Starscan

Johnson Space Center Astronomical Society

Volume 24, Number 12 December 2008

FORTY YEARS
AND
COUNTING!

JOHNSON SPACE CENTER
USA
ASTRONOMICAL SOCIETY

TABLE OF CONTENTS

Message from the el Presidente

As we look toward the end of 2008, we have endured and accomplished a lot in 2008 Two great Ft. McKavett trips, both with great skies each time, the Haak Wine parties, and others. We also endured the edge of Gustav and took Ike head on. But the time has passed quickly. I look forward to the winter months for crisp clean skies just from around here. Before we know it, the March Fort trip will soon be upon us. Hopefully in 2009, we will be able to help the Galveston Star-gazers with the Moody Gardens Star Party and we will be exploring a renewed dialogue with the staff at Armand Bayou Nature Center.

Before the turn of the year, don't forget about the Borders book deal that benefits Galveston ISD, and don't forget about our Winter Solstice gathering at the LPI for December.

I wish everyone the best for the Holidays and a Happy New Year.

Clear skies!
David Haviland

LETTER FROM THE EDITOR
By Connie Haviland

Hi Everyone;

We are coming to the end of another year. Wow, time sure passes quickly! I look forward to a new year and a lot of stargazing. I want to wish everyone a Merry Christmas, Happy Holiday and a Blessed and Safe New Year. See you at the Solstice Party.

LETTER TO THE EDITOR

Submitted by D. Haviland—FYI

Hi Everyone,

I just wanted to invite your club members to the inaugural Hodges Gardens Star Party next March. For the past 8 years, the Baton Rouge Astronomical Society has hosted the Kisatchie Star Party. Over the summer of 2008, however, our observing site became unusable. Although we will miss our old field, we're really excited about the new location.

Our new web site is http://www.bro.lsu.edu/bras/hgsp.html

Hodges Gardens was operated as a private park for almost 50 years. In May, 2007, it became Louisiana's newest state park. Many of the existing facilities are scheduled for renovation, and new structures are still in the planning stages. This gives us an opportunity to push for proper lighting before it is actually installed. If attendance is high, we hope to convince the Louisiana Office of State Parks to develop and promote Hodges Gardens as a Dark Sky Park.

So, if at all possible, please join us at the Hodges Gardens Star Party next March 25-29.

Thanks,

Don Weinell
Baton Rouge Astronomical Society

Hey everybody…Bob Rogers, ADay webmaster, has completed the photo album for ADay 2008 and has done a great job! Please check it out at www.astronomyday.org

ASTRONOMY DAY COMMITTEE

Star Parties for 2008

By John Erickson

DECEMBER

December 12 - No Star Party

Galveston Stargazor Group

TBA

*********REMINDER*********

PLEASE DON'T FORGET OUR NEIGHBORS IN GALVESTON THIS HOLIDAY SEASON

Borders Baybrook Book Drive

Borders in Webster is excited to have a book drive benefiting the Galveston school libraries. We are inviting customers to purchase titles to replace books lost during Hurricane Ike. The book drive is taking place at Borders at Baybrook from November 16 to December 13.

The store is located at 19419 Gulf Freeway at Bay Area Boulevard.
Please call 281-338-9390 with any questions.
What's Happening at the George!!!
Cynthia Gustava

George Observatory December Events

Friday Night Group (all times are 20:30 to 22:30)… Volunteers for domes and deck scopes are needed. Contact Cynthia Gustava at cynm31@comcast.net.

December 5 – Sky Search Overnight (Full): Bring those laser pointers and instruct the Girl Scouts on the constellations!

Saturday Night Public Viewing (dusk to 23:00)… Volunteers for domes and deck scopes are needed. Contact the building manager teams below.

Dec 6 – Leonard Ferguson and Cynthia Gustava leonardferguson@mac.com or cynm31@comcast.net
Dec 13 – Jack McKaye and Wes Whiddon jemckaye@comcast.net or wwhiddon@concentric.net
Dec 20 – Tracy Knauss and Keith Rivich birdbarn2000@yahoo.com or icgalaxies@cs.com
Dec 27 – Mary Lockwood and Cynthia Gustava mplockwood@att.net or cynm31@comcast.net

Eldorado Star Party

I thought some of you might be interested in the outcome of this year's Eldorado Star Party (ESP). This is the first year that I have attended, and I found that it suited me very well, and I would recommend this event to those of you who like good observing in a no frills setting.

ESP is held at the X-bar ranch, just west of Sonora (and not far off I-10). It is about 410 mi. from Kingwood. The ranch is less developed than the Prude ranch. It has a lodge with TV area, room for dining, and a large room for presentations. It does not have a kitchen, though, so meals are catered in. Otherwise, the meal service is similar to TSP. There are about 6 small cabins for rent, so most star party attendees must find other accommodations, ie. tent camping, RV camping, or hotel rooms in Sonora or Ozona (one way drives of 20-25 miles). I tent camped, with my tent adjacent to the observing field. The observing field is reminiscent of TSP's upper field, and there are porta-potties, water, electricity, and a bath house. There are some RV connections near the field, but the number is limited.

There were a couple of interesting talks, but not the long list of talks that one encounters at TSP. Also, there was a very limited swap meet, but no vendors in attendance. So, other than the observing, there is not a long list of things to do as at TSP.

Having said this, the high points of the star party were good weather, clear skies, and lots of knowledgeable observers with which to share experiences. Most of the observers came from Austin or its environs, but there were others from farther afield. In total, there were about 125 registrants. There were 6 nights of observing, and the skies were clear for 100% of all 6 nights. Transparency ranged from fair to very good, and seeing was good most of the time. The skies were very dark, although perhaps not quite as good as TSP (minor sky glows in the directions of Sonora and Ozona). Daytime temperatures were very pleasant (mid to upper 70's), allowing one to sleep outdoors to a "respectable" hour, say 10:00 a.m. Nighttime temperatures dropped into the mid to upper 40's – chilly, but not too bad. Humidity was high enough a couple of nights to cause some dewing issues, but not really severe at any time. And, of course, since the timing of ESP is displaced about 6 months from TSP, you get to see the "other half" of the sky.

Submitted by Dick Miller

How Round is the Sun?

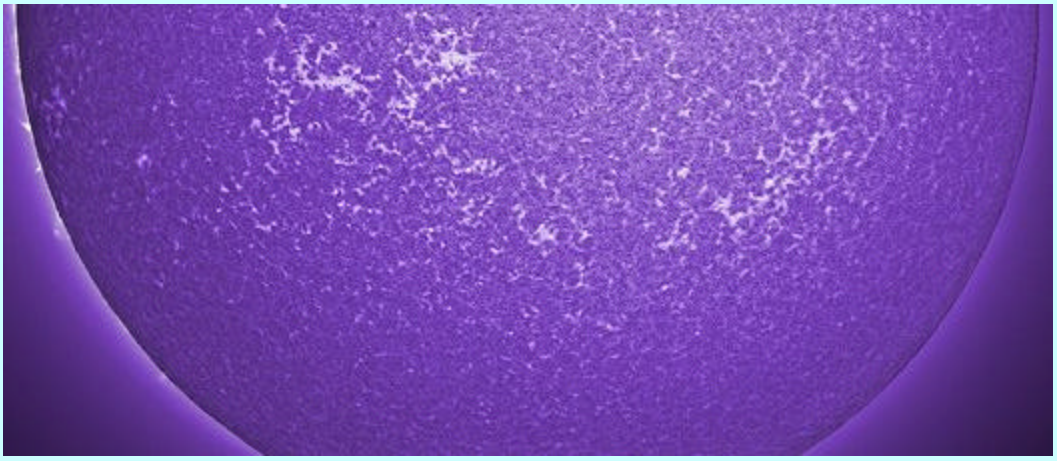
(a fascinating article – at least I though so! DLH)

Posted: 10.02.2008 http://science.nasa.gov/headlines/y2008/02oct_oblatesun.htm?list1089931

Oct. 2, 2008: Scientists using NASA's RHESSI spacecraft have measured the roundness of the sun with unprecedented precision, and they find that it is not a perfect sphere. During years of high solar activity the sun develops a thin "cantaloupe skin" that significantly increases its apparent oblateness. Their results appear the Oct. 2nd edition of Science Express.

