Starscan

Johnson Space Center
Astronomical Society

Volume 24, Number 10 October 2008

FORTY YEARS
AND
COUNTING!

IT'S OCTOBER AND THAT MEANS FORT McKAVETT

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CONNIE HAVILAND

Message from the el Presidente

I won't mince words… this is probably the third draft of this month's note from me. The reason there have been three so far is that each time I've drafted them the news in the astronomy area has changed. In each case it was for the better. All summed up… ADAY is a GO!!! And I couldn't be happier. The slated date as I mentioned on our List-group is that the park will be open Oct 4th. That of course is much better news that the initial "closed until further notice". What we need folks is to go to the ADAY web site, look over the volunteer list and email myself, Chris, or directly to Cynthia. Don't forget the All-Club's Meeting, ADAY and our trip to the Fort this month!

Clear skies,
David

LETTER FROM THE EDITOR

By Connie Haviland

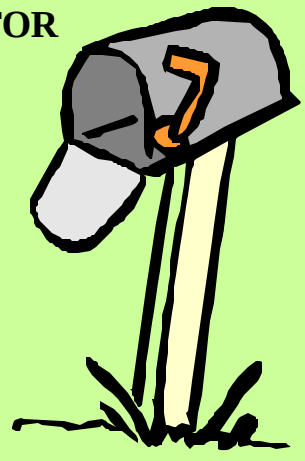
Hi Everyone!!

Don't forget the All-Club meeting at HCC on Oct. 17. Make sure you contact Cynthia Gustava and volunteer for A-Day. And when you go, make sure you have your *OFF*® Mosquito Repellent, Ike did leave a lot of water. I want to mention that our club members were effected by Hurricane Ike and I hope everyone is back home and safe and that they didn't suffer a lot from all of this. Mother Nature is tough and you can't compete against her, but prayers are answered in numbers. I do pray everyone is ok.

Also, Fort McKavett is this month. Don't forget to read the email sent by Ken Lester regarding some of the new guidelines. We are blessed with this opportunity to stay there and I look forward to many years to come, visiting and viewing.

Enjoy!!!!

LETTER TO THE EDITOR



Star Parties for 2008

By John Erickson

OCTOBER

October 18 - Astronomy Day @ George Observatory
October 23 to 26 - Fort Mckavett StarParty

NOVEMBER

November 01 - Haak Winery Star Party
Nov 15th at the LPI for an evening star party with refreshments (some wine and such) afterward...

DECEMBER

December 12 - No Star Party

Galveston Stargazor Group

NOVEMBER

11-1 - HAAK WINERY STAR PARTY
11-5 - GSG MEETING
11-8 - GSG SIDEWALK ASTRONOMY
11-21 - BRAZOSPORT STAR PARTY
11-22 - GSG STAR PARTY

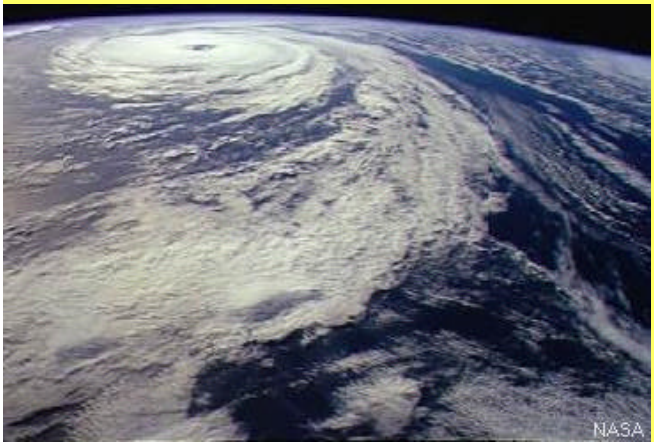
DECEMBER

12-3 - GSG MEETING
12-6 - GSG XMAS PARTY
12-16 - BRAZOSPORT XMAS PARTY

NASA PROVIDES SOME INTERESTING PICTURES OF OUR WEATHER

IKE COMES TO HOUSTON—VIA GALVESTON

ISS017-E-015752 (10 Sept. 2008) --- This picture of Hurricane Ike from earlier today was downlinked by the crew of the International Space Station, flying 220 statute miles above Earth. The center of the hurricane was near 23.8 degrees north latitude and 85.3 degrees west longitude, moving 300 degrees at 7 nautical miles per hour. The sustained winds were 80 nautical miles per hour with gusts to 100 nautical miles per hour and forecast to intensify. Photo Credit: NASA



STS - 125...LAST HUBBLE SERVICING MISSION

http://www.nasa.gov/mission_pages/shuttle/shuttlemissions/hst_sm4/index.html

THIS HAS BEEN POSTPONED UNTIL NEXT FEB. 2009

Image above: These seven astronauts take a break from training to pose for the STS-125 crew portrait. From the left are astronauts Michael J. Massimino, Michael T. Good, both mission specialists; Gregory C. Johnson, pilot; Scott D. Altman, commander; K. Megan McArthur, John M. Grunsfeld and Andrew J. Feustel, all mission specialists. Image credit: NASA

Veteran astronaut Scott D. Altman will command the final space shuttle mission to Hubble. Navy Reserve Capt. Gregory C. Johnson will serve as pilot. Mission specialists include veteran spacewalkers John M. Grunsfeld and Michael J. Massimino and first-time space fliers Andrew J. Feustel, Michael T. Good and K. Megan McArthur.

Altman, a native of Pekin, Ill., will be making his fourth space flight and his second trip to Hubble. He commanded the STS-109 Hubble servicing mission in 2002. He served as pilot of STS-90 in 1998 and STS-106 in 2000. Johnson, a Seattle native and former Navy test pilot and NASA research pilot, was selected as an astronaut in 1998. He will be making his first space flight.

Chicago native Grunsfeld, an astronomer, will be making his third trip to Hubble and his fifth space flight. He performed a total of five spacewalks to service the telescope on STS-103 in 1999 and STS-109 in 2002. He also flew on STS-67 in 1995 and STS-81 in 1997. Massimino, from Franklin Square, N.Y., will be making his second trip to Hubble and his second space flight. He performed two spacewalks to service the telescope during the STS-109 mission in 2002.

Feustel, Good, and McArthur were each selected as astronauts in 2000. Feustel, a native of Lake Orion, Mich., was an exploration geophysicist in the petroleum industry at the time of his selection by NASA. Good is from Broadview Heights, Ohio, and is an Air Force colonel, weapons systems officer and graduate of the Air Force Test Pilot School, having logged more than 2,100 hours in 30 different types of aircraft. McArthur, born in Honolulu, Hawaii, considers California her home state. She has a doctorate in oceanography from the Scripps Institution of Oceanography, University of California-San Diego.

National Aeronautics and Space Administration

Lyndon B. Johnson Space Center
Houston, Texas 77058

Scott D. Altman (Captain, USN, RET.) - Commander
NASA ASTRONAUT

PERSONAL DATA: Born August 15, 1959 in Lincoln, Illinois. Married to the former Jill Shannon Loomer of Tucson, Arizona. They have three children. Hometown is Pekin, Illinois, where his parents, Fred and Sharon Altman, currently reside.

EDUCATION: Graduated from Pekin Community High School, Pekin, Illinois in 1977; received bachelor of science degree in aeronautical and astronautical engineering from the University of Illinois in May 1981, and a master of science degree in aeronautical engineering from the Naval Postgraduate School in June 1990.

ORGANIZATIONS: University of Illinois Alumni Association, Sigma Chi Alumni Association, life member Association of Naval Aviation and Military Order of the World Wars.

SPECIAL HONORS: Defense Superior Service Medal, Legion of Merit, Distinguished Flying Cross, Defense Meritorious Service Medal, Navy Strike/Flight Air Medal, Navy Commendation Medal, Navy Achievement Medal, 1987 Award winner for Outstanding Achievement in Tactical Aviation as selected by the Association of Naval Aviation.

EXPERIENCE: Commissioned as an Ensign in the United States Navy in August 1981, received his Navy wings of gold in February 1983. Attached to Fighter Squadron 51 at NAS Miramar, Altman completed two deployments to the Western Pacific and Indian Ocean flying the F-14A Tomcat. In August 1987, he was selected for the Naval Postgraduate School-Test Pilot School Coop program and graduated with Test Pilot School Class 97 in June 1990 as a Distinguished Graduate, spending the next two years as a test pilot on various F-14 projects. Deploying withVF-31 and the new F-14D, he was awarded the Navy Air Medal for his role as a strike leader flying over Southern Iraq in support of Operation SOUTHERN WATCH. Shortly following his return from this six-month deployment, he was selected for the astronaut program. He has logged over 5000 flight hours in more than 40 types of aircraft.

NASA EXPERIENCE: Altman reported to the Johnson Space Center in March 1995 as an astronaut candidate. He completed a year of training and was initially assigned to work technical aspects of orbiter landing and roll out issues for the Astronaut Office Vehicle Systems Branch. He was the pilot on STS-90 (1998) and STS-106 (2000), and the mission commander on STS-109 (2002). A veteran of three space flights, Altman has logged over 38 days in space. Following two years as Shuttle Branch Chief for the Astronaut Office and lead for the Cockpit Avionics Upgrade, he was assigned on temporary duty to NASA Headquarters as Deputy Director, Requirements Division of the Exploration Systems Mission Directorate. On returning to Houston, he served as the Deputy Chief of the Exploration Branch of the Astronaut Office. Altman is assigned to command the final Space Shuttle mission to the Hubble Space Telescope. The mission will extend and improve the observatory's capabilities through 2013. Launch is targeted for October 2008.

SPACE FLIGHT EXPERIENCE: STS-90 Neurolab (April 17 to May 3, 1998). During the 16-day Spacelab flight the seven person crew aboard Space Shuttle Columbia served as both experiment subjects and operators for 26 individual life science experiments focusing on the effects of microgravity on the brain and nervous system.

