summarizing the importance of this finding, astronomer Ryosuke Yamauchi from Tohoku University said, "Something this large and this dense would have been rare in the early universe. The structure we discovered and others like it are probably the precursors of the largest structures we see today which contain multiple clusters of galaxies."

Giant 3D Filaments of Galaxies

The research group used the Subaru telescope to make a detailed study of a region of sky 12 billion light-years from Earth that is known to have a large concentration of galaxies. They used Subaru's Suprime-cam camera outfitted with special filters designed to be sensitive to the light from galaxies at that distance. The results showed that this concentration of galaxies is just a small portion of a much larger structure.

The newly found giant structure extends over 200 million light years and has a concentration of galaxies up to four times denser than the universe's average. The only previous known structures with such a high density are much smaller, measuring about 50 million light-years in scale.

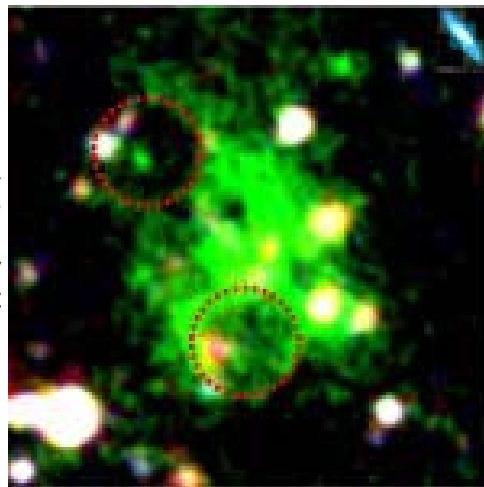


Figure 1: A comparison of a Lyman alpha blob and the Andromeda Galaxy. Light emitted by the blob is green. In the upper right corner is an image of the Andromeda Galaxy, similar in size to the Milky Way Galaxy, scaled as if were at the same distance as the blob. (Courtesy of the University of Tokyo Kiso Observatory.) The red circle indicates a bubble like structure discovered for the first time with the Subaru telescope observations.

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Using Subaru's Faint Object Camera and Spectrograph (FOCAS) to study the 3D distribution of galaxies in this filament, the team also discovered at least three overlapping filaments that make up the giant structure.

Large Concentrations of Gas

Astronomers knew this region contained at least two large concentrations of gas. One of them, shown in figure 1, extends across 400,000 light-years. A comparison with the Andromeda Galaxy, thought to be about the same size as the Milky Way Galaxy, shows the relative immensity of this gas structure.

The researchers found that these large concentrations of gas are located near the overlap regions of the filaments.

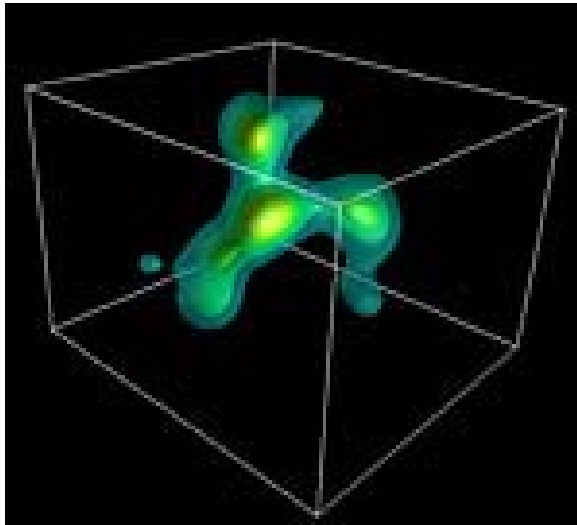


Figure 2: The filamentary structure in 3D. There are at least three intersecting filaments.

The Subaru observations were successful in finding much fainter objects than previously discovered in this region. (Figure 4) For example, they found 33 new large concentrations of gas along the filamentary structure extending across 100,000 light-years. This is the first time that so many large concentrations of gas, known to astronomers as Lyman alpha blobs, have been discovered in the distant universe.

Astronomers think that such Lyman alpha blobs, named so since they are seen in the Lyman alpha emission line of hydrogen, are probably related to the births of the largest galaxies. In the "gravitational heating" model, the blobs are regions where gas is collapsing under its own gravity to form a galaxy. The "photoionization" model attributes emission from the gas to ionization by ultraviolet light from newborn stars or a massive black hole. The "shock heating" or "galactic superwind" model hypothesizes that the glow of the gas is caused by the death of many massive stars born early in the history of the universe, living out short lives, and then dying in supernova explosions that blow out surrounding gas. Team members Yoshiaki Taniguchi and Yasuhiro Shioya (Ehime University) have been advocating for the galactic superwind model.