"The sun is the biggest and smoothest natural object in the solar system, perfect at the 0.001% level because of its extremely strong gravity," says study co-author Hugh Hudson of UC Berkeley. "Measuring its exact shape is no easy task."

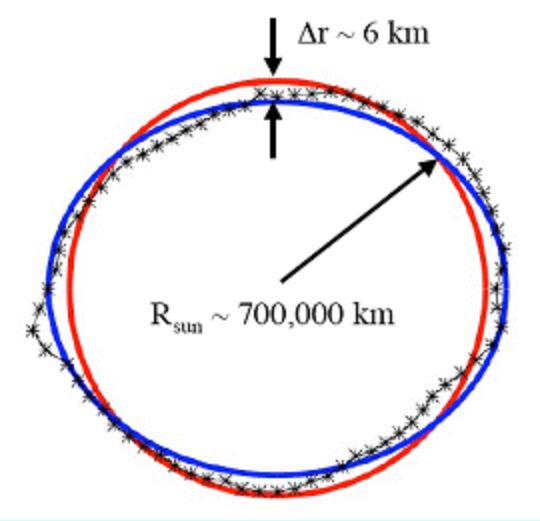
The team did it by analyzing data from the Reuven Ramaty High-Energy Solar Spectroscopic Imager, RHESSI for short, an x-ray/gamma-ray space telescope launched in 2002 on a mission to study solar flares. Although RHESSI was never intended to measure the roundness of the sun, it has turned out ideal for the purpose. RHESSI observes the solar disk through a narrow slit and spins at 15 rpm. The spacecraft's rapid rotation and high data sampling rate (necessary to catch fast solar flares) make it possible for investigators to trace the shape of the sun with systematic errors much less than any previous study. Their technique is particularly sensitive to small differences in polar vs. equatorial diameter or "oblateness."



Above: "Cantaloupe ridges" on the sun. The glowing white magnetic network is what gives the sun its extra oblateness during times of high solar activity. Los Angeles astronomer Gary Palmer took the picture in July 29, 2005, using a violet calcium-K solar filter.

"We have found that the surface of the sun has rough structure: bright ridges arranged in a network pattern, as on the surface of a cantaloupe but much more subtle," describes Hudson. During active phases of the solar cycle, these ridges emerge around the sun's equator, brightening and fattening the "stellar waist." At the time of RHESSI's measurements in 2004, ridges increased the sun's apparent equatorial radius by an angle of 10.77 +- 0.44 milli-arcseconds, or about the same as the width of a human hair viewed one mile away.

"That may sound like a very small angle, but it is in fact significant," says Alexei Pevtsov, RHESSI Program Scientist at NASA Headquarters. Tiny departures from perfect roundness can, for example, affect the sun's gravitational pull on Mercury and skew tests of Einstein's theory of relativity that depend on careful measurements of the inner planet's orbit. Small bulges are also telltale signs of hidden motions inside the sun. For instance, if the sun had a rapidly rotating core left over from early stages of star formation, and if that core were tilted with respect to its outer layers, the result would be surface bulging. "RHESSI's precision measurements place severe constraints on any such models."



The "cantaloupe ridges" are magnetic in nature. They outline giant, bubbling convection cells on the surface of the sun called "supergranules." Supergranules are like bubbles in a pot of boiling water amplified to the scale of a star; on the sun they measure some 30,000 km across (twice as wide as Earth) and are made of seething hot magnetized plasma. Magnetic fields at the center of these bubbles are swept out to the edge where they form ridges of magnetism. The ridges are most prominent during years around Solar Max when the sun's inner dynamo "revs up" to produce the strongest magnetic fields. Solar physicists have known about supergranules and the magnetic network they produce for many years, but only now has RHESSI revealed their unexpected connection to the sun's oblateness.

Right: In this diagram, the sun's oblateness has been magnified 10,000 times for easy visibility. The blue curve traces the sun's shape averaged over a three month period. The black asterisked curve traces a shorter 10-day average. The wiggles in the 10-day curve are real, caused by strong magnetic ridges in the vicinity of sunspots.

"When we subtract the effect of the magnetic network, we get a 'true' measure of the sun's shape resulting from gravitational forces and motions alone," says Hudson. "The corrected oblateness of the non-magnetic sun is 8.01 +- 0.14 milli-arcseconds, near the value expected from simple rotation."

"These results have far ranging implications for solar physics and theories of gravity," comments solar physicist David Hathaway of the NASA Marshall Space Flight Center. "They indicate that the core of the sun cannot be rotating much more rapidly than the surface, and that the sun's oblateness is too small to change the orbit of Mercury outside the bounds of Einstein's General Theory of Relativity."

Further analysis of RHESSI oblateness data could also help researchers detect a long-sought type of seismic wave echoing through the interior of the sun: gravitational oscillations or "g-modes." The ability to monitor g-modes would open a new frontier in solar physics—the study of the sun's internal core.

"All of this," marvels Hathaway, "comes from clever use of data from a satellite designed for something entirely different. Congratulations to the RHESSI team!"

The paper reporting these results, "A large excess in apparent solar oblateness due to surface magnetism," was authored by Martin Fivian, Hugh Hudson, Robert Lin and Jabran Zahid, and appears in the Oct. 2nd issue of Science Express.

Author: Dr. Tony Phillips | Credit: Science@NASA

Submitted by D. Haviland

No. 2420
RHETICUS AND COPERNICUS

by John H. Lienhard

Today, Copernicus' prophet. The University of Houston's College of Engineering presents this series about the machines that make our civilization run, and the people whose ingenuity created them.
Late in Copernicus' life, a young man arrived at his home in Frauenburg, Poland. The year was 1539, and twenty-five-year-old mathematics professor Georg Rheticus was on leave from the University of Wittenberg where Martin Luther was his older colleague. Rheticus was an enthusiastic Lutheran Protestant. Copernicus was Catholic and the local canon of the Cathedral in Cracow.

Yet in those turbulent early years of the Protestant Reformation, religious differences are *not* a part of our story, at least not yet. Rheticus, fascinated by astronomy, was on a tour visiting the great astronomers of Central Europe, ending with Copernicus.

Copernicus had done many things. He'd studied medicine and canon law. He'd written extensively on economics. He was first to state what we call Gresham's Law, "Bad money drives out the good." He gave us a theory of just pricing.

And his warnings against the inflationary printing of money were based on ideas that sounded a lot like those of Adam Smith, three centuries later.

Yet his underlying passion was astronomy. He'd lectured only briefly on the subject -- never tutored a student. As for his sun-centered solar system, he'd published only a short tract long before -- in 1514. And it included none the math behind the idea.
Still, his astronomical knowledge was well-known. And now Rheticus appeared, eager to learn. He stayed for two years. The two became very close. Each admired the other's honest dedication to learning.

Dedication to learning.