STS-106 Atlantis (September 8-20, 2000). During the 12-day mission, the crew successfully prepared the International Space Station for the arrival of the first permanent crew. Additionally, he handflew two complete flyarounds of the station after undocking.

STS-109 Columbia (March 1-12, 2002). STS-109 was the fourth Hubble Space Telescope (HST) servicing mission. The STS-109 crew successfully upgraded the Hubble Space Telescope leaving it with a new power unit, a new camera and new solar arrays. HST servicing and upgrade was accomplished by four crewmembers during a total of 5 EVAs in 5 consecutive days. The space walkers were assisted by crewmates inside Space Shuttle Columbia. STS-109 orbited the Earth 165 times, and covered 3.9 million miles in over 262 hours, culminating in a night landing at Kennedy Space Center, Florida. JUNE 2008

Gregory C. Johnson (Captain, USN, Ret.) - Pilot
NASA Astronaut

PERSONAL DATA: Born in Seattle, Washington. Married to Nanette Faget. Greg has two grown sons, Scott and Kent. Nanette has three children. Recreational interests include running, cycling and swimming. His father, Raleigh O. Johnson, and wife Patsy, reside in Mukilteo, Washington. His mother, Mary Ann Johnson, is deceased.

EDUCATION: West Seattle High School, Seattle, Washington, 1972.
B.S., Aerospace Engineering, University of Washington, 1977.
USAF Test Pilot School, Edwards AFB California, 1984.

ORGANIZATIONS: Society of Experimental Test Pilots; American Institute of Aeronautics and Astronautics; Tau Beta Pi Honorary Engineering Society; Naval Reserve Association, Tailhook Association.

SPECIAL HONORS: NASA James A. Korkowski Excellence in Achievement Award, VA-128 Attack Pilot of the Year, Carrier Airwing Fifteen Top Ten Tailhook Pilot, Carrier Airwing Fourteen Top Ten Tailhook Pilot, Navy Meritorious Service Medals (3), Navy and Marine Corps Commendation Medals (3), Navy and Marine Corps Achievement Medal, Armed Forces Expeditionary Medal, Humanitarian Service Medal and numerous other USN decorations.

EXPERIENCE: Johnson received his commission through the Naval Aviation Officer Candidate Program at Naval Air Station Pensacola, Fl. in September 1977. He received his Naval Aviator wings in December 1978 and following training was designated an instructor pilot in TA-4J aircraft. In 1980 he transitioned to A-6E aircraft completing 2 deployments in the Western Pacific and Indian Oceans. In 1984 he reported to the United States Air Force Test Pilot School at Edwards Air Force Base, California. After graduation he reported to the Naval Weapons Center, China Lake, California, performing flight tests in A-6E and F/A-18A aircraft. Following his flight test tour he reported to Naval Air Station Whidbey Island Washington as the maintenance department head in an operational A-6 squadron. During this tour he completed another Western Pacific and Indian Ocean deployment as well as a Northern Pacific deployment. He resigned his commission in 1990 and accepted a position at the NASA JSC Aircraft Operations Division. From 1990-2007 Johnson served as a Captain in the United States Navy, reserve component, and was the Commanding Officer of four Naval Reserve units. He served as a senior research officer in Office of Naval Research 113, a science and technology unit based at the Navy Postgraduate School in Monterey, California. He has logged over 9,000 flying hours in 50 aircraft and over 500 carrier landings.

NASA EXPERIENCE: In April 1990, Johnson was accepted as an aerospace engineer and research pilot at the NASA JSC Aircraft Operations Division, Ellington Field, Texas. He qualified as a T-38 instructor, functional check flight and examiner pilot, as well as Gulfstream I aircraft commander, WB-57 high altitude research pilot and KC-135 co-pilot. Additionally, he conducted flight test programs in the T-38 aircraft including JET-A airstart testing, T-38N avionics upgrade testing and the first flight of the T-38 inlet redesign aircraft. In 1994 he assumed duties as the Chief, Maintenance & Engineering Branch responsible for all maintenance and engineering modifications on NASA JSC's 44 aircraft.

Selected by NASA in June 1998, he reported for training in August 1998. Johnson was the class leader for the seventeenth group of astronauts comprised of 31 U.S. and international members. Astronaut Candidate Training included orientation briefings, tours, numerous scientific and technical briefings, intensive instruction in Shuttle and International Space Station systems, and physiological training and ground school to prepare for T-38 flight training. Johnson was initially assigned as an Astronaut Support Personnel (ASP) responsible for configuring the Orbiter switches prior to launch and strapping astronauts in their seats for launch. More recently he served as the astronaut office representative for all technical aspects of orbiter landing and roll out issues. From June 2004 to November 2005, Johnson served as Manager, Launch Integration, for the Space Shuttle Program at the Kennedy Space Center, Florida. He also served as the astronaut office Deputy, Shuttle Branch and Return to Flight Representative. Johnson is assigned as the pilot on the final Space Shuttle mission to the Hubble Space Telescope. The mission will extend and improve the observatory's capabilities through 2013. Launch is targeted for 2008.

AUGUST 2008

Andrew J. Feustel (Ph.D.) – Mission Specialist
NASA Astronaut

PERSONAL DATA: Raised and educated in Lake Orion, Michigan. Married to the former Indira Devi Bhatnagar of Ontario. Drew enjoys auto restoration, guitar, and water and snow skiing. His parents both live in Michigan, and Indira's parents reside in Ontario

EDUCATION: Graduated from Lake Orion High School, Michigan. Associate Science degree, Oakland Community College, Michigan.

B.S. in Solid Earth Sciences, Purdue University. M.S. in Geophysics, Purdue University. Ph.D. in Geological Sciences specializing in Seismology, Queen's University, Kingston, Ontario, Canada, 1995.

ORGANIZATIONS: Society of Exploration Geophysicists, American Geophysical Union, Sigma Phi Epsilon, Indiana Alpha Chapter, Purdue University, USA Water Skiing Association, BMW Car Club of America.

SPECIAL HONORS: Graduated Cum Laude, Oakland Community College, Michigan. Purdue University: C.J. Newby Scholarship Award; Ned Smith Field School Scholarship Award; Amoco Fellowship; Chevron Fellowship. Queen's University: Thesis Bursary Award, Deans Award, Graduate Award, McLaughlin Fellowship, Reinhardt Fellowship.

EXPERIENCE: While attending Community College, Dr. Feustel worked as an auto mechanic at International Autoworks, Ltd., Farmington Hills, Michigan, restoring 1950's Jaguars. At Purdue University, Dr. Feustel served as a Residence Hall Counselor for two years at Cary Quadrangle for the Purdue University Student Housing organization. His summers were spent working as a commercial and industrial glazier near his home in Michigan. During his Master's degree studies Feustel worked as a Research Assistant and Teaching Assistant in the Earth and Atmospheric Sciences Department of Purdue University. His M.S. thesis investigated physical property measurements of rock specimens under elevated hydrostatic pressures simulating Earth's deep crustal environments. While at Purdue, Feustel served for three years as Grand Prix Chairman and team Kart driver for Sigma Phi Epsilon Fraternity. In 1991, Feustel moved to Kingston, Ontario, Canada to attend Queen's University where he worked as a Graduate Research Assistant and Graduate Teaching Assistant. Feustel's Ph.D. thesis investigated seismic wave attenuation in underground mines and measurement techniques and applications to site characterization. For three years he worked as a Geophysicist for the Engineering Seismology Group, Kingston, Ontario, Canada, installing and operating microseismic monitoring equipment in underground mines throughout Eastern Canada and the United States. In 1997 Feustel began working for the Exxon Mobil Exploration Company, Houston, Texas, as an Exploration Geophysicist designing and providing operational oversight of land, marine, and borehole seismic programs worldwide.

NASA EXPERIENCE: Selected as a Mission Specialist by NASA in July 2000, Dr. Feustel reported for training in August 2000. His training included five weeks of T-34 training at Naval Air Station VT-4, Pensacola, Florida. Following the completion of two years of training and evaluation, he was assigned technical duties in the Astronaut Office Space Shuttle and Space Station Branches. Dr. Feustel is assigned to the final Space Shuttle mission to the Hubble Space Telescope. The mission will extend and improve the observatory's capabilities through 2013. Launch is targeted for 2008.

JANUARY 2008

Michael T. Good (Colonel, USAF) – Mission Specialist
NASA Astronaut

PERSONAL DATA: Born in Parma, Ohio, but considers Broadview Heights, Ohio his hometown. Married to the former Joan M. Dickinson of Broadview Heights, Ohio. They have three children: Bryan, Jason and Shannon. Recreational interests include running, golfing and family activities. Mike's father and mother, Robert and Carol Good, reside in Brecksville, Ohio. Joan's mother, Marj Dickinson, resides in Broadview Heights, Ohio. Her father, David Dickinson, is deceased.

EDUCATION:
Brecksville-Broadview Heights High School, Broadview Heights, Ohio, 1980.
B.S., Aerospace Engineering, University of Notre Dame, 1984.
M.S., Aerospace Engineering, University of Notre Dame, 1986.

ORGANIZATIONS: Sigma Gamma Tau, National Honor Society for Aerospace Engineering.

SPECIAL HONORS/AWARDS: Distinguished Graduate from the University of Notre Dame, Reserve Officer Training Corps, 1984; Lead-in Fighter Training, 1989; Squadron Officer School, 1993. Top Academic Graduate of Specialized Undergraduate Navigator Training, 1989; F-111 Replacement Training Unit, 1989; USAF Test Pilot School, 1994. Aircrew of the Year, 77th Fighter Squadron, 1991. Military decorations include the Meritorious Service Medal (4), Aerial Achievement Medal (2), Air Force Commendation Medal, Air Force Achievement Medal, Combat Readiness Medal and various other service awards.