Observations with the DEIMOS spectrograph at the Keck II telescope revealed that the gas inside the blobs move with speeds greater than 500 kilometers per second (300 miles per second). The extent of the gas concentrations and the speed of the material within them suggest that these regions must be up to ten times as massive as the Milky Way Galaxy.

The blobs show a great variety in shape and brightness. For example, some show bubble-like features that match computer simulations of galactic winds such as those by Masao Mori (Senshu University) and Masayuki Umemura (University of Tsukuba). There are also diffuse blobs and those consisting of several galaxies (Figures 3, 5, and 6).

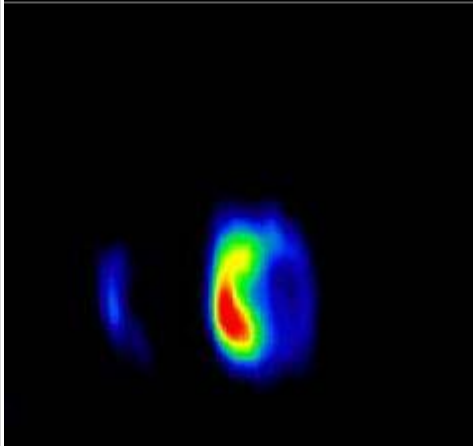
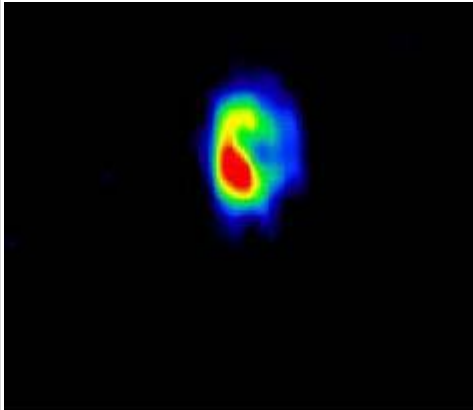
"Galaxies of various sizes surround us," said Yuichi Matsuda of Kyoto University. "The large gas concentrations we found may tell us a lot about how the largest of these came to be."

For more information visit: <http://www.naoj.org/Pressrelease/2006/07/26/index.html>.

"Special Case" Stellar Blast Teaching Astronomers New Lessons About Cosmic Explosions

Embargoed For Release: 1 p.m., EDT, Wednesday, July 19, 2006

A powerful thermonuclear explosion on a dense white-dwarf star last February has given astronomers their best look yet at the early stages of such explosions, called novae, and also is giving them tantalizing new clues about the workings of bigger explosions, called supernovae, that are used to measure the Universe.



RS Ophiuchi Expansion
Credit: Rupen, Mioduszewski & Sokoloski,
NRAO/AUI/NSF

Using the National Science Foundation's Very Long Baseline Array (VLBA) and other telescopes, "We have seen structure in the blast earlier than in any other stellar explosion," said Tim O'Brien of the University of Manchester's Jodrell Bank Observatory in the U.K.

"We see evidence that the explosion may be ejecting material in jets, contrary to theoretical models that assumed a spherical shell of ejected material," O'Brien added.

The explosion occurred in a star system called RS Ophiuchi, in the constellation Ophiuchus. RS Ophiuchi consists of a dense white dwarf star with a red giant companion whose prolific stellar wind dumps material onto the surface of the white dwarf. When enough of this material has accumulated, theorists say, a gigantic thermonuclear explosion, similar to a hydrogen bomb but much larger, occurs.

Systems such as RS Ophiuchi may eventually produce a vastly more powerful explosion -- a supernova -- when the white dwarf accumulates enough mass to cause it to collapse and explode violently. Because such supernova explosions (called Type 1a supernovae by astronomers) all are triggered as the white dwarf reaches the same mass, they are thought to be identical in their intrinsic brightness. This makes them extremely valuable as "standard candles" for measuring distances in the Universe.

"We think the white dwarf in RS Ophiuchi is about as massive as a white dwarf can get, and so is close to the point when it will become a supernova," said Jennifer Sokoloski, of the Harvard-Smithsonian Center for Astrophysics. "If astronomers use such supernovae to measure the Universe, it's important to fully understand how these systems evolve prior to the explosion," she added.

RS Ophiuchi is a "recurrent" nova that experienced such blasts in 1898, 1933, 1958, 1967, and 1985 prior to this year's event. Sokoloski also pointed out that RS Ophiuchi is "a very special type of system," in which the nova explosions occur inside a gaseous nebula created by the stellar wind coming from the red giant companion to the white dwarf.

"This means that we can track the outward-moving blast wave from the explosion by observing X-rays produced as the blast plows through this nebula," said Sokoloski, who led a team using the

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Rossi X-Ray Timing Explorer (RXTE) satellite to do so. "One natural way to produce what we observe is with an explosion that was not spherical," she added.