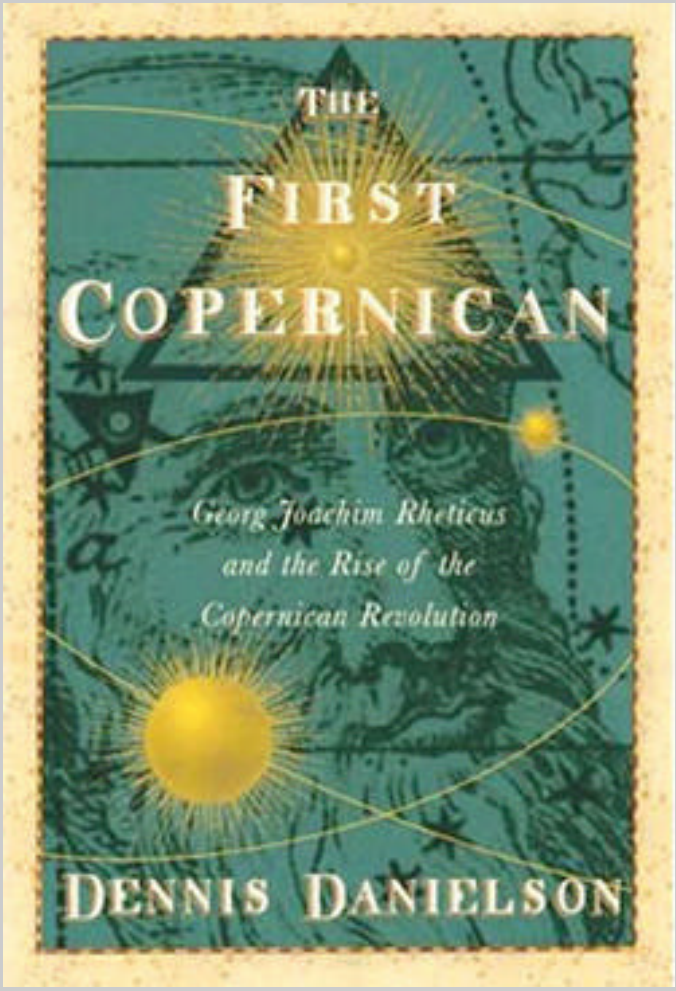
Copernicus had drafted a full treatise on his ideas, but he was sitting on it. Neither the church nor the public was ready to see the center of the universe anywhere but at the center of Earth. It took Rheticus' passion for the idea to get Copernicus to finish the book -- titled, On the Revolutions of the Heavenly Spheres.

Copernicus entrusted the finished manuscript to Rheticus, who took it off to a publisher in Nürnberg. Rheticus left the complex typesetting, under the eye of a noted Nürnberg theologian. The actual printing was done very well, but then the theologian added an anonymous introductory letter to the text. It said that, although Earth did not really orbit the Sun, the mathematics becomes much simpler if we simply imagine that it does.

When Rheticus saw that, he was outraged. Today we find, in every copy that he ever held, a livid X slashed across that page in red crayon. And yet, that letter probably allowed Copernicus' ideas to spread and touch our world as few other ideas ever did.

As for Copernicus, he suffered a stroke before he saw the finished book. It arrived as he lay unable to speak. Just hours before he died, his friends put the title page where he could see it. And we're left to wonder: could he still comprehend? And did he know what forces he had unleashed -- with the help of a young man who clearly was aware that nothing would ever be the same again?

I'm John Lienhard at the University of Houston, where we're interested in the way inventive minds work.



D. Danielson, The First Copernican: Georg Joachim Rheticus and the Rise of the Copernican Revolution. (New York: Walker & Company, 2006).

E. Rosen, Rheticus, George Joachim. Dictionary of Scientific Biography, C.C. Gillispie, ed., Vol. XI (New York: Charles Scribner's Sons, 1950): pp. 395-398.

See also this online Copernicus biography from Stanford University and this Rheticus biography from the University of St. Andrews, Scotland.

Photo of the Copernicus statue at Olsztyn is courtesy of Wikipedia commons.

Members' Gallery—December 2008
By
CHRIS WELLS & DICK MILLER

FROM CHRIS WELLS

M20 Triffid Nebula and M8 - League City, TX

Scope: Celestron C11 at f2 on PM1 Equatorial Mount
Image Camera: Canon XTi (non modified)
Processing: AIP4WIN and PS CS2

I owe Richard Berry (AIP Handbook co-author) a debt of thanks for his expert analysis on the noise characteristics of my camera leading to some custom calibration processing steps in AIP4WIN that I now use in my process.

49 Images at 60secs each at ISO100.

M33 - Ft McKavett, TX

Scope: Celestron C11 at f2 on PM1 Equatorial Mount
Image Camera: Canon XTi (non modified)
Processing: AIP4WIN and PS2
Autoguiding: DSI, ETX125 and MaxIm DL

82 mins Total comprising of 31 @ 2mins and 5 @ 4mins.

FROM DICK MILLER

M33 10-inch Newtonian, SBIG ST2000XM w/ Astrodon RGB filters, 60:28:28:28 minutes

Helix SBIG ST2000XM w/ Astrodon RGB filters, 92:64:64:64 minutes

"Star of Wonder, Star of Night"
An Astronomer Looks at the
Star of Bethlehem

Someone once observed, "The universe is composed of stories, not atoms." The Star of Bethlehem is certainly a story (as is most of the Bible, first and foremost). It is a mystery and a puzzle, involving not only theology and astronomy, but also history and even astrology. 'It is an attempt of men to understand not the universe at large, but specific events, or "What I Saw." What do we know about the Star of Bethlehem? The popular conception is summarized in the Christmas carol:

We three kings of Orient are / Bearing gifts we traverse afar / Field and fountain, moor and mountain / Following yonder star. 0 star of wonder, star of night / Star with royal beauty bright / Westward Leading; still proceeding / Guide us to thy perfect light.

We all know those lines as the story of the Star, which is fine - except for the fact that almost everything in it is wrong. The actual New Testament account of the Star of Bethlehem comes from the second chapter of the Gospel of Matthew (told here in the Revised English Bible translation):

Jesus was born at Bethlehem in Judaea during the reign of Herod. After his birth astrologers [Magi] from the east arrived in Jerusalem; asking; "Where is the newborn king of the Jews? We observed the rising of his star, and we have come to pay him homage. " King Herod was greatly perturbed when he heard this and so was the whole of Jerusalem. He called together the chief priests and scribes of the Jews and asked them where the Messiah was to be born. "At Bethlehem in Judaea, " they replied, '.for this is what the prophet wrote 'Bethlehem in the land of Judah, you are by no means Least among the rulers of Judah; for out of you shall come a ruler to be the shepherd of my people Israel '"

Then Herod summoned the astrologers to meet him secretly, and ascertained from them the exact time when the star had appeared. He sent them to Bethlehem and said, "Go and make a careful search for the child, and when you have found him, bring me word, so that I may go myself and pay him homage. "

After hearing what the king had to say they set out, there before them was the star they had seen rising; and it went ahead of them until it stopped above the place where the child lay They were overjoyed at the sight of it and, entering the house, they saw the child with Mary his mother and bowed low in homage to him; they opened their treasure chests and Presented gifts to him: gold frankincense, and myrrh. Then they returned to their own country by another route for they had been warned in a dream not to go back to Herod.

What is your initial reaction to this story? It seems to me that it is not a fabulous tale. That is it does not conjure up fantastic details or images, and it is told in a rather mundane fashion, not at all like a fable. It is also the only account we have of it in our Bible. Later, various non-canonical sources did elaborate on it. Books like the Protevangelium of James and an epistle of Ignatius say this star was the brightest star in the sky, brighter than all other stars combined, even including the sun and the moon, which bowed down before it. But Matthew is very matter-of-fact.

The historical perspective

To understand this story, we must view it in the context of its time. Who were these Magi? Where did they come from? Magi is the plural of Magus, the root of our word magic. "Court astrologer" is probably the best translation. "Wise men" is also a good term, descriptive of the esteem in which they were widely held. The group of Magi in question (it is the Christmas carol, not Matthew, that refers to three of them) came "from the east." They might have been Zoroastrians, Medes, Persians, Arabs, or even Jews. They served as court advisors, making forecasts and predictions for their royal patrons based on their study of the stars, about which they were quite knowledgeable. Magi often wandered from court to court, and it was not unusual for them to cover great distances in order to attend the birth or crowning of a king, paying their respects and offering gifts. It is not surprising, therefore, that Matthew would mention them as validation of Jesus' kingship, or that Herod would regard their arrival as a very serious matter.