EXPERIENCE: Good graduated from the University of Notre Dame in 1984 and was commissioned a second lieutenant. After completing a graduate degree he was assigned to the Tactical Air Warfare Center, Eglin Air Force Base, Florida. While at Eglin, he served as a flight test engineer for the Ground Launched Cruise Missile program. He was selected to attend Undergraduate Navigator Training at Mather Air Force Base, California, receiving his wings in January 1989. After Lead-in Fighter Training at Holloman Air Force Base, New Mexico, and transition training in the F-111 at Mt. Home Air Force Base, Idaho, Good was assigned to the 20th Fighter Wing, RAF Upper Heyford, England. He served as an F-111 instructor weapon systems officer. In 1993, he was selected for Air Force Test Pilot School at Edwards Air Force Base, California, graduating in 1994. After graduation, he was assigned to the 420th Flight Test Squadron at Edwards where he flew and tested the B-2 Stealth Bomber. In 1997, he was assigned to Maxwell Air Force Base, Alabama, to attend Air Command and Staff College. After graduation he was assigned to the 46th Operations Support Squadron, Eglin Air Force Base, Florida. He served as operations officer and F-15 test weapon systems officer.

He has logged over 2,100 hours in more than 30 different aircraft.

NASA EXPERIENCE: Selected as a mission specialist by NASA in July 2000, Good reported for training in August 2000. Following the completion of two years of training and evaluation, he was assigned technical duties in the Astronaut Office Advanced Vehicles Branch and the Space Shuttle Branch. Col. Good is assigned to the final Space Shuttle mission to the Hubble Space Telescope. The mission will extend and improve the observatory's capabilities through 2013. Launch is targeted for 2008.

OCTOBER 2006

John M. Grunsfeld (Ph.D.) – Mission Specialist
NASA Astronaut

PERSONAL DATA: Born in Chicago, Illinois. Married to the former Carol E. Schiff. They have two children. John enjoys mountaineering, flying, sailing, bicycling, and music. His father, Ernest A. Grunsfeld III, resides in Highland Park, Illinois. Carol's parents, David and Ruth Schiff, reside in Highland Park, Illinois.

EDUCATION: Graduated from Highland Park High School, Highland Park, Illinois, in 1976; received a bachelor of science degree in physics from the Massachusetts Institute of Technology in 1980; a master of science degree and a doctor of philosophy degree in physics from the University of Chicago in 1984 and 1988, respectively.

ORGANIZATIONS: American Astronomical Society. American Alpine Club. Explorers Club, Experimental Aircraft Association. Aircraft Owners and Pilot Association.

SPECIAL HONORS: W.D. Grainger Fellow in Experimental Physics, 1988-89. NASA Graduate Student Research Fellow, 1985-87. NASA Space Flight Medals (1995, 1997, 1999, 2002). NASA Exceptional Service Medals (1997, 1998, 2000). NASA Distinguished Service Medal (2002). Distinguished Alumni Award, University of Chicago. Alumni Service Award, University of Chicago. Komarov Diploma (1995). Korolov Diploma (1999, 2002). NASA Constellation Award (2004). Society of Logistics Engineers, 2006 Space Logistics Medal.

EXPERIENCE: Dr. Grunsfeld's academic positions include that of Visiting Scientist, University of Tokyo/Institute of Space and Astronautical Science (1980-81); Graduate Research Assistant, University of Chicago (1981-85); NASA Graduate Student Fellow, University of Chicago (1985-87); W.D. Grainger Postdoctoral Fellow in Experimental Physics, University of Chicago (1988-89); and Senior Research Fellow, California Institute of Technology (1989-92). Dr. Grunsfeld's research has covered x-ray and gamma-ray astronomy, high-energy cosmic ray studies, and development

of new detectors and instrumentation. Dr. Grunsfeld studied binary pulsars and energetic x-ray and gamma ray sources using the NASA Compton Gamma Ray Observatory, x-ray astronomy satellites, radio telescopes, and optical telescopes including the NASA Hubble Space Telescope.

NASA EXPERIENCE: Dr. Grunsfeld was selected by NASA in March 1992, and reported to the Johnson Space Center in August 1992. He completed one year of training and is qualified for flight selection as a mission specialist. Dr. Grunsfeld was initially detailed to the Astronaut Office Mission Development Branch and was assigned as the lead for portable computers for use in space. Following his first flight, he led a team of engineers and computer programmers tasked with defining and producing the crew displays for command and control of the International Space Station (ISS). As part of this activity he directed an effort combining the resources of the Mission Control Center (MCC) Display Team and the Space Station Training Facility. The result was the creation of the Common Display Development Facility (CDDF), responsible for the onboard and MCC displays for the ISS, using object-oriented programming techniques. Following his second flight, he was assigned as Chief of the Computer Support Branch in the Astronaut Office supporting Space Shuttle and International Space Station Programs and advanced technology development. Following STS-103, he served as Chief of the Extravehicular Activity Branch in the Astronaut Office. Following STS-109 Grunsfeld served as an instructor in the Extravehicular Activity Branch and Robotics Branch and worked on the exploration concepts, and technologies for use beyond low earth orbit in the Advanced Programs Branch. He served as the NASA Chief Scientist detailed to NASA Headquarters in 2003-2004 where he helped develop the President's Vision for Space Exploration. A veteran of four space flights, STS-67 (1995), STS-81 (1997), STS-103 (1999) and STS-109 (2002), Dr. Grunsfeld has logged over 45 days in space, including 5 space walks totaling 37 hours and 32 minutes. Dr. Grunsfeld is assigned as the EVA lead for the Hubble Space Telescope Servicing Mission-4, targeted to fly in 2008 on the Space Shuttle. The mission will add new scientific instruments and extend the observatory's capabilities well into the next decade.

SPACE FLIGHT EXPERIENCE: STS-67/Astro-2 Endeavour (March 2-18, 1995) was launched from Kennedy Space Center, Florida, and returned to land at Edwards Air Force Base, California. It was the second flight of the Astro observatory, a unique complement of three ultra-violet telescopes. During this record-setting 16-day mission, the crew conducted observations around the clock to study the far ultraviolet spectra of faint astronomical objects and the polarization of ultraviolet light coming from hot stars and distant galaxies. Mission duration was 399 hours and 9 minutes.

STS-81 Atlantis (January 12-22, 1997) was a 10-day mission, the 5th to dock with Russia's Space Station Mir, and the 2nd to exchange U.S. astronauts. The mission also carried the Spacehab double module providing additional middeck locker space for secondary experiments. In five days of docked operations more than three tons of food, water, experiment equipment and samples were moved back and forth between the two spacecraft. Grunsfeld served as the flight engineer on this flight. Following 160 orbits of the Earth the STS-81 mission concluded with a landing on Kennedy Space Center's Runway 33 ending a 3.9 million mile journey. Mission duration was 244 hours, 56 minutes.

STS-103 Discovery (December 19-27, 1999) was an 8-day mission during which the crew successfully installed new gyroscopes and scientific instruments and upgraded systems on the Hubble Space Telescope (HST). Enhancing HST scientific capabilities required three space walks (EVA). Grunsfeld performed two space walks totaling 16 hours and 23 minutes. The STS-103 mission was accomplished in 120 Earth orbits, traveling 3.2 million miles in 191 hours and 11 minutes.

STS-109 Columbia (March 1-12, 2002) was the fourth Hubble Space Telescope (HST) servicing mission. The crew of STS-109 successfully upgraded the Hubble Space Telescope installing a new digital camera, a cooling system for the infrared camera, new solar arrays and a new power system. HST servicing and upgrades were accomplished by four crewmembers during a total of 5 EVAs in 5 consecutive days. Grunsfeld served as the Payload Commander on STS-109 in charge of the space walking activities and the Hubble payload. He also performed 3 space walks totaling 21 hours and 9 minutes, including the installation of the new Power Control Unit. STS-109 orbited the Earth 165 times, and covered 3.9 million miles in over 262 hours.
SEPTEMBER 2007

Michael J. Massimino (Ph.D.) – Mission Specialist
NASA Astronaut

PERSONAL DATA: Born in New York in 1962. His hometown is Franklin Square, New York. Married. Two children. He enjoys baseball, family activities, camping, and coaching kids' sports.

EDUCATION: H. Frank Carey High School, Franklin Square, New York, 1980. B.S. Industrial Engineering, Columbia University, 1984. M.S. Mechanical Engineering, Massachusetts Institute of Technology, 1988. M.S. Technology and Policy, Massachusetts Institute of Technology, 1988. Degree of Mechanical Engineer, Massachusetts Institute of Technology, 1990. Ph.D. Mechanical Engineering, Massachusetts Institute of Technology, 1992.

ORGANIZATIONS: MIT Alumni Association, Columbia University Alumni Association, and the Association of Space Explorers.

SPECIAL HONORS: NASA Space Flight Medal, Order of Sons of Italy in America 2005 Guglielmo Marconi Award, Aviation Week & Space Technology 2002 Laurel Award (awarded to the STS-109 crew), Sergei P. Korolev Diploma (awarded to the STS-109 crew).