Another surprise came when the radio waves coming from RS Ophiuchi indicated that a strong magnetic field is present in the material ejected by the explosion. "This is the first case we've seen that showed signs of such a magnetic field in a recurrent nova," said Michael Rupen who, with Amy Mioduszewski, both of the National Radio Astronomy Observatory, and Sokoloski, did another study of the system using the VLBA.

Rupen pointed out the importance of observing the object with both X-ray and radio telescopes. "What we could infer from the X-ray data, we could image with the radio telescopes," he said.

All the researchers agree that their studies show that the explosion is more complex than scientists previously thought such blasts to be. "It's a jet-like explosion, probably shaped by the geometry of the binary-star system at the center," said O'Brien. Rupen added that RS Ophiuchi showed the "earliest detection ever of such a jet. In fact, we could actually tell -- within a couple of days -- when the jet turned on."

The new information is valuable for understanding not just nova explosions but other stellar blasts, the scientists believe. "The physics is analogous to the physics of supernova explosions, so what we're learning from this object can be applied to supernovae and possibly to stellar explosions in general," Sokoloski said. In addition, she said, "in the early days of this explosion, we saw changes in the blast wave that it would take hundreds of years to see in a supernova explosion."

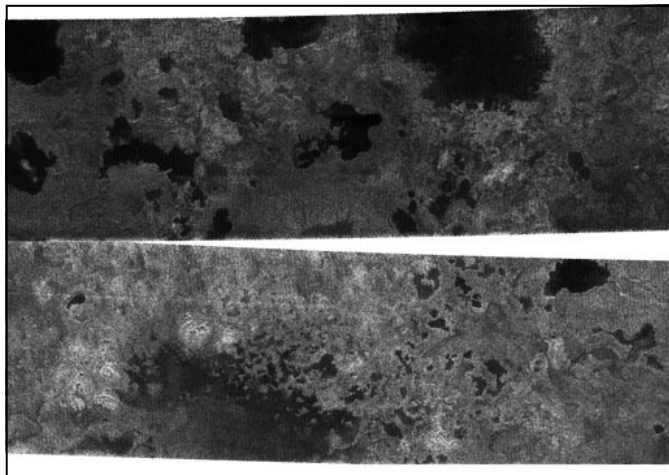
Lakes on Titan

Credit NASA/JPL

07.24.06

The Cassini spacecraft, using its radar system, has discovered very strong evidence for hydrocarbon lakes on Titan. Dark patches, which resemble terrestrial lakes, seem to be sprinkled all over the high latitudes surrounding Titan's north pole.

Scientists have speculated that liquid methane or ethane might form lakes on Titan, particularly near the somewhat colder polar regions. In the images, a variety of dark patches, some with channels leading in or out of them, appear. The channels have a shape that strongly implies they were carved by liquid. Some of the dark patches and connecting channels are completely black, that is, they reflect back essentially no radar signal, and hence must be extremely smooth. In some cases rims can be seen around the dark patches,



suggesting deposits that might form as liquid evaporates. The abundant methane in Titan's atmosphere is stable as a liquid under Titan conditions, as is its abundant chemical product, ethane, but liquid water is not. For all these reasons, scientists interpret the dark areas as lakes of liquid

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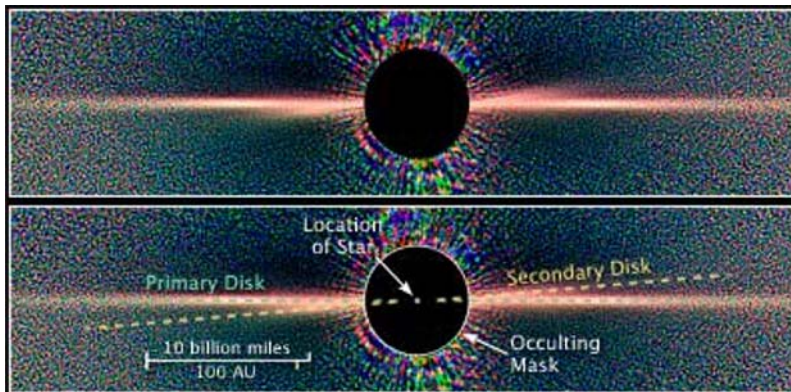
methane or ethane, making Titan the only body in the solar system besides Earth known to possess lakes. Because such lakes may wax and wane over time, and winds may alter the roughness of their surfaces. Repeat coverage of these areas should test whether indeed these are bodies of liquid.