When might these Magi have appeared in Judaea? Obviously, determining the story's date is important if we are to look for astronomical connections. We might assume that it was around I B.C. or I A.D., since that is when, by conventional reckoning, Jesus was born. But the calendar on which these dates are based was set by the Roman monk Dionysius Exiguus in the year 525 A D., long after the fact. Scholars writing in the first and second centuries A.D. asserted that Jesus was born between what we now call 4 B.C. and 1 B.C. They were living much closer to the event and had access to thousands of historical records in many excellent libraries, and their opinions probably should be given much more weight than has been common.

How about the time of the year? The best clue is a passage in the Book of Luke:

"And there were in the same country shepherds abiding in the fields keeping watch over their flock by night "

If the reference to "fields" is accurate - not pastures or holding pens - we might guess at a date in late summer or early fall, for it was customary for farmers to allow sheep and cattle to graze the stubble in the fields following the harvest. This clue is suggestive, but hardly definitive.

One difficulty in seeking a precise date is the fact that Matthew reports two separate sightings, possibly separated by a substantial time. First, the Magi saw the Star rising en anatole, best translated as "rising in the east," the ancient technical term for an acronical rising, when an object rises at sunset and is visible all night. After they come to Jerusalem - we do not know how long that took, and there is no indication that the Star was in any way involved with the journey- they see the Star again as they travel the few miles to Bethlehem:

There before them was the star they had seen rising; and it went ahead of them until it stopped above the place where the child lay.

There was no need for a bright or supernatural guiding light to find Bethlehem from Jerusalem; it lies just five miles south on the main road. There is a reference not to the house of an infant (brephos in the Greek) but of a paidion, or toddler, indicating that some months may have elapsed since the birth itself .

What are the astronomical possibilities? This question has been asked many times since the Christian apologist Origen first raised it around 250 A.D. It is safe to say that every astronomical event known to have occurred during, say, the decade of interest has at some point been proposed as the Star of Bethlehem.

The key point to answering this question is to note that it is not just any astronomical event that is of interest. We can restrict our inquiry to those appearances that would have had astrological significance to the Magi, who declared:

"We observed the rising of his star, and we have come to "pay him homage."

An astronomical event may not have been very obvious at all; certainly it was not obvious to Herod. Had it been an incomparably bright object, as later writers thought, there would be numerous written records of it. It is much more plausible that the Star of Bethlehem went unnoticed by all but a few experts such as the Magi.

The Death of Herod

A major key to the chronology is the date of the death of Herod, who figures prominently in our story. Herod was alive when the Star of Bethlehem appeared and the commonly quoted date for his death is 4 B.C. Thus dates of 7 B.C. through 4 B.C. are often given for the birth of Jesus. The political events of this period are best known from the writings of Josephus Flavius, the Jewish historian who lived from 37 A.D. to about 95 A.D. His testimony has always been considered vital in determining these dates.

According to Josephus, on the night of a lunar eclipse Herod executed two rabbis. They were accused of inciting some young men to climb up on the wall and tear down the golden eagle that the king had ordered placed on the gate to the Temple in Jerusalem. This eagle was, of course, an abomination to the Jews because it was a graven image. Soon Herod himself died and was buried. One of his sons inherited his throne, shortly after which Passover was celebrated. It was long believed that the lunar eclipse in question occurred on March 13 in 4 B.C. But this was only a partial eclipse (40 percent total) and fairly hard to detect. And it occurred only 29 days before Passover. Based on what we know of Herod's life, here is what would have had to happen in those 29 days:

Herod was sick at the time of the execution of the rabbis and his condition worsened almost immediately. He was treated for a time by his physicians, to no avail. Herod then decided to pack up the royal household and move to Jericho to take the baths. He tried the baths unsuccessfully for some days and then returned to Jerusalem. Believing that he soon would die, Herod came up with a diabolical plan to insure that all of Israel would mourn his death, in spite of his unpopularity. He commanded the leading men from around the country to come to Jerusalem; there he imprisoned them in the Hippodrome and ordered the army to execute them as soon as he was dead. Israel would indeed mourn. (Fortunately, the order was not carried out.)

In the meantime, word arrived from Rome that Herod had the Emperor's permission to execute his rebellious son Antipater, and he promptly complied. Five days later he died, but not before decreeing that his was to be the largest funeral ever held in the history of the world. His body was embalmed. The army was assembled to carry his body in the funeral procession to a burial site some 25 miles away. The soldiers walked in bare feet, as was required when in mourning, traveling one mile a day. A legate from Rome, where word of Herod's death had been received, arrived to protect the royal treasury. Finally, Herod's son Archelaus was crowned king and had time to issue a few decrees prior to the celebration of Passover.

The 29 days between the eclipse of 4 B.C. and the following Passover simply do not allow enough time for all of this to have happened. A minimum of 10 weeks would have been required. But on January 10, 1 B.C., there was a total lunar eclipse visible in Palestine, and it occurred twelve-and-a-half-weeks before Passover. As Martin points out, there are other compelling reasons to regard I B.C. as the true date of Herod's death. For example, the War of Varus, known to have followed Herod's death, can be redated to I B.C., where it fits the other known facts perfectly.

If we conclude that Herod did die in the spring of 1 B.C., we are free to add the years 3 B.C. and 2 B.C. to our search for the Star of Bethlehem. What was happening then? The year 2 B.C. marked the 25th anniversary of Caesar Augustus's rule and the 750th anniversary of the founding of Rome. Huge celebrations were planned. The whole empire was at peace. The doors of the temple of Janus were closed for only the third time in Roman history. To honor their emperor, the people were to rise as one and name Augustus pater patriae, or "Father of the Country." Now, getting the people of an empire to do something "spontaneously" requires a great deal of organization. And so an enrollment, or census, was ordered.

In those days, a decree went out from Caesar Augustus that all the world should be enrolled .... And all went to be enrolled, each to his own city.

This enrollment, described in the Gospel of Luke, which brought Joseph and Mary to Bethlehem, always has been a mystery since no regular taxation census occurred at this time. But the pater patriae enrollment fits perfectly.

The Astronomical Perspective

What astronomical events, possibly in the years 3 or 2 B.C., might have been related to the Star of Bethlehem?

Novae have been suggested, the unexpected, sudden brightening of a star from invisibility into a bright object for a period of days or weeks. There is no historical record of such a nova, nor is it clear what a nova's astrological significance would be. Comets are candidates, for they appear sporadically, move, and even seem to point down to the earth. (This was Origen's choice.) But the recorded comets around this time, even Halley's Comet in 12 B.C., were very impressive; astrologically, they were considered ominous. Meteors and fireballs are even less likely candidates.

Conjunctions of planets have long been considered good possibilities. A conjunction is a close apparent approach between two celestial objects. Technically speaking, a conjunction occurs at the moment when both objects have the same celestial longitude; one is due north of the other. The closer the objects, the more visually impressive is the event and the more significant astrologically. In 3 B.C. and 2 B.C., there was a series of close conjunctions involving Jupiter, the planet that represented kingship, coronations, and the birth of kings. In Hebrew, Jupiter was known as Sedeq or "Righteousness," a term also used for the Messiah.

In September of 3 B.C., Jupiter came into conjunction with Regulus, the star of kingship, the brightest star in die constellation of Leo. Leo was the constellation of kings, and it was associated with the lion of Judah. The royal planet approached the royal star in the royal constellation representing Israel. Just a month earlier Jupiter and Venus, the Mother planet, had almost seemed to touch each other in another dose conjunction, also in Leo. Then the conjunction between Jupiter and Regulus was repeated, not once but twice, in February and May of 2 B.C. Finally, in June of 2 B.C., Jupiter and Venus, the two brightest objects in the sky save the sun and the moon. experienced an even closer encounter when their discs appeared to touch; to the naked eye they became a single object above the setting sun. This exceptionally rare spectacle could not have been missed by the Magi. In fact, we have seen here only the highlights of an impressive series of planetary motions and conjunctions fraught with a variety of astrological meanings, involving all the other known planets of the period, Mercury, Mars, and Saturn. The astrological significance of these impressive events must surely have been seen by the Magi as the announcement of the impending birth of a great king of Israel.