EXPERIENCE: Upon completing his B.S. degree from Columbia University, Mike worked for IBM as a systems engineer in New York City from 1984 until 1986. In 1986 he entered graduate school at the Massachusetts Institute of Technology where he conducted research on human operator control of space robotics systems in the MIT Mechanical Engineering Department's Human-Machine Systems Laboratory. His work resulted in the awarding of two patents. While a student at MIT he worked during the Summer of 1987 as a general engineer at NASA Headquarters in the Office of Aeronautics and Space Technology, during the summers of 1988 and 1989 as a research fellow in the Man-Systems Integration Branch at the NASA Marshall Space Flight Center, and during the summer of 1990 as a visiting research engineer at the German Aerospace Research Establishment (DLR) in Oberpfaffenhofen, Germany. After graduating from MIT in 1992, Mike worked at McDonnell Douglas Aerospace in Houston, Texas as a research engineer where he developed laptop computer displays to assist operators of the Space Shuttle remote manipulator system. These displays included the Manipulator Position Display, which was evaluated on STS-69. From 1992 to 1995 he was also an adjunct assistant professor in the Mechanical Engineering & Material Sciences Department at Rice University, where he taught feedback control of mechanical systems. In September 1995, Mike joined the faculty of the Georgia Institute of Technology as an assistant professor in the School of Industrial and Systems Engineering. At Georgia Tech he taught human-machine systems engineering classes and conducted research on human-machine interfaces for space and aircraft systems in the Center for Human-Machine Systems Research. He is currently an adjunct professor at Rice University and at Georgia Tech. He has published papers in technical journals and in the proceedings of technical conferences.

NASA EXPERIENCE: Selected as an astronaut candidate by NASA in May 1996, Mike reported to the Johnson Space Center in August 1996. He completed two years of initial training and evaluation and is qualified for flight assignment as a mission specialist. Prior to his first space flight assignment, Mike served in the Astronaut Office Robotics Branch, and in the Astronaut Office Extravehicular Activity (EVA or spacewalking) Branch. In March 2002, Massimino flew on STS-109 and has logged over 10 days in space, including 2 EVAs (spacewalks) totaling 14 hours and 46 minutes. Following his first spaceflight, Mike served as a CAPCOM (spacecraft communicator) in Mission Control and as the Astronaut Office Technical Liaison to the Johnson Space Center EVA Program Office. Mike is currently assigned to the final Space Shuttle mission to the Hubble Space Telescope during which his responsibilities will include spacewalking and operating the Space Shuttle's robotic arm. Launch is targeted for 2008.

SPACE FLIGHT EXPERIENCE: STS-109 Columbia (March 1-12, 2002). STS-109 was the fourth Hubble Space Telescope servicing mission. The crew of STS-109 successfully upgraded the Hubble Space Telescope leaving it with a new power unit, a new camera (the Advanced Camera for Surveys), and new solar arrays. STS-109 set a record for spacewalk time with 35 hours and 55 minutes during 5 spacewalks. Massimino performed 2 spacewalks totaling 14 hours and 46 minutes. STS-109 orbited the Earth 165 times, and covered 4.5 million statute miles in over 262 hours and 10 minutes.

FEBRUARY 2008

K. Megan McArthur (Ph.D.)
NASA Astronaut

PERSONAL DATA: Born in 1971 in Honolulu, Hawaii. Considers California to be her home state. Her parents, Don & Kit McArthur, reside in San Jose, California. Megan enjoys SCUBA diving, backpacking, and cooking.

EDUCATION: Graduated from St. Francis High School, Mountain View, CA, 1989. B. S. Aerospace Engineering, University of California-Los Angeles, 1993. Ph.D., Oceanography, University of California-San Diego, 2002.

EXPERIENCE: At the Scripps Institution of Oceanography, Megan conducted graduate research in nearshore underwater acoustic propagation and digital signal processing. Her research focused on determining geoacoustic models to describe very shallow water waveguides using measured transmission loss data in a genetic algorithm inversion technique. She served as Chief Scientist during at-sea data collection operations, and has planned and led diving operations during sea-floor instrument deployments and sediment-sample collections. While at Scripps, she participated in a range of in-water instrument testing, deployment, maintenance, and recovery, and collection of marine plants, animals, and sediment. During this time, Megan also volunteered at the Birch Aquarium at Scripps, conducting educational demonstrations for the public from inside a 70,000 gallon exhibit tank of the California Kelp Forest.

NASA EXPERIENCE: Selected as a mission specialist by NASA in July 2000, Megan McArthur reported for training in August 2000. Following the completion of two years of training and evaluation, she was assigned to the Astronaut Office Shuttle Operations Branch working technical issues on shuttle systems in the Shuttle Avionics Integration Laboratory (SAIL). Dr. McArthur then served as the Crew Support Astronaut for the Expedition 9 Crew during their six-month mission aboard the International Space Station. She also worked in the Space Station and Space Shuttle Mission Control Centers as a Capsule Communicator (CAPCOM). Dr. McArthur is assigned to the final Space Shuttle mission to the Hubble Space Telescope. The mission will extend and improve the observatory's capabilities through 2013. Launch is targeted for 2008.
JANUARY 2008

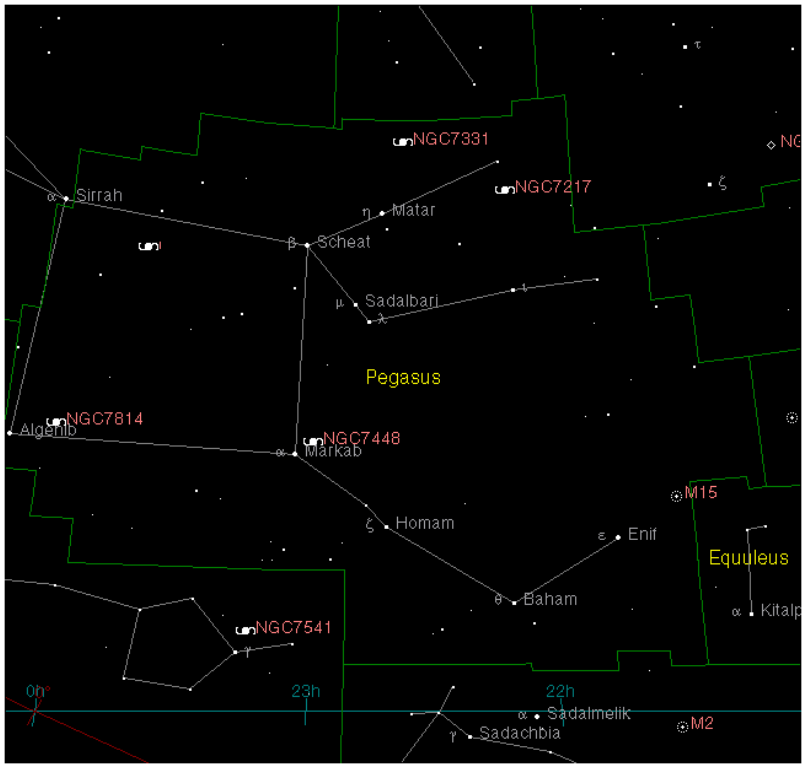
Courtesy of NASA
Put together by C. Haviland

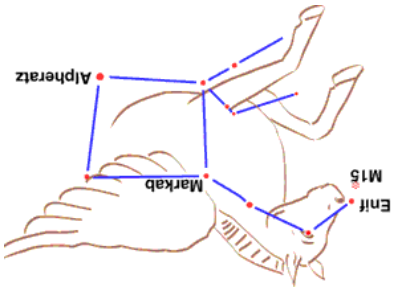
OCTOBER OBSERVING

Deep Sky

According to National Climate Center, October is the least cloudy month for Eastern and Southern parts of the United States. Of course, it is also one of the most vacant parts of the sky with only one first magnitude star, Fomalhaut low on the horizon, in that region. However, the region isn't without interest. It is like the sea, few land marks, but you can see a long way. The reason the southern sky is devoid of first magnitude stars is that we're looking out toward the flat spiral arm of our galaxy.

The dominant constellation is the large, rather dim (The brightest stars of the constellation are 2nd magnitude stars.) collection of stars, Pegasus, the Winged Horse. Traditionally, Pegasus is drawn as half of a horse, as if emerging from the sea. Pegasus was created by Poseidon from beach sand, sea foam and blood that fell from the severed head of Medusa—quite a pedigree. The distinguishing feature of Pegasus is the "Great Square," four 2nd magnitude stars that form a large square about 15° a side



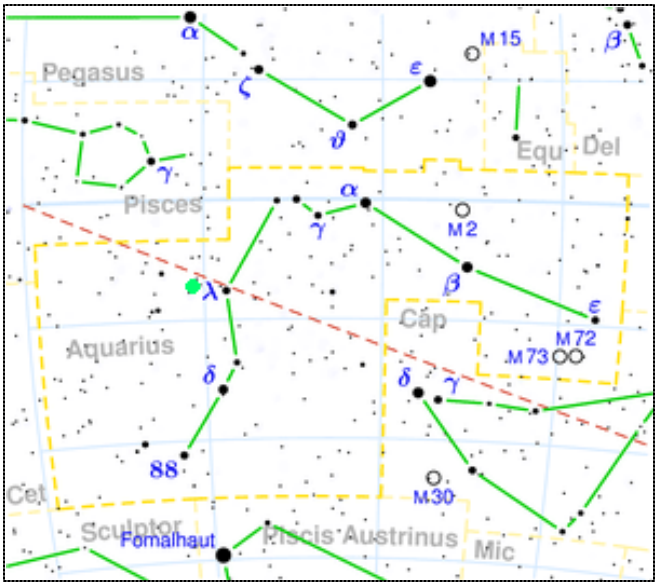


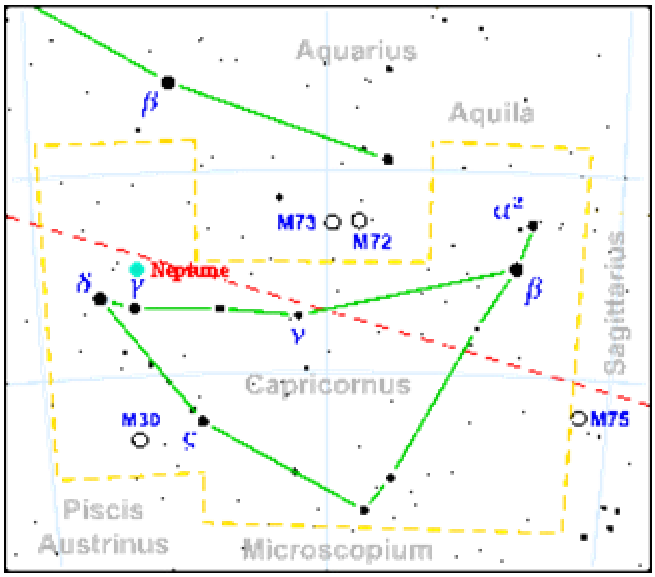
The grid system we use to locate objects in the sky is similar to the grid system to locate points on the earth, but in the sky, the latitude is called declination and the longitude is called right ascension. The declination is measured in degrees like latitude, but right ascension in time. The celestial sphere is divided into 24 hours, with the start of time chosen along the north-south line intersecting the spring equinox. The east side of the "Great Square" almost coincides with 0 hours, right ascension and, of course, the west side is almost an hour away.