These two radar images were acquired by the Cassini radar instrument in synthetic aperture mode on July 21, 2006. The top image centered near 80 degrees north, 92 degrees west measures about 420 kilometers by 150 kilometers (260 miles by 93 miles). The lower image centered near 78 degrees north, 18 degrees west measures about 475 kilometers by 150 kilometers (295 miles by 93 miles). Smallest details in this image are about 500 meters (1,640 feet) across.

For more information about the Cassini-Huygens mission visit <http://saturn.jpl.nasa.gov>.

Hubble Reveals Two Dust Disks Around Nearby Star

NASA Press Release



NASA's Hubble Space Telescope has revealed two dust disks circling the nearby star Beta Pictoris. The images confirm a decade of scientific speculation that a warp in the young star's dust disk may actually be a second inclined disk, which is evidence for the possibility of at least one Jupiter-size planet orbiting the star.

The disk is fainter than the star because, at the visible wavelengths measured, its dust only reflects light. To see the faint disk, astronomers used Hubble's Advanced Camera for Surveys' coronagraph, which blocked the light from Beta Pictoris. The Hubble images clearly show a distinct secondary disk that is tilted by about 4 degrees from the main disk. The secondary disk is visible out to roughly 24 billion miles from the star, and probably extends even farther. The finding appears in the June 2006 issue of the *Astronomical Journal*.

The best explanation for the observations is that a suspected unseen planet, up to 20 times the mass of Jupiter and in an orbit within the secondary disk, is using gravity to sweep up material from the primary disk.

"The Hubble observation shows that it is not simply a warp in the dust disk but two concentrations of dust in two separate disks," said lead astronomer David Golimowski of Johns Hopkins University in Baltimore, Md. "The finding suggests that planets could be forming in two different planes. We know this can happen because the planets in our solar system are typically inclined to Earth's orbit by several degrees. Perhaps stars forming more than one dust disk may be the norm in the formative years of a star system."

Computer models by David Mouillet and Jean-Charles Augereau of Grenoble Observatory in France suggest how a secondary dust disk can form. A massive planet in an inclined orbit gravitationally

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attracts small bodies of rock and/or ice, called planetesimals, from the main disk, and moves them into an orbit aligned with that of the planet. These perturbed planetesimals then collide with each other, producing the tilted dust disk seen in the new Hubble images.

"The actual lifetime of a dust grain is relatively short, maybe a few hundred thousand years," Golimowski said. "So the fact that we can still see these disks around a 10- to 20-million-year-old star means that the dust is being replenished by collisions between planetesimals."

Astronomers do not know how the massive planet, if it exists, settled into an inclined orbit. However, computer simulations by multiple research teams show that planet embryos which start out in a very thin plane, can, through gravitational interactions, scatter into orbits that become inclined to the primary disk.

Beta Pictoris is located 63 light-years away in the southern constellation Pictor. Although the star is much younger than the sun, it is twice as massive and nine times more luminous. Beta Pictoris entered the limelight more than 20 years ago when the multinational Infrared Astronomical Satellite detected excess infrared radiation from the star. Astronomers attributed this excess to the presence of warm dust in a disk around the star. The dust disk was first imaged by ground-based telescopes in 1984. Those images showed that the disk is seen nearly edge-on from Earth. Hubble observations in 1995 revealed an apparent warp in the disk.

Subsequent images obtained in 2000 by Hubble's Imaging Spectrograph confirmed the warp. The latter study was led by Sara Heap of NASA's Goddard Space Flight Center in Greenbelt, Md. At that time, Heap and her colleagues suggested that the apparent warp may be an unresolved secondary disk tilted about 4 degrees from the main disk. Several teams of astronomers attributed the warp to a planet in a tilted orbit out of the plane of the main disk.

Astronomers using ground-based telescopes also found various asymmetries in the star's disk. Infrared images taken in 2002 by the Keck II Observatory in Hawaii showed that another, smaller inner disk may exist around the star in a region the size of our solar system. Golimowski's team did not spot the inner disk because it is small and is blocked by the Advanced Camera's coronagraph. This possible inner disk is tilted in the opposite direction from the disk seen in the new Hubble images. This misalignment implies that the tilted disks are not directly related. Nevertheless, they both may bolster evidence for the existence of one or more planets orbiting the star.

Images and more information about Beta Pictoris are available on the Web at:
<http://hubblesite.org/news/2006/25>

Cassini Reveals Titan's Xanadu Region to be an Earth-Like Land

News Release: 2006-093
July 19, 2006

New radar images from NASA's Cassini spacecraft revealed geological features similar to Earth on Xanadu, an Australia-sized, bright region on Saturn's moon Titan.