September 11, 3 B.C., is perhaps the most interesting date of all. Not only was Jupiter very dose to Regulus in the first of their conjunctions, but the sun was in the constellation of Virgo (of obvious symbolism), together with the new moon, in a configuration that fits a plausible interpretation of a passage in the Book of Revelation describing the birth of a male child who is to be the ruler of the universe. Significantly, September 11, 3 B.C., also marked the beginning of the Jewish New year, traditionally regarded as the anniversary of Noah's landing after the Great Flood. But if the planet Jupiter was the Star of Bethlehem, or was a component of the events that triggered the visit by the Magi, how do we view the final appearance of the Star on their journey to Bethlehem? It would have been in the southern sky, though fairly high above the horizon. Could it have stopped over Bethlehem?

The answer is yes. The word "stop" was used for what we now call a planet's "stationary point." A planet normally moves eastward through the stars from night to night and month to month, but regularly exhibits a "retrograde loop." As it approaches the opposite point in the sky from he sun, it appears to slow, come to a full stop, and move backward (westward) through the sky for some weeks. Again it slows, stops, and resumes its eastward course. It seems plausible that the Magi were "overjoyed" at again seeing before them, as they traveled southward, His star, Jupiter, which at its stationary point was standing still over Bethlehem. We do know for certain that Jupiter performed a retrograde loop in 2 B.C. and that it was stationary on December 25, interestingly enough, during Hanukkah, the season for giving presents.

What Room for God?

Where has this search for the Star of Bethlehem taken us? What meaning, what room for God, do we find in the events that we know to have occurred? If we have correctly identified the Star of Bethlehem, the science is clear and simple. Keplerian orbits of planets are predictable, so that we can deduce quite accurately what the sky looked like 2,000 years ago. Even the ancient Magi understood apparent planetary motions quite well. Predictions of the conjunctions of 3 and 2 B.C. were made 400 years prior to the birth of Christ, and they were in error by only a few days. There is no need to invoke God or divine miracles to explain what happened in the heavens above Judaea. Natural laws are sufficient. But is this kind of sufficiency really enough for us? The significant question raised here is not what happened, but why it happened. What does it mean? Was Matthew right in seeing this event as divine confirmation of a central moment in God's plan for mankind? What room is left for God, not as an agent filling in the gaps between what we can understand as physical causes, but as the creator of purpose? And was God's purpose fulfilled by the great celestial dance that we call the Star of Bethlehem? These questions are examples of the kind of decisions we are faced with daily. No theologian can say, in a way convincing to a scientist, that some event required an act of God outside natural law. Similarly, no scientist can say that some event was merely (a dangerous word) an act of natural law working itself out with no other meaning. That is, no one is forced to believe that what happened in the heavens two thousand years ago was a simple, natural event devoid of meaning. The Star of Bethlehem is an excellent example of an event that occurs right at the intersection of Christianity and science, in a world created by a God who chose to institute natural laws but who nevertheless continues to carry out His own purposes. - by Craig Chester

Craig Chester is the president and co-founder of the Monterey (California) Institute for Research in Astronomy (MIRA). He holds a Ph.D in Astronomy from Case Western Reserve University [Reprinted from IMPRIMIS, the monthly journal of Hillsdale College, December 1993]
http://www.tccsa.tc/articles/star_of_bethlehem.html

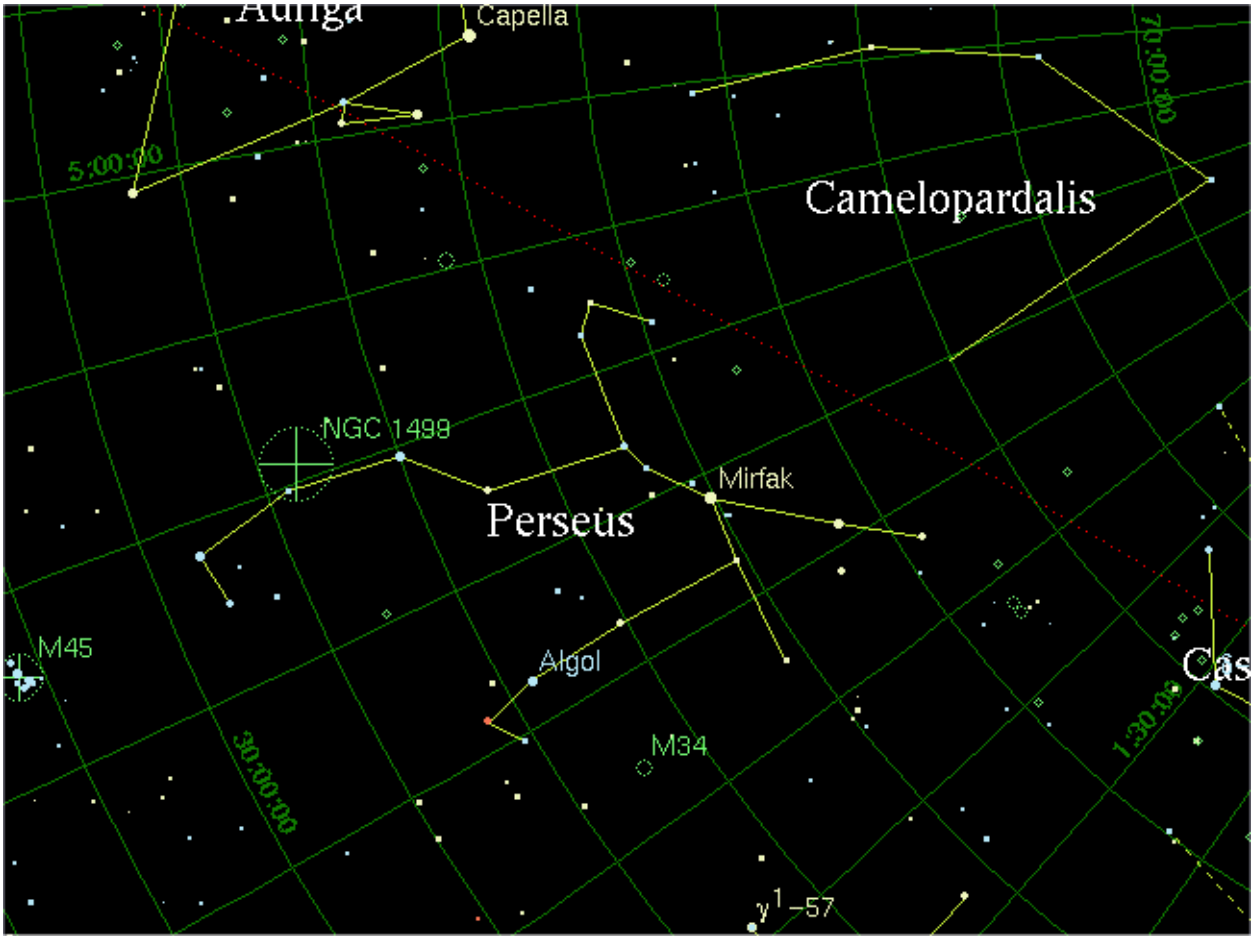
MONTHLY OBSERVING

December Sky

The December sky is rich with stars that sparkle like precious gems. Perseus and Triangulum are the dominant constellations amid the array of colorful stars.

In Greek mythology Perseus is the son of Zues and the wife of Polydectes, the king of Seriphos.Of course, Polydectes was angry, but what can you do when you are cuckolded a god, especially the chief god? Polydectes remained angry for a long time. When Perseus grew up, the king sent his step-son to kill Medusa, one of three sisters called the Gorgons who were so ugly, anyone who looked at them would turn to stone. With the help of Athena, the goddess of wisdom, and Mercury, the messenger of the gods, who gave winged sandals, Perseus cut Medusa's head while she was asleep. He avoided turning to stone by seeing only the reflection of the snake-haired monster. The great hero of Greek mythology is depicted carrying the snake-haired head of Medusa. The constellation is not easy to pick out. The stars seem randomly scattered and it takes quite an imagination to see a warrior with a snake haired head in his hand. Perseus lies between Cassiopeia and the Pleiades. Algol, one of the brightest stars in the constellation is the eye of Medusa and has always been considered malevolent, the "evil eye." The name of the star means "the ghoul." Algol is a binary system with the stars only six million miles apart. The primary is a brilliant blue-white star several times larger than our sun, the secondary is a much larger, but less massive yellow star. Every three days the star blinks as the stars eclipse each other. Triangulum is a simple, three sided, geometric constellation without a story behind it..