The "Great Square" can be seen as a window to see intergalactic space. Within the square you can see two well-formed galaxies. The first observation object for this month is NGC 7814, an edge on view of a spiral galaxy located near the southeast corner of the window. The second object, NGC 7741, is a barred galaxy located near the north edge of the window. A little outside the northwest corner of the square is Stephan's Quintet.

Solar System Objects:

Three planets can be easily seen. Uranus is in Aquarius, Neptune is in Capricornus, and Jupiter is in Sagitarius.



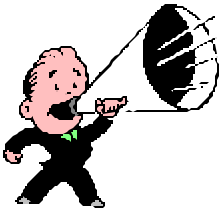


Jupiter is one of my favorite objects. When Galileo saws the moons of Jupiter, it was the first time anyone had seen a body orbiting around something other than the earth.

I want to welcome Hernan Contreras back and into his new role as our deep sky observing spokesperson. It is so nice to see you here. I look forward to working with you and your articles for the clubs observing. Again, welcome back Hernan!

Connie Haviland

Need volunteers



What's Happening at the George!!!

Cynthia Gustava

George Observatory October Events

The George Observatory, located one hour's drive southwest of Houston (Texas), will again host its 8th annual **ASTRONOMY DAY** activities on October 18, 2008. The entire event is free to the public and will begin at 3:00 in the afternoon on Saturday the 18th and run until 10:30 that night. One lucky person will win a Meade ETX-80AT-TC-BB (Backpack) Observatory Telescope (80mm), courtesy of Meade Instruments Corporation.

The George Observatory is located within Brazos Bend State Park, about one hour's drive southwest of Houston. The Brazos Bend State Park is a fascinating blend of lakes and trails, with alligators, small animals and wild birds of many types. The park on its own is well worth a day of your time, and the observatory is home to three high-quality telescopes, including the multi-million dollar, 36-inch diameter Gueymard telescope, which is used regularly for scientific research. The 11-inch refractor mounted onto one side of the Gueymard telescope was donated to the George Observatory by Preston and Donna Engebretson of Houston and has proven to be a wonderful addition to the retinue of telescopes housed in the domes. The 11" refractor telescope provides impressive views of planets and deep sky objects alike. This facility is open to the public every weekend of the year, including most holiday weekends, for the low cost of $5.00 per person. Local area amateur astronomers bring their telescopes out for the night and set up on the viewing deck, providing amateur looks to the public of planets and deep sky objects.

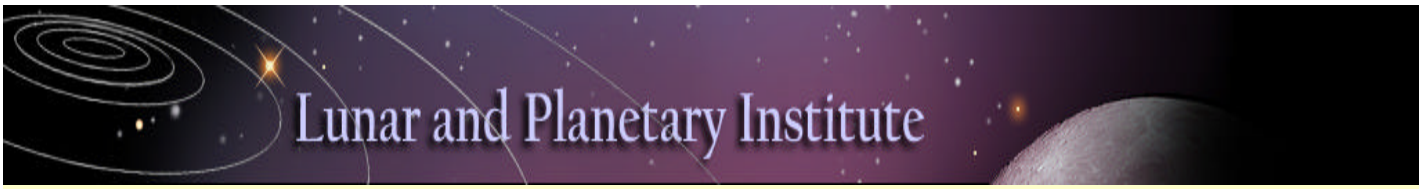
The Texas Gulf Coast Astronomy Consortium, a combination of astronomy clubs from Houston, Beaumont, Galveston, and Huntsville, come together this one day of the year for the purpose of sharing with the general public as much information about astronomy as is possible in one day. Notable speakers are part of the agenda starting indoors at 4:00 p.m. and running until 10:00 p.m. David Levy will be part of the lecture lineup this year. He will be the keynote speaker at the Texas Gulf Coast All-Clubs Meeting the night before at the downtown Houston Community College campus and will give one talk during the Saturday afternoon Astronomy Day activities at the Observatory. His talk to the All-Club's meeting and to the public on Saturday will be titled "My Life and Times as a Comet Hunter." There are also outdoor presentations on Saturday every half hour until dark, learning tools for the young and old, kid's activities, face painting, observing lists to challenge all levels of observers, prizes to win, and much, much more! T-shirts will be available to astronomy club members on Friday, October 18 at the All-Clubs meeting for $15. The theme this year for the shirts is Messier 31, the Andromeda Galaxy.

Solar telescopes will be set up on the deck in the afternoon hours for safe viewing of the Sun, but this event really comes to life after dark. As the sun sets, the skies darken and the stars begin to shine. Dozens of privately owned telescopes will be added to the three domed scopes to give everyone a chance to enjoy the delights of our night sky. Star clusters, planets and galaxies are all visible in the Texas skies. Laser constellation tours and informative lectures about the constellations will be available after dark as well. Overhead passes of the Hubble Space Telescope, the International Space Station, and any iridium satellites will be announced and tracked for the public to enjoy.

In the afternoon, from 3:00 to 6:30 p.m., a simulated spaceship flight to the Moon in the Challenger Mission Center will once again be open to the public. They will run a new mission called "Return to the Moon." For the kids, face painting and astronomy button making will be available in the foyer area.

Tables will be set up with free material for the public and many interesting displays on light pollution, getting started in astronomy, and CCD imaging will be available. Land, Sea and Sky and Advantage Telescope Repair (Houston-based companies supporting the astronomy community) will be displaying their wares.
The Park and the Observatory can be reached in two ways. From downtown Houston, take Highway 59 south towards Sugar Land. A few miles past the First Colony shopping mall in Sugar Land, take the left exit at Grand Parkway 99 or Crabb River Road. There is a sign to the park and observatory just before the turning. Follow Crabb River Road (FM 2759 and then becoming FM 762 before the George Ranch) as it winds for about 13 miles, until you reach Park Road 72. You will see the brown and yellow sign for the Brazos Bend State Park. Enter the park and drive all the way to the middle till you see the Interpretive Center. Park your car and walk across the road to the observatory. Alternatively, take Route 288 south from downtown, cross Beltway 8 and then cross Route 6. In about 8 miles, take the right turn for Rosharon. You will see signs to the park. Go through the lights in Rosharon and drive about 10 miles to the blinking light. Turn right on FM 762 and the park is a mile up on the right hand side. For updated information on Houston's Astronomy Day 2008, email Cynthia Gustava at cynm31@comcast.net or browse the website www.astronomyday.org.

DON'T FORGET THE OCTOBER—FORT McKAVETT STARPARTY WEEKEND - October 23 to 26



Family Space Day is a free family event geared for families with children ages 5-8. The event focuses on space science topics with activities that are parent-driven. Each month we will explore a different space science topic. We will provide hands-on activities, information, books and resources to those who attend. The event is come-and-go and does not require an RSVP. For questions, please contact Katy Buckaloo at 281.486.2106 or Buckaloo@lpi.usra.edu. Visit our website at www.lpi.usra.edu/education/space_days/.

Our upcoming schedule (dates, times, topics subject to change)

October 18th	10am - 1pm	The moon and the Lunar Reconnaissance Orbiter
November	Date and time TBA	tentative telescope observing session

****

Folks:

In times past, people that have wanted to take advantage of the club discount have had to write their check, put it in with the renewal slip, and then either mail it to me at my home or chase me down at a meeting. In most cases, within a week, I have sent out the renewal. Sometimes, and I don't really mind, the renewals have gone out at my expense for the postage. Without hesitation, question, or fail, it is not the most efficient means to maintain club subscriptions. So as secretary, I'd like to try something new...

You get all your stuff ready for the subscription, whether it be Astronomy or Sky & Telescope, you keep it - you hang on to it. Email (most reliable) or tell me when you see me that you want to take advantage of the club discount for either or both of these publications and that you need a supporting letter. What I'll do is get the letter together and email the "letter from the treasurer/secretary" back to you as a PDF. You print it off, and enclose it with your renewal. For this to work your computer must have Adobe Reader (which is free) and a means to print it. I would like this procedure to become the "Standard Operating Procedure" for Astronomy/S&T discounts through JSCAS. For those still not in the computer age, we can process things as we have in the past.

Clear skies,
David Haviland

Members' Gallery—October 2008
By Dick Miller

While we were hiding out at our cabin after Ike, I did get one clear night to image. These are my first two color images with my 10". M27 was shot while it was still fully dark. M32 (Arp 168), showing a lot of M31 next to it, was started while it was dark but the Moon came up shortly after I started the greens. That produced some odd gradients but they aren't too obvious. The main defect of this image was just not enough exposure. Both images were 20:20:20:20 of LRGB. I'm still taking short images to get the system and process checked out.