These radar images, from a strip more than 4,500 kilometers (2,796 miles) long, show Xanadu is surrounded by darker terrain, reminiscent of a free-standing landmass. At the region's western edge, dark sand dunes give way to land cut by river networks, hills and valleys. These narrow river networks flow onto darker areas, which may be lakes. A crater formed by the impact of an asteroid

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or by water volcanism is also visible. More channels snake through the eastern part of Xanadu, ending on a dark plain where dunes, abundant elsewhere, seem absent. Appalachian-sized mountains crisscross the region.



This image of Titan was acquired on April 30, 2006, by Cassini's radar instrument in synthetic-aperture mode over the continent-sized region called Xanadu. Credit: JPL/NASA

"We could only speculate about the nature of this mysterious bright country, too far from us for details to be revealed by Earth-based and space-based telescopes. Now, under Cassini's powerful radar eyes, facts are replacing speculation," said Dr. Jonathan Lunine, Cassini interdisciplinary scientist at the University of Arizona, Tucson. "Surprisingly, this cold, faraway region has geological features remarkably like Earth."

Titan is a place of twilight, dimmed by a haze of hydrocarbons surrounding it. Cassini's radar instrument can see through the haze by bouncing radio signals off the surface and timing their return. In the radar images, bright regions indicate rough or scattering material, while a dark region might be smoother or more absorbing material, possibly liquid.

Xanadu was first discovered by NASA's Hubble Space Telescope in 1994 as a striking bright spot seen in infrared imaging. When Cassini's radar system viewed Xanadu on April 30, 2006, it found a surface modified by winds, rain, and the flow of liquids. At Titan's frigid temperatures, the liquid cannot be water; it is almost certainly methane or ethane.

"Although Titan gets far less sunlight and is much smaller and colder than Earth, Xanadu is no longer just a mere bright spot, but a land where rivers flow down to a sunless sea," Lunine said. Observations by the European Space Agency's Huygens probe, which Cassini carried to Titan, and by NASA's Voyager spacecraft strongly hint that both methane rain and dark orange hydrocarbon solids fall like soot from the moon's dark skies.

On Xanadu, liquid methane might fall as rain or trickle from springs. Rivers of methane might carve the channels and carry off grains of material to accumulate as sand dunes elsewhere on Titan.

"This land is heavily tortured, convoluted and filled with hills and mountains," said Steve Wall, the Cassini radar team's deputy leader at NASA's Jet Propulsion Laboratory, Pasadena, Calif. "There appear to be faults, deeply cut channels and valleys. Also, it appears to be the only vast area not covered by organic dirt. Xanadu has been washed clean. What is left underneath looks like very porous water ice, maybe filled with caverns."

"In the 1980s, it took the shuttle imaging radar to discover subsurface rivers in the Sahara. Similarly, if it hadn't been for the Cassini radar, we would have missed all of this. We have a newly discovered continent to explore," Wall said.

Cassini will view Titan again on Saturday, July 22, exploring the high northern latitudes. In the next two years the orbiter will fly by Titan 29 times, nearly twice as many encounters as in the first half of Cassini's four-year prime mission. Twelve of the planned flybys will use radar.

George Observatory Amateur Researchers Name Asteroid Discovery After the Lone Star State

The Houston Museum of Natural Science

Texans have always thought their state to be out of this world. Now it's a scientific fact. Over 170 years after declaring its independence, the State of Texas now has representation in space. Asteroid 35352, located in an asteroid belt roughly 120 million miles from earth between the orbits of Jupiter and Mars, has been officially named "Texas" nine years after an amateur research team discovered it through the 18-inch telescope at the George Observatory — a satellite facility of the Houston Museum of Natural Science.

Bill Dillon and Randy Pepper, founding members of the George Observatory's Asteroid Team, or "A-Team," discovered the asteroid in 1997 and used it as a unique opportunity to honor the Lone Star State. "I had come across an asteroid named Massachusetts and was surprised to learn that Texas was not represented in the heavens," said co-discoverer Dillon. "The cosmic balance has been restored."

Texas the asteroid is much smaller than its terrestrial counterpart, most likely measuring about 1.5 miles in diameter. The Asteroid Team has been making discoveries for over 10 years now, but Dillon said seeing Texas listed was still exciting. "I'm a native Texan; I was born in Big Spring," said Dillon. "It's a big thrill."

Co-discoverer Pepper, who has since moved to Norway, said he felt honored to have been able to name an asteroid after the state. "I was surprised there wasn't a Texas asteroid already," said Pepper. "Texas definitely deserves it."

The accepted citation for "Texas" reads: "Largest state in the continental U.S., Texas is well-known for its proud, independent people, the Alamo, oil wealth, cowboys and cattle, April wildflowers and NASA's Johnson Space Center."