Deep Sky Objects



DEEP SKY OBSERVING - cont'd.
NGC 1499—California Nebula.

M 34--an intermediate aged open cluster of about 100 stars

The Double Cluster lies between Cassiopeia and Perseus. This pair of open star clusters is easily seen with binoculars.

Planets

Venus forms a lovely triangle with Jupiter and crescent moon after dark on December 1st and continues to be the "evening star" the rest of the month. Saturn rises in the east late in the evening.

Events

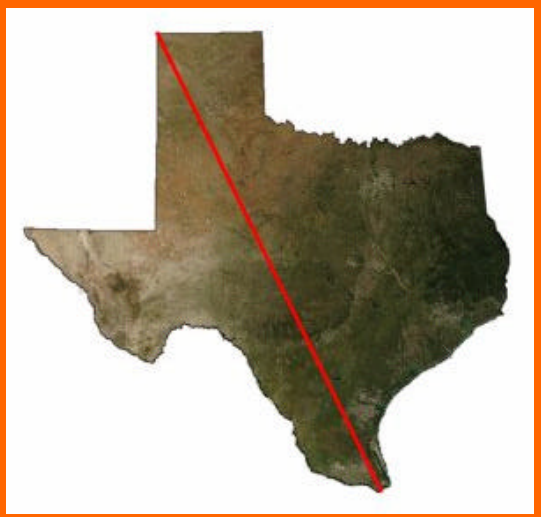
From December 12th to the 14th, the bright and fast Geminids streak across the sky. The meteors appear to come from Gemini and, hence, the source for the name.

A TEXAN definition of a planet
reported by Wm. Robert Johnston
last modified 14 November 2008

Given the considerable debate as to whether such outer solar system objects as Pluto and Eris (2003 UB313) should be counted as planets, and the not-entirely satisfactory resolution on the matter recently passed by the International Astronomical Union, we offer the best possible definition of a planet--the TEXAN definition:

Regarding the confusion over a definition separating planets from other Sun-orbiting bodies:

Since any object too small to be considered a planet is a "minor planet", a "small solar system body", or a "dwarf planet", and
Since anything bigger than TEXAS is certainly not minor, not small, and not a dwarf,
Therefore, a planet must be any star-orbiting, non-fusing celestial body larger than the smallest sphere containing TEXAS.

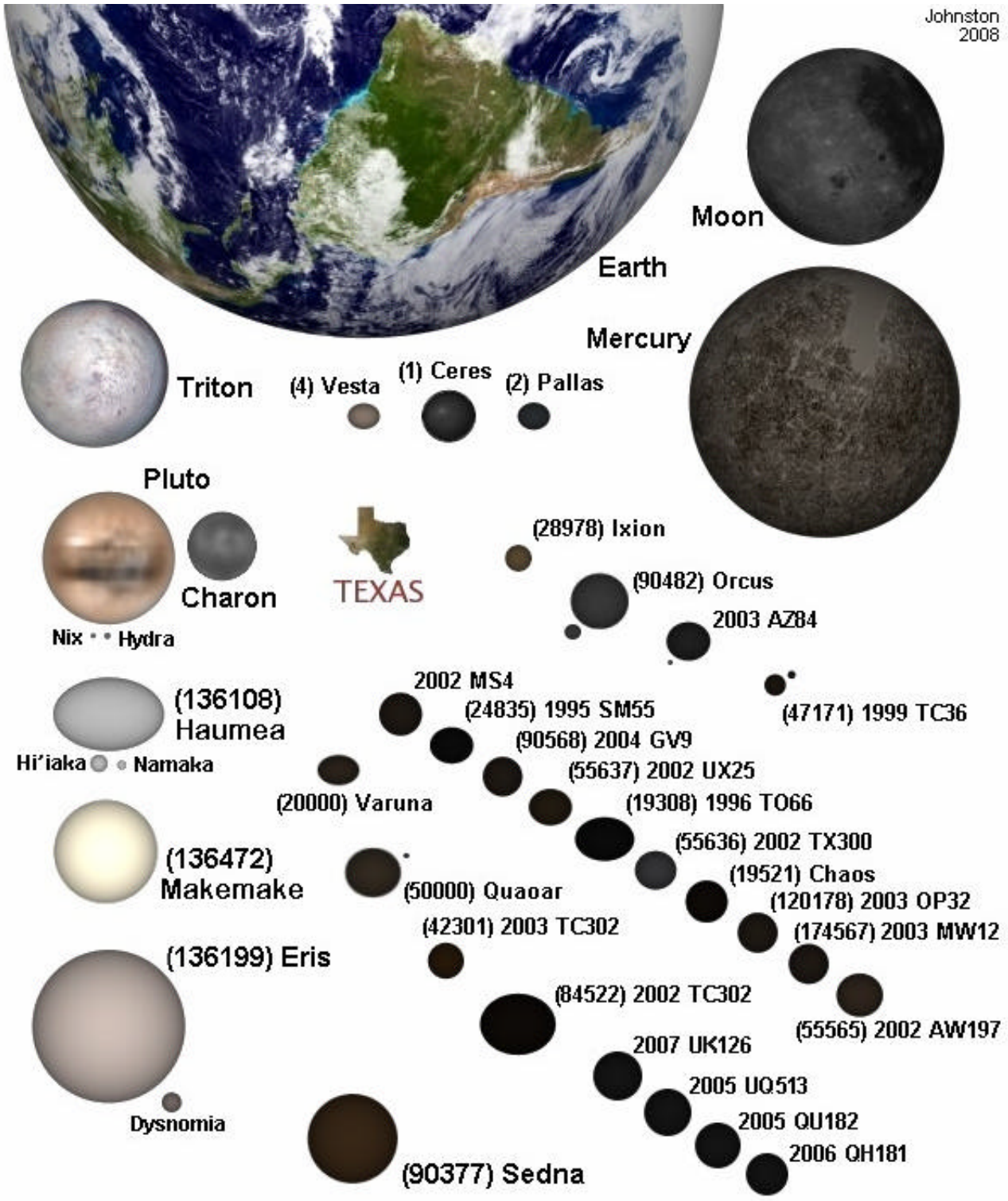


List of known and possible planets in the solar system:

Planet	mean diameter* (km)	status	mean distance from Sun (AU)	year discovered
Mercury	4879	planet	0.39	pre-Texas
Venus	12102	planet	0.72	pre-Texas
Earth	12742	planet	1.00	pre-Texas
Mars	6779	planet	1.52	pre-Texas
Jupiter	139640	planet	5.20	pre-Texas
Saturn	116160	planet	9.54	pre-Texas
Uranus	50730	planet	19.19	1781
Neptune	49240	planet	30.07	1846
Pluto	2320±50	planet	39.48	1930
Haumea	1300±100	probable planet	43.34	2003
Makemake	1500±300	probable planet	45.71	2005
(84522) 2002 TC302	1150±330	possible planet	55.02	2002
Eris	2660±300	planet	67.67	2003
Sedna	1500±300	probable planet	491.74	2003

** mean diameter is diameter of sphere of equal volume*

Here they are compared:



Of course, the original Republic of Texas extended to 42° north latitude; using the full extent of the Republic of Texas, the definition of a planet is an object with a diameter of at least **2,012.6 km** (1,250.6 miles). By this threshold, the solar system has ten planets: the traditional nine including Pluto plus the newly discovered planet Eris. Surely it is not coincidental that one definition for a planet previously considered by the International Astronomical Union used a minimum diameter of 2,000 km. The final International Astronomical Union decision, to classify Pluto and other objects as "dwarf planets", however, cannot be accepted as appropriately TEXAN.