Light pollution:
Any adverse effect of artificial light including sky glow, glare, light trespass, light clutter, decreased visibility at night, and energy waste.

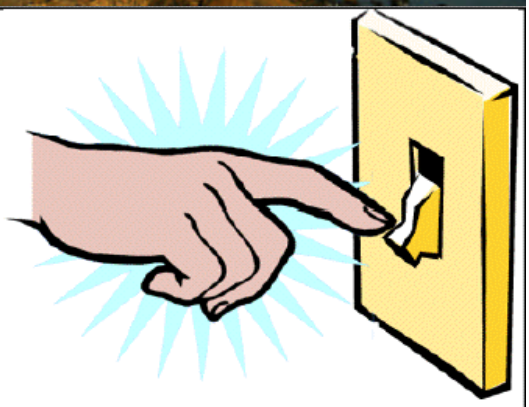
.Do you have a question about light pollution, protecting the night sky, or IDA's resources? **Get Help from IDA** http://www.darksky.org/mc/page.do?sitePageId=56399

Photograph © Phil Hart

IDA
THE LIGHT POLLUTION AUTHORITY

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."



Houston Area Astronomy Clubs

Brazosport Astronomy Club
Meets the Third Tuesday of the month, 7:45p.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
Sugarland, 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 Theatre at Kingwood College
20000 Kingwood Drive
Kingwood, Texas

Galveston Stargazers
Meets the first Wednesday of the month At Home Cut Donuts, 6807 Stewart Rd, Galveston, TX From 7PM to 9PM.
Contact: Jim Gilliam at Jim.Gilliam@dars.state.tx.us or
At (409)795-3620, M - F, 8AM to 5PM

Johnson Space Center Astronomical Society

2008-Club Officers

President – David Haviland
Vice President – Chris Randall
Secretary – David Haviland
Starscan Editor – Connie Haviland
Star Party Chairperson – John Erickson
Librarian – Bob and Karen Taylor
Historian – Chris Randall
Scientific Expeditions – Paul Maley
Web Master—Chris Randall

SIGS

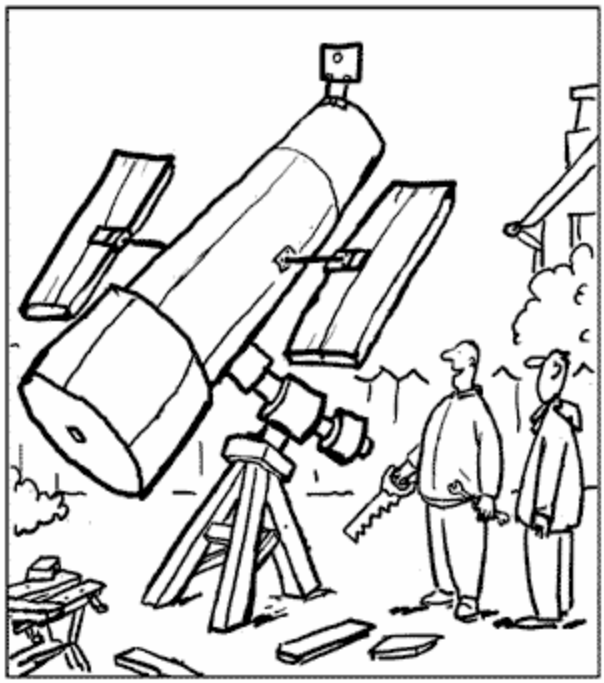
Observing Awards – Triple Nickel
Astronomy 101 — Triple Nickel
CCD Imaging – Al Kelly
Binocular Observing – "OPEN"
Telescope Making – Bob Taylor
Deep Sky Observing – Hernan Contreras

Starscan Submission Procedures

Original articles of some relation to astronomy will be accepted up to 6 p. m. (18:00 hrs) on the 25th of each month. THE most convenient way to submit articles or a Calendar of Events is by email and is preferred, but hard copies (CD, disk) are also accepted. All articles must include author's name and phone number. Also include any picture credits. Word, WordPerfect, and text files will be accepted. I have set up a special email account so that I can keep all of the Starscan articles, pictures, information, etc, separate from all of the other email I get. This makes is much easier to edit and set up the Starscan

Please send all submissions to:
conniesstarscanaccount@gmail.com

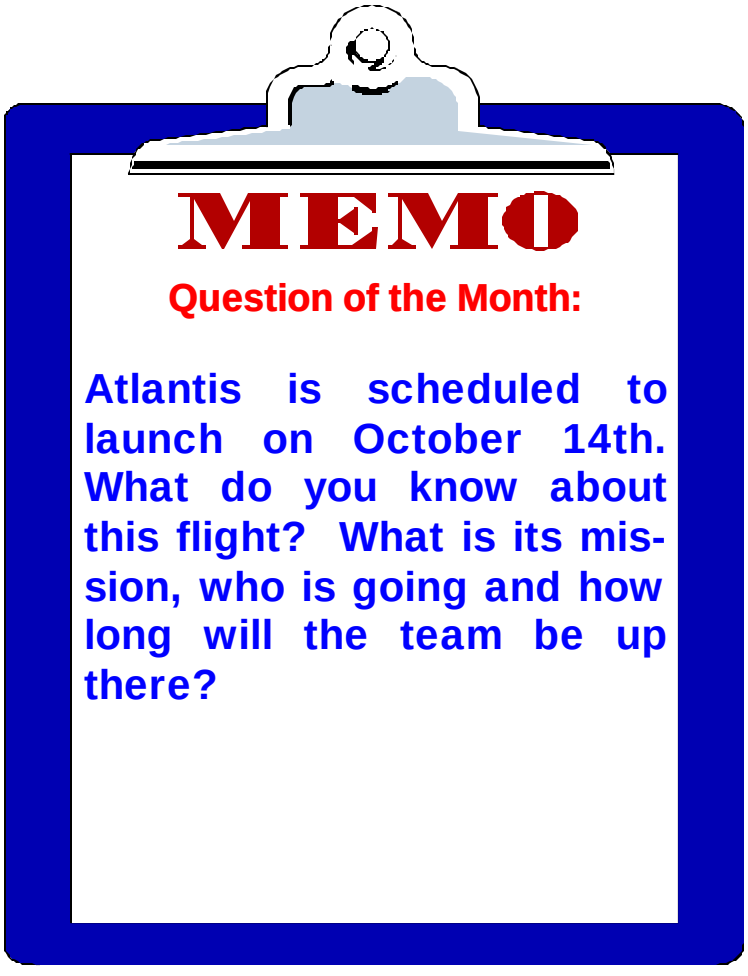
The author of individual articles bears all responsibility for publishing any e-mail addresses in the article on the World Wide Web



'It's based on the Hubble Space Telescope.'

Astronomy and Kids

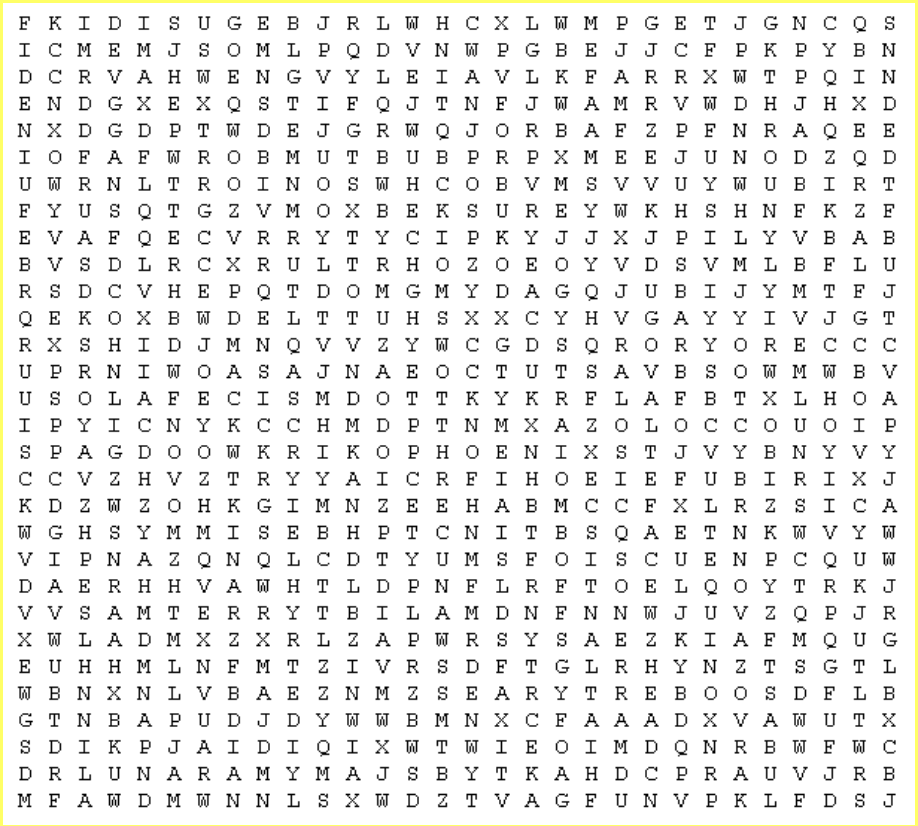
This is the section strictly for kids (or kids at heart). We will be including information, stories, ideas, puzzles or anything that has to do with astronomy. The only difference here is, it will be directed for children. We don't discourage parents or any other adult to get involved. In fact, we encourage it strongly. So we hope you enjoy this section and if it touches a child's interest in astronomy, our