Star-naming companies often sell naming rights to individuals, but those names are not recognized by the scientific community. However, since its approval by the International Astronomical Union in Cambridge, Mass. this summer, "Texas" is this asteroid's official and recognized title. The process of naming an asteroid takes many years as the location of its orbit must be determined and refined. Discoverers have exclusive rights to the naming of their asteroids.

The George Observatory's Asteroid Team has named 21 asteroids since its inception in 1997 and has 10 names pending approval. They have discovered over 400 asteroids in all. The Asteroid Team is a recipient of the Lone Stargazer Award in honor of its contributions to the field of astronomy.

The Canada-France-Hawaii Telescope Goes Wide in the Infrared Too

June 29, 2006

With MegaCam, the largest wide-field digital camera ever operated on a telescope, CFHT has delivered exciting science as well as stunning pictures of the universe for the past three years. MegaCam images are, however, limited to the visible light. Now, CFHT is extending its wide vision to the invisible red side of the spectrum, thanks to WIRCam, an infrared camera recently put in operation on CHFT's 3.6-m telescope on Mauna Kea, the highest mountain of the Island of Hawaii.

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Images obtained during the commissioning phase of the camera and released today illustrate its excellent image quality and shows how it complements MegaCam.

Already heavily used for its first operational runs, WIRCam is gathering complementary infrared images for large programs already undertaken with MegaCam in the visible, like the CFHT Legacy Survey or with the NASA Great Observatories like the Hubble Space Telescope or Spitzer. WIRCam-dedicated large programs are also on their way, such as a search for isolated planetary mass objects in star forming regions.

With WIRCam and MegaCam, CFHT is the only facility in the world offering its users the opportunity to observe their favorite areas of the sky from the near ultra-violet (0.320 micrometers) to the near infrared (2.5 micrometers). While WIRCam has only one-ninth of the field of view of MegaCam, it is joining a very selective club of infrared arrays, all of them operating from Mauna Kea, boasting as many as 16 MegaPixels. It is also the first one in operation to work with the new generation of infrared detectors that will be used on the James Webb Space Telescope and taking advantage of the on-chip guiding capability of these devices built by Rockwell Scientific.



Sky & Telescope and Astronomy Magazine Subscriptions – Don't Forget about the Club Discount!

Sky & Telescope offers a "Club Discount" on subscriptions. You can subscribe to Sky and Telescope for \$10 off the normal price (\$32.95 with the club discount). Astronomy magazine is also offering a club discount. JSCAS members can subscribe to Astronomy for \$34 a year. We need to have a minimum of five subscribers to take advantage of the discount. If you are a current subscriber, *please* contact me so I can put you on the list for the club discount when your subscription is due for renewal!

Contact me by the email listed on the JSCAS web site, catch me at a meeting, or send your check and renewal form to my home address: 2407 Elkton Ct., Pearland, TX, 77584. I'll put your renewal in the mail within 48 hours after I receive it.

David Haviland
Vice-president and Secretary

Upcoming Events

The Texas Astronomical Society is proud to host the annual **ALCON EXPO 2006** in the D/FW Metroplex, Arlington, Texas. Register now for ALCON 2006!

The Texas Astronomical Society (TAS) and the University of Texas at Arlington's College of Science will host the Astronomical League's annual conference August 4th & 5th, at the University of Texas at Arlington in Arlington, Texas. (The Astronomical League Council meeting will be held Thursday, Aug. 3). Register online at our website <http://www.alconexpo.com>.

The conference will be packed with great speakers, including Scott Roberts from Meade Instruments Corp., David J. Eicher from Astronomy Magazine, and Jason Ware, astrophotographer from the Texas Astronomical Society, plus many others.

The annual Star-B-Que will take place on Friday evening, August 4th, with distinguished speaker Marnie Berensen from the Astronomical Society of the Pacific, and will include planetarium shows in UT Arlington's new Digistar – 360-foot-dome planetarium.

The Awards Banquet will be held Saturday evening, August 5th, with keynote speaker Dr Fritz Benedict from McDonald Observatory taking about the use of the Hobby-Eberly telescope in the search for extra-solar planets.

Location: UT Arlington's University Center in Arlington, Texas, just off Interstate 30, in the Heart of the Dallas/Fort Worth Metroplex.

Minutes from world-class museums, numerous entertainment facilities such as Six Flags Over Texas and 10 professional sports venues such as the American League Texas Rangers.

Only 15 miles from D/FW International Airport.

Come to Texas for ALConExpo 2006.

While you're here ...

Explore the Lone Star Sky!

Don't miss this fun filled astronomy weekend. For a detailed itinerary, registration form or more information visit the Alcon Expo website at <http://www.alconexpo.com>.

Registration forms are also in your copies of the June 2006 issue of the Reflector. Event chairs are Dr. Linda McCalla and Jeff Barton of TAS.