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

I have a Celestron NexStar 5 Scope for sale with
Pelican Case
Tripod
Rigel Finder
Accessories include 10 MM and 25 mm Lenses
The buyer must live in the Houston Region because you must come get it or meet me in Houston.. Shipping is not available.
I am asking $6000.00 OBO
The only Phone number to list is my cell: 832-545-7828
The only email to list in the ad is my home email FrankBittinger@yahoo.com
Thanks,
Frank Bittinger

FOR SALE
Orion SkyQuest XT-10 Dobsonian
10" f 4.7
This scope is a great performer with super optics.
Includes: 9 x 50mm finder, 1 1/4" or 2" focuser, eyepiece tray, eyepieces: Orion Sirius 10mm and 26mm Plossls
This scope is set up with encoders but no hand controller was purchased (seperate item)
This scope has plenty of scratches showing wear...but all works perfect and provides stunning views.
Only asking $200 or best offer

Call Clayton Jeter @ 713-569-7529

Light pollution:

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

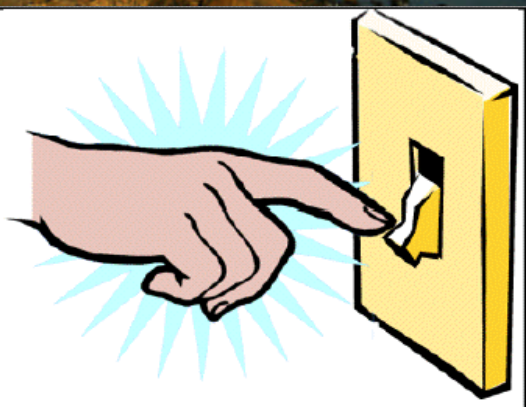
.Do you have a question about light pollution, protecting the night sky, or IDA's resources? **Get Help from IDA** http://www.darksky.org/mc/page.do?sitePageId=56399

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

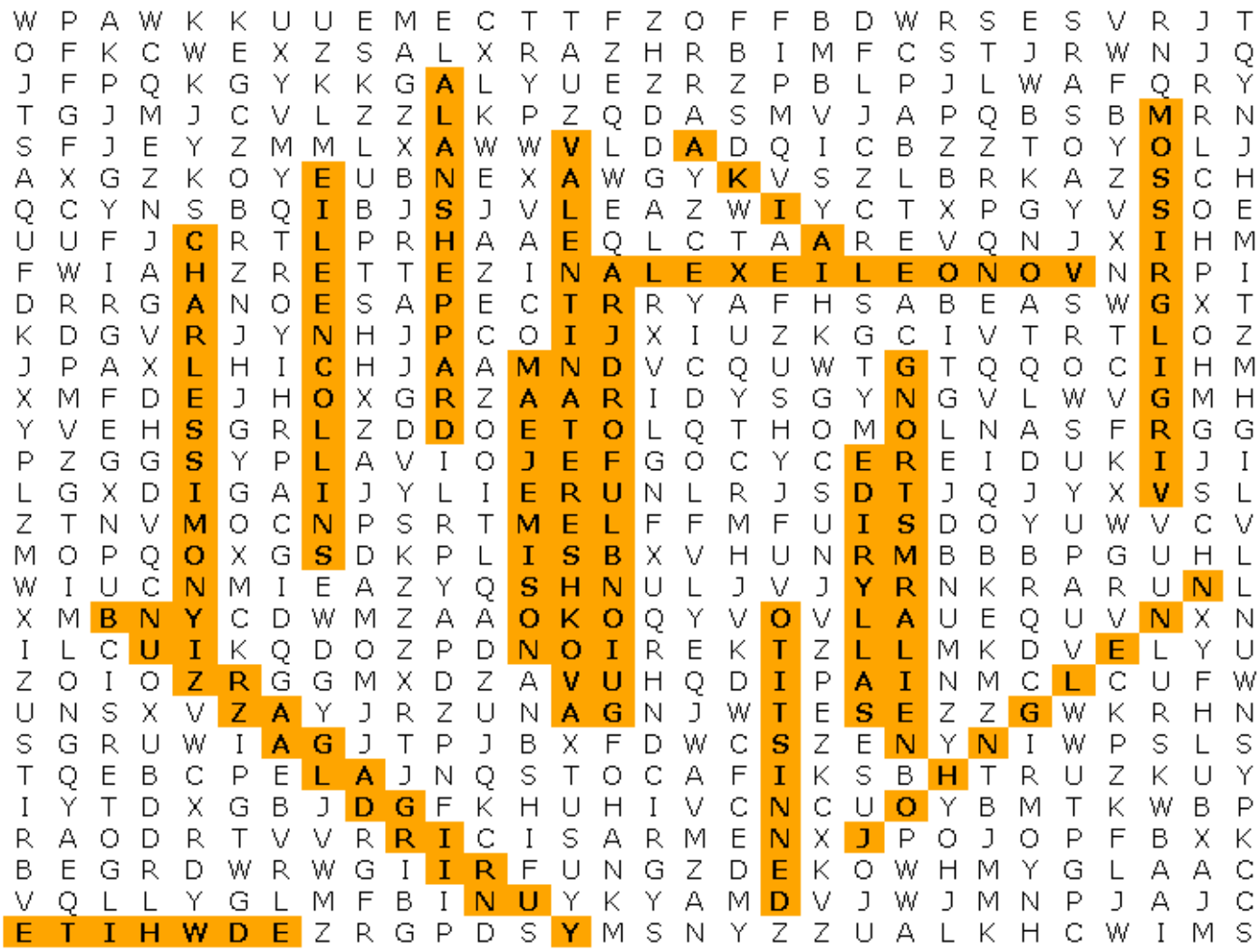
http://www.cartoonstock.com/directory/A/Astronomy.asp