WORD SEARCH SOLUTION

N

W

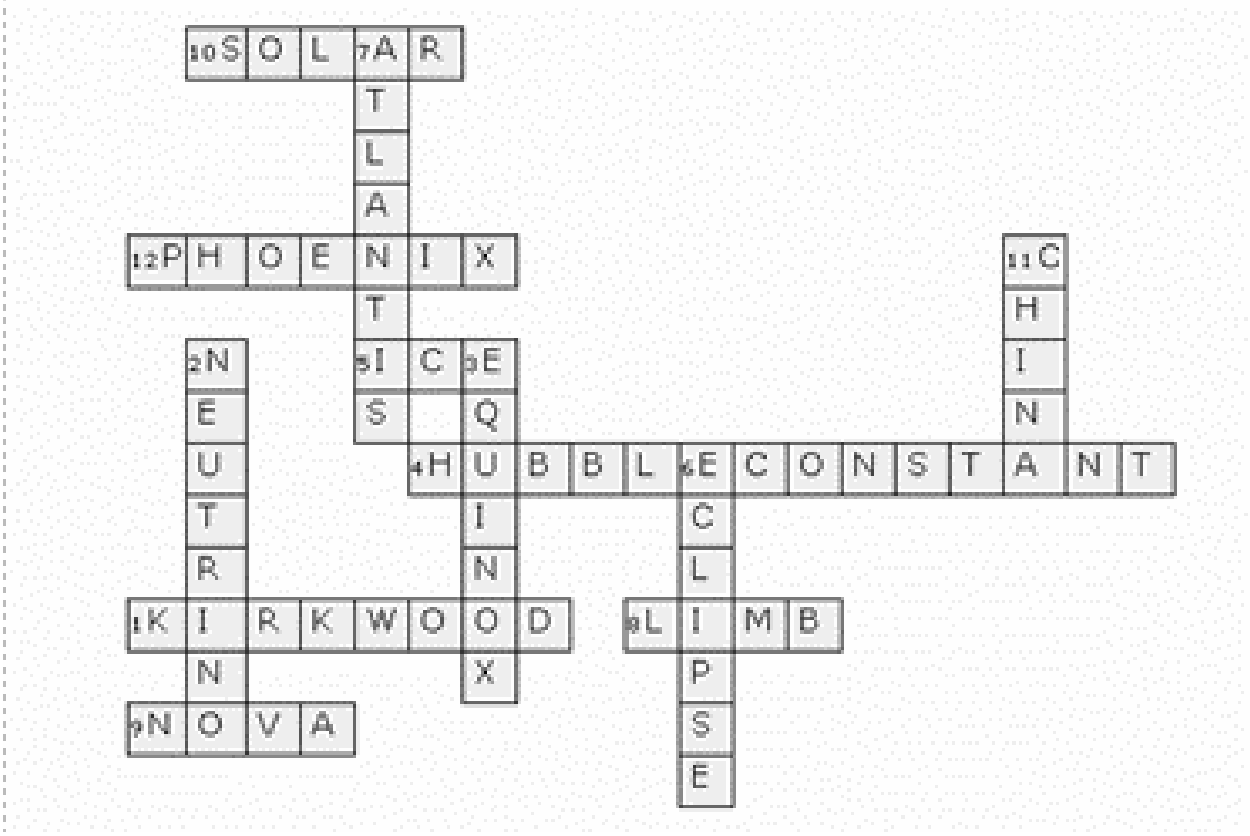


E

S

	(Over,Down,Direction)
ATLANTIS	(20,27,N)
CHINA	(15,20,NE)
COMMANDER	(14,18,NW)
ECLIPSE	(10,20,SE)
EQUINOX	(24,21,S)
HUBBLE CONSTANT	(28,15,SW)
ICE	(9,15,W)
KIRKWOOD GAPS	(12,17,W)
LANDER	(26,30,NW)
LIMB	(11,24,SE)
LUNAR	(3,29,E)
MARS	(6,20,SW)
NEUTRINO	(21,23,NE)
NOVA	(25,21,S)
PHOENIX	(14,17,E)
ROBOTIC	(26,13,SW)
SHUTTLE	(15,12,W)
SOLAR	(21,17,N)

SOLUTION TO SEPTEMBER'S CROSS-WORD PUZZLE



Across:

1. REGIONS IN THE ASTEROID BELT WHERE ALMOST NO ASTEROIDS CAN BE FOUND ARE CALLED _____GAPS.
4. THE RELATIONSHIP BETWEEN THE DISTANCE OF AN OBJECT, AND THE SPEED AT WHICH IT IS TRAVELING AWAY FROM US. THE FURTHER AWAY AN OBJECT IS THE FASTER AWAY FROM US IT IS TRAVELING.
5. WHAT WAS FOUND ON MARS LAN-DER
8. THE EDGE OF ANY OBJECT IN OUTER SPACE.
9. A STAR WHICH SUDDENLY FLARES UP TO MANY TIMES ITS ORIGINAL BRIGHTNESS BEFORE FADING AGAIN.
10. THERE WAS A TOTAL _____ECLIPSE IN AUGUST.
12. NAME FOR MARS LANDER

Down:

2. A VERY SMALL PARTICLE WITH NO MASS OR CHARGE.
3. TWICE A YEAR, WHEN THE DAY AND NIGHT ARE THE SAME AMOUNT OF TIME ALL AROUND THE WORLD.
6. WHEN OUR VIEW OF ONE OBJECT IN THE SKY IS BLOCKED BY EITHER ANOTHER OBJECT, OR THE EARTHS SHADOW.
7. NAME THE NEXT SPACE SHUTTLE TO BE LAUNCHED
11. WHERE WAS THE BEST VIEW OF THE AUGUST ECIPSE?

WORD SCRAMBLE

NAME _____
DATE _____

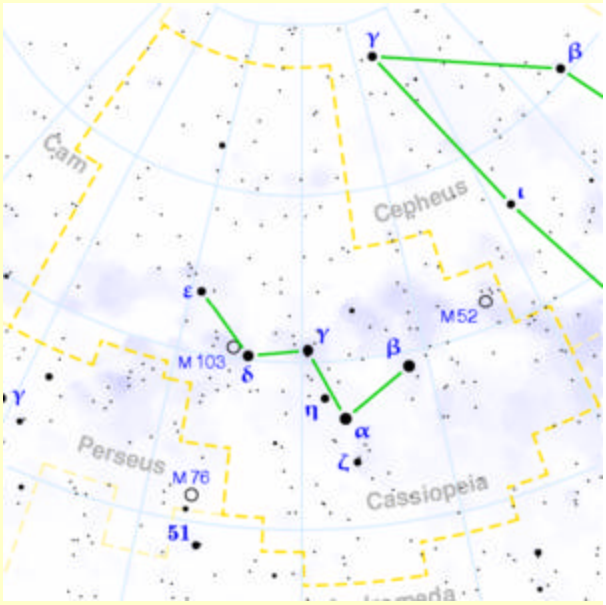
Please unscramble the words below

1. TSNAADMYOYR _____
2. DOGO _____
3. OLPIT _____
4. MARCUTRHC _____
5. ELBBHU _____
6. EOLCESETP _____
7. AATLITSN _____
8. NSOMSII _____
9. SATSLEPIIC _____
10. LMTNAA _____
11. LEDGRUNFS _____
12. ALPADOY _____
13. UNLHAC _____
14. IIMOISMNS _____
15. OOHJNNS _____
16. EDAMMNORC _____
17. ELUSEFT _____
18. SLPEAKCWA _____
19. TNIDUOAR _____

Cassiopeia
Transit Date of principal star:
1 October

Cassiopeia was the wife of Cepheus, the Ethiopian king of Joppa (now known as Jaffa, in Israel), and the mother of Andromeda. The queen was both beautiful and vain, and the story of how her vanity caused great distress is told in relation to the constellation Andromeda.
After promising her daughter in marriage to Perseus, Cassiopeia had second thoughts. She convinced one of Poseidon's sons, Agenor, to disrupt the ceremony by claiming Andromeda for himself. Agenor arrived with an entire army, and a fierce struggle ensued.

In the battle Cassiopeia is said to have cried "Perseus must die". At any rate it was Perseus who was victorious, with the help of the Gorgon's head.
Perseus had recently slain Medusa, the Gorgon, and had put its head in a bed of coral. He retrieved the head and waved it in midst of the warring wedding party, instantly turning them all to stone. In the group was both Cepheus and Cassiopeia.
A contrite Poseidon put both father and mother in the heavens. But because of Cassiopeia's vanity, he placed her in a chair which revolves around the Pole Star, so half the time she's obliged to sit upside down.



The asterism clearly shows the chair upon which Cepheus's queen sits. The Bayer stars are generally third and fourth magnitude, with the exception of the first four stars which make up the "chair".
Cassiopeia has many fine binaries, a few variables of note, and several interesting deep sky objects.

Double stars:
Gamma Cassiopeiae has a faint companion, made doubly-difficult to see because of the brightness of the primary: 2.5, 11; PA 252º and separation 2.3".
Eta Cas is a fine binary with color contrast, yellow and red. Some observers see them as more gold and purple. The companion orbits every 480 years.
Lambda Cas has two nearly equal stars
Iota Cas is a triple system, with AB a visual binary with an orbit of 840 years.
Omicron Cas has a faint companion: 4, 11; 302º, 33.6".
Phi Cas is another multiple system, with rather wide components. The binary lies on the edge of NGC 457.
Sigma Cas: 5.0, 7.1; 326º, 3".
Struve 3062 is a visual binary with orbit of 106.8 years: 6.4, 7.5; presently 322º and separation 1.5".

Variable stars:

Beta Cas is a delta Sct: 2.25-2.31 with period of 0.104 days (2h 30m 11.5s).

Gamma Cas is a prototype of an important class of variable.

"Gamma Cas" variables are B stars, very rapidly rotating subgiants or even dwarfs with emission spectra. The variation in magnitude is typically quite small.

The biggest exception is gamma Cas itself, which has a range of 1.5 to 3.0 with a sporadic period, roughly every 0.7 days.