Family Space Days Children between the ages of 5 and 8 are invited to bring their families to explore space science! This is a free event held from 10:00 a.m. to 1:00 p.m. on the third Saturday of each month.

Families are encouraged to bring lunch on sunny days and to enjoy a picnic on the Lunar and Planetary Institute's grounds.

The Institute is located at the USRA Center for Advanced Space Studies (CASS), 3600 Bay Area

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Boulevard, Houston, Texas 77058. A map of the region and the LPI location is available for download from <http://www.lpi.usra.edu/lpi/areamap.pdf>.

Events: Hands-on activities and demonstrations will allow the children and their families to explore the theme of the day for themselves. Read stories! Color pictures! Get messy with theme-based crafts!

Schedule for 2006

August 19th – Space Station
September 16th – Human Health in Space
October 21st – Solar System Extremes
November 18th – Water and Ice in our Solar System
December – No Family Space Day

Schedule for 2007

January (date TBD) – Lunar Viewing Night
February 17th – Careers in Space Science
March 24th – Storms and Atmospheres in the Solar System (with Sun/Earth Day)

Please note: Each child must be accompanied by a responsible parent or adult the entire time they are visiting the LPI.

For more information contact Mike Madera, Education Specialist, 281-244-2040, or madera@lpi.usra.edu.

Astroimage 2006 Conference will be held August 11th -13th, 2006 in Brea, California. It is being hosted by the Orange Country Astronomers, and sponsored by companies like Quantum Systems, Hutech Astronomical Systems, OPT, Diffraction Limited, Yankee Robotics, Advanced Telescope Systems, SoCal Astro and the Western Amateur Astronomers. There will be a great lineup of big name speakers, top names in the imaging field! There will be galleries for images, both print and electronic, and lunch is included on Saturday. There is also an optional behind the scenes tour of the 200 inch telescope at Palomar, specifically relating to imaging. There are workshops on Friday as well as a reception. There is an optional buffet dinner on Saturday.

Here is a summary of the speakers and events planned:

Friday night workshops include:

Image Processing Techniques and Advanced Techniques by Tony Hallas. Tony is a great imager and well known, his workshops sell out quickly and are always at capacity!

Introduction to Digital Astroimaging, by Alan Smallbone. Alan is OCA member and will cover getting started in astroimaging using some of the lower cost cameras.

Saturday:

Creating Mosaics with John Laborde
Webcam Imaging with Robert Reeves
Hybrid Imaging with Rob Gendler
Video Astrophotography with Ron Dantowitz
Going Digital and Astrophotographers Perspective with Chuck Vaughn
and the keynote address in the evening:

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Imaging for Print with Tony Hallas.

Sunday:

The optional trip to Mt. Palomar and the behind the scenes imaging tour.

The price is \$110 at the door! To sign up or for additional information visit:

<http://www.ocastronomers.org/astroimage/2006/index.asp>.

The Red River Astronomy Club will host their **Second Annual ArkLaTex Star Party** beginning September 21st - 24th, 2006 near Nashville, Arkansas. The main attraction is the dark sky. This year's presentations will include a Mission Specialist (name to be announced by AAS), a Cosmo-chemist, a presentation on the mysterious lights of Gurdon, Arkansas, and a workshop on image processing by a panel of experts.

Rex's Astro Stuff will have a wide variety of accessories available for sale. They offer free camping, observing field power for laptops and scopes, a shower, T-shirts, swap meet, bottomless coffee pot, cocoa and snacks plus their now famous ArkLaTex give-away. This's BBQ will have a catering trailer on site. What has become the hallmark of the star party is the relaxed and friendly atmosphere. 4 days / 3 nights. For details / registration: <http://www.rrac.org>.

6th Annual Houston/Beaumont Regional Astronomy Meeting will be held Friday, October 27 from 8:00 to 10:15 pm at the Houston Community College. The meeting will be hosted by the North Houston Astronomy Club. There will be no JSCAS meeting at LPI in October.

Astronomy Day 2006 will be held Saturday, October 28th at the George Observatory, Brazos Bend State Park from 3:00 - 10:30 PM.

Visit <http://www.astronomyday.org> for more information.

Arkaroola Wilderness Sanctuary and the Astronomical Society of South Australia present **Star Party DownUnder 2007**. To be held January 18th to 21st, 2007 at the Arkaroola Wilderness Sanctuary, Flinders Ranges, South Australia.

Their lineup of guest speakers include:

Prof Ian Plimer - Chair of Geology, The University of Adelaide
Prof Fred Watson - Astronomer-in-Charge, Anglo-Australian Observatory
Dr Kym Thalassoudis - Star Chart development through the ages
Paul Curnow - Aboriginal Dreaming and Astronomy

Arkaroola Wilderness Sanctuary is situated in the majestic Flinders Ranges, 600 kilometres north of Adelaide, South Australia. It has it all. Beautiful landscapes during the day, and skies at night that make you want to reach up and touch the stars.

More details at <http://www.arkaroola.com.au/events.php>.

Help turn off the lights...

Join the
International Dark-Sky Association (IDA)

<http://www.darksky.org>

"To preserve and protect the nighttime environment and our heritage of dark skies through quality outdoor lighting."



Visit the homepage of the Texas IDA affiliate of the International Dark-Sky Association. Their web site is at: <http://www.texasida.org/>.

As reported by Ben Jones on the Texas IDA Group: The Helotes city council passed a new lighting ordinance on July 25th. This ordinance is very strong and has a lot of material from the Fort Bend ordinance. As well, there is no grandfather clause. All commercial property have until 2008 to change their lights and conform to the ordinance.

Telescope and Mount for Sale

Takahashi FC-50 Apochromatic Fluorite Refractor, 50mm f:8

Finder

Thousand Oaks Solar Filter

10-1 TNR Micro Focuser

Takahashi Sky Patrol Equatorial Mount, complete with:

DC powered sidereal drive

Three counterweights

Knobs, power pack, charger

Illuminated Polar Axis Alignment scope

Fitted Tundra Waterproof Case. Original Sky Patrol backpack included. This is the equipment I used to photograph the 1991 Solar Eclipse. All are in superb condition. \$1500.00 As is, \$1600 with Bogen tripod and all head adapters.

Call Ed Malewitz (281) 488 1959 or email to emalewitz@sprynet.com



Member Recognition

Randy Brewer's image of NGC 1931 appears in the September issue of Astronomy magazine on page 95.

MEMBER'S GALLERY



M22 ▲
©Chris Wells

Taken on 5/30/06 at Fort Davis, Texas using a Celestron C8 at f6.5 on a PM1 equatorial mount. L/RGB processing from 9 clear, 6 red, 6 green and 17 blue images. Each image was 30 seconds in duration, unguided and binned. Processed in AIP4WinV2 and Photoshop.

▼ NGC5466
©Chris Wells

Taken on 5/30/06 at Fort Davis, Texas using a Celestron C8 at f6.5 on a PM1 equatorial mount. L/RGB processing from 24 clear, 8 red, 8 green and 26 blue images. Each image was 30 seconds in duration, unguided and binned. Processed in AIP4WinV2 and Photoshop.





M13▲
©Chris Wells

Taken on 5/30/06 from Fort Davis, Texas using a Celestron C8 at f6.5 on a PM1 equatorial mount. L/RGB processing from 19 clear, 9 red, 11 green and 14 blue images. Each image was 30 seconds in duration, unguided and binned. Processed in AIP4WinV2 and Photoshop.

▼ NGC4631 (Whale Galaxy)
©Chris Wells

Taken on 5/28/06 Fort Davis, Texas using a Celestron C8 at f6.5 on a PM1 equatorial mount. L/RGB processing from 12 clear, 10 red, 7 green and 10 blue images. Each image was 1 minute in duration, unguided and unbinned. Processed in AIP4WinV2 and Photoshop.



Johnson Space Center Astronomical Society

An association of amateur astronomers dedicated to the study and enjoyment of astronomy. Membership is open to anyone wishing to learn about astronomy.

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August Meeting Agenda

August 11th, 7:30 p.m., Center for Advanced Space Studies/
Lunar Planetary Institute, 3600 Bay Area Blvd. (at Middlebrook Drive).

- Welcome!!!
- Next JSCAS expeditions: A Preview Of Cool Things To Come - Paul Maley
- Voyagers, Where Are They Now? — Bob Taylor
- Break
- SIG reports, Star Party News
- Astronomical Oddities — Hernan Contreras
- Last Words, Door Prizes

Any unfinished discussions can be continued over food and beverages at a location to be announced at the end of the meeting.

Starscan Submission Procedures

Original articles of astronomical interest will be accepted up to **6 P.M. August 25th**.

The most convenient way to submit articles or a Calendar of Events is by electronic mail, however computer diskettes or CDs will also be accepted. All articles should include author's name and phone number. Also include any picture credits. The recommended format is Microsoft Word. Text files will also be accepted.

Submitter bears all responsibility for the publishing of any e-mail addresses in the article on the World Wide Web.

Editor's electronic address is: lesteke@swbell.net. Be sure to include the word Starscan in the subject line for proper routing of your message.

Cover Image STA and Shuttle Credit: Rod Ostoski

JSCAS member Triple Nickel is piloting the highly modified Gulfstream II that is making a flyby past the just landed Space Shuttle Discovery.