Other stars in this class include zeta Tau and BU Tau ("Pleione"), mu Cen, lambda Pav, and epsilon Cap.

Iota Cas is an alpha CVn type variable: 4.45 to 4.53 every 1.74 days.

Omicron Cas is a gamma Cas type variable, ranging from 4.5 to 4.62.

R Cas is a Mira type variable with a period of 430.46 days, ranging from 4.7 to 13.5. A maximum should occur in the last week of August in the year 2000.

Deep Sky Objects:

Cassiopeia has two Messier objects and several other star clusters of interest.

M52 (NGC 7654) is an open cluster of about 120 stars. It's found 6º NW of rho Cas. Burnham gives the best method of finding the cluster: draw a line from alpha Cas to beta Cas, then continue this line, doubling its length. The cluster is just past the end point, about another quarter-length.

M103 (NGC 581) is another open cluster, with about forty stars. It's 1º NE of delta Cas, or 1.5º due north of chi Cas.

NGC 457 is an open cluster about 4º SE of gamma Cas. The star phi Cas is considered a part of this cluster. This star is one of the most luminous known, with at least 200,000 times the light of the sun.

NGC 7789 is a rich open cluster of perhaps a thousand stars. It's 3º SW of beta Cas, lying just between rho Cas and sigma Cas.

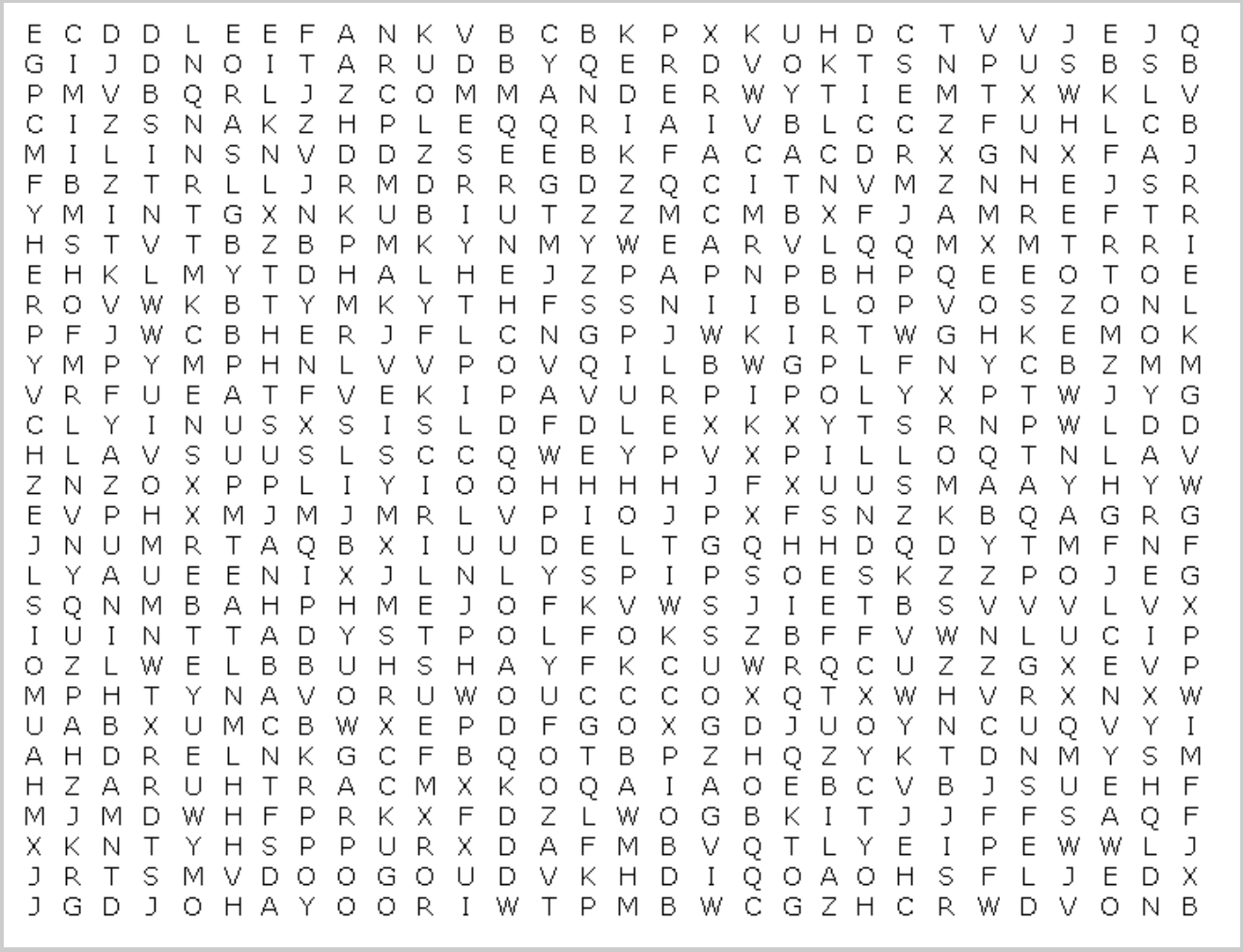
*-

QUESTION OF THE MONTH FOR SEPTEMEBER

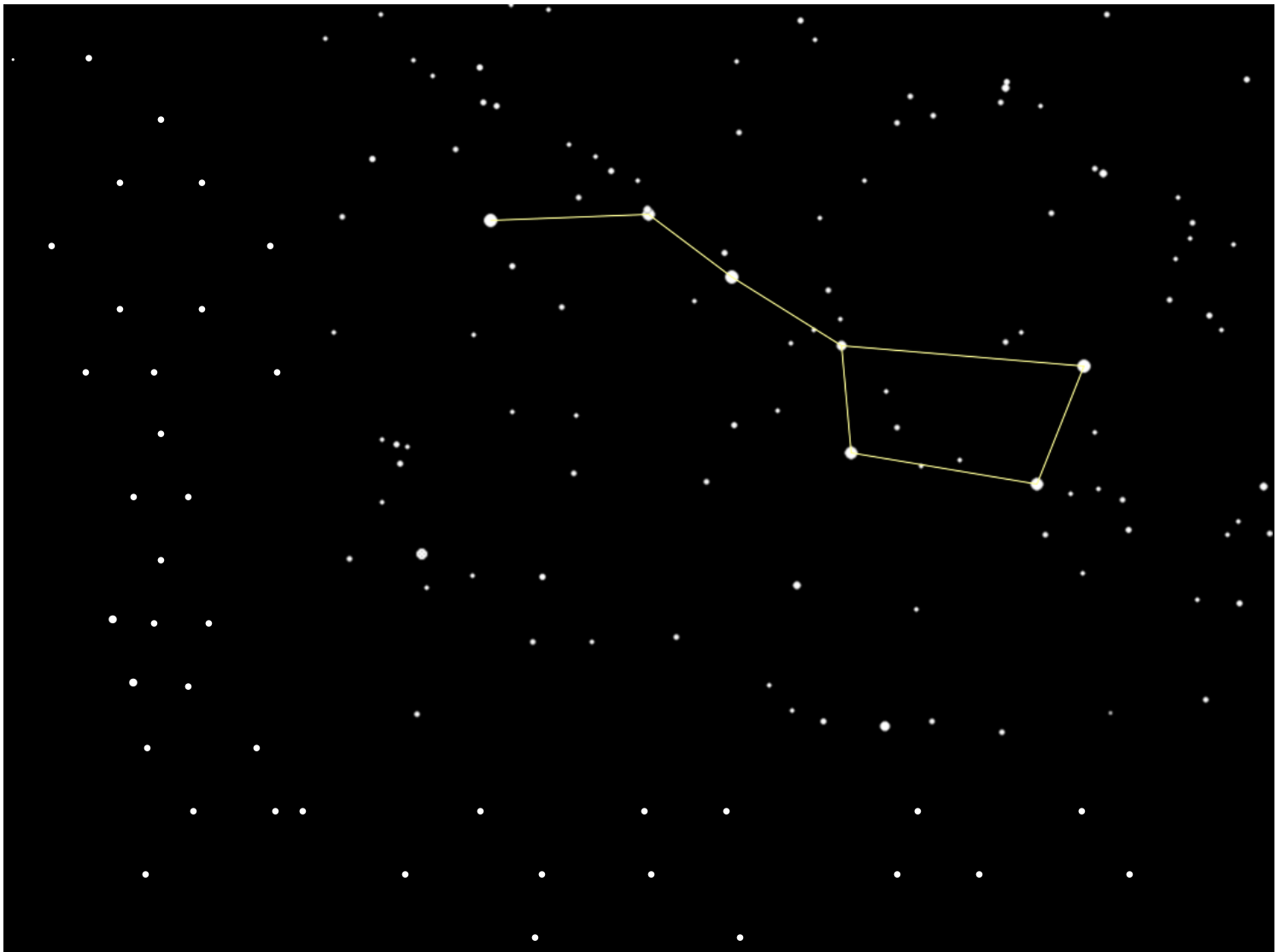
With A-Day next month at the George Observatory, how much do you know about it? What year did it open? What did they obtained in 1989 and from where?

ANSWER: 1) it opened in 1984 2)The 36-inch telescope from Louisiana State University

WORD SEARCH



- ASTRONOMYDAY
- GOOD
- PILOT
- MCARTHUR
- HUBBLE
- TELESCOPE
- ATLANTIS
- MISSIONSPECIALIST
- ALTMAN
- GRUNSFELD
- PAYLOAD
- LAUNCH
- MASSIMINO
- JOHNSON
- COMMANDER
- FEUSTEL
- SPACEWALK
- DURATION



Snoopy says, never stop looking up..reach for the stars and may you always have clear skies!!!!