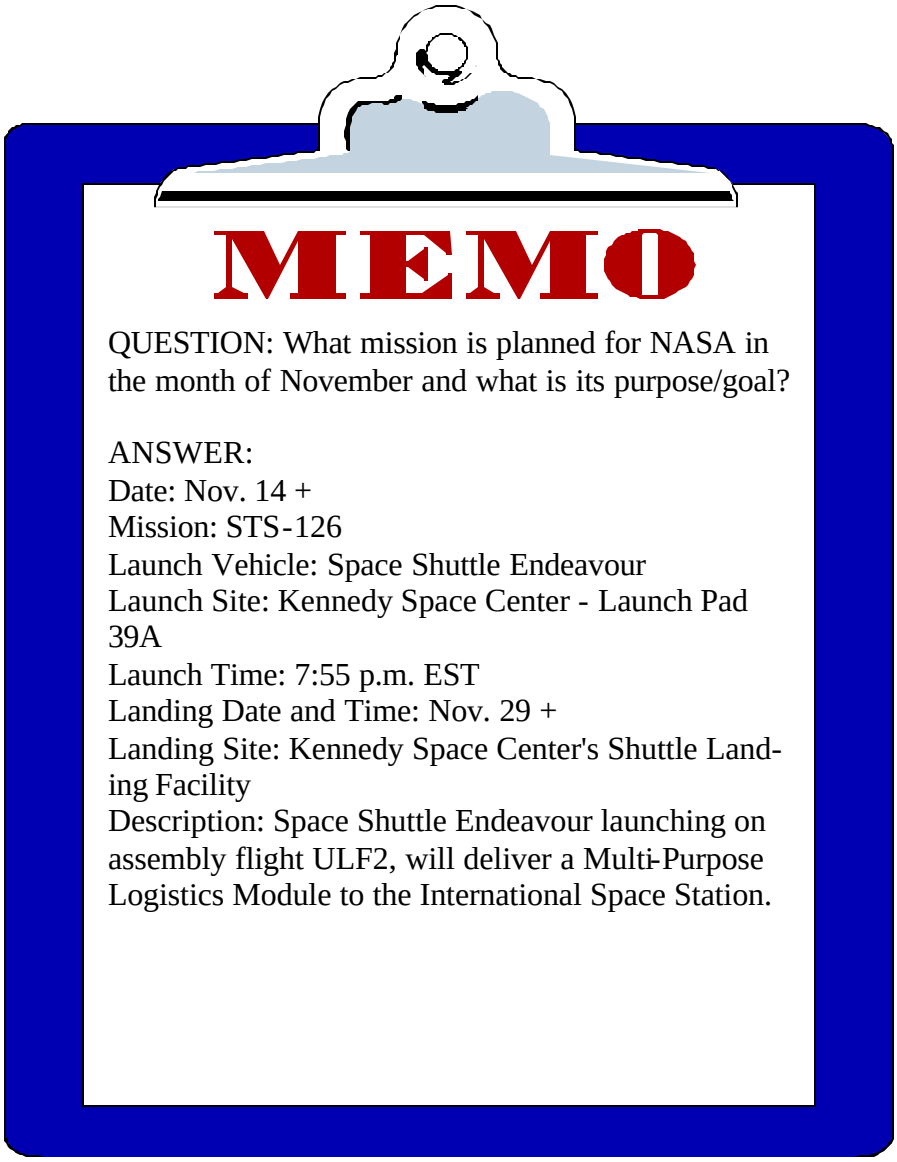
Astronomy and Kids

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 FOR NOVEMBER

FIRST IN THEIR LEAGUE





QUESTION: What mission is planned for NASA in the month of November and what is its purpose/goal?

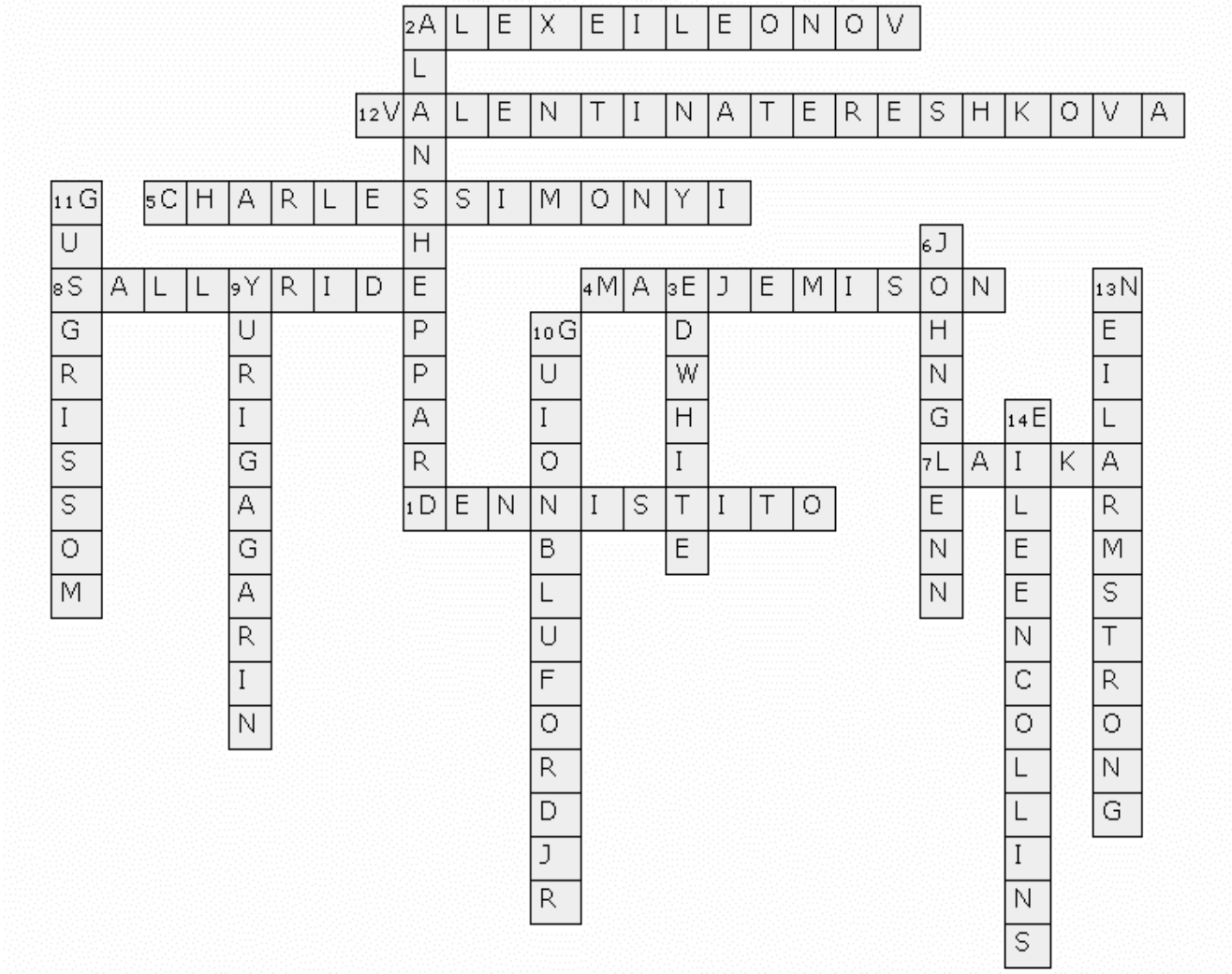
ANSWER:
Date: Nov. 14 +
Mission: STS-126
Launch Vehicle: Space Shuttle Endeavour
Launch Site: Kennedy Space Center - Launch Pad 39A
Launch Time: 7:55 p.m. EST
Landing Date and Time: Nov. 29 +
Landing Site: Kennedy Space Center's Shuttle Landing Facility
Description: Space Shuttle Endeavour launching on assembly flight ULF2, will deliver a Multi-Purpose Logistics Module to the International Space Station.

NAME _____

DATE _____

FIRSTS KEY

Please complete the crossword puzzle below



Across:

1. THE FIRST PERSON TO VISIT SPACE AS A TOURIST
4. THE FIRST AFRICAN AMERICAN WOMAN IN SPACE
5. THE FIRST REPEAT CIVILIAN TO VISIT THE ISS
7. THE FIRST EARTHLING IN SPACE
8. THE FIRST AMERICAN WOMAN IN SPACE
2. THE FIRST PERSON TO SPACE WALK
12. THE FIRST WOMAN IN SPACE

Down:

2. THE FIRST AMERICAN IN SPACE
3. THE FIRST AMERICAN TO WALK IN SPACE
6. THE FIRST AMERICAN TO ORBIT THE EARTH
9. THE FIRST HUMAN IN SPACE
10. THE FIRST AFRICAN AMERICAN IN SPACE
11. THE FIRST PERSON TO MAKE A SECOND TRIP INTO SPACE
13. THE FIRST MAN ON THE MOON
14. THE FIRST AMERICAN WOMAN TO PILOT A SPACECRAFT

WHAT'S HAPPENING IN DECEMBER

* Dec 01 - Solar Dynamics Observatory (SDO) Atlas 5 Launch
* Dec 01 - Conjunction of Moon, Venus, and Jupiter (3 Degree Triangle)
* Dec 01 - Cassini, Orbital Trim Maneuver #175 (OTM-175)
* Dec 01 - Asteroid 155336 (2006 GA) Near-Venus Flyby (0.032 AU)
* Dec 01 - Asteroid 2003 YS70 Near-Mars Flyby (0.036 AU)
* Dec 01 - Asteroid 30785 Greeley Closest Approach To Earth (1.357 AU)
* Dec 02 - Cassini, Distant Flyby of Calypso
* Dec 02 - Kuiper Belt Object 19521 Chaos Closest Approach To Earth (40.798 AU)
* Dec 03 - 35th Anniversary (1973), Pioneer 10, Jupiter Flyby
* Dec 04 - 30th ANniversary (1978), Pioneer Venus 1, Venus Orbit Insertion
* Dec 05 - Asteroid 4433 Goldstone Closest Approach To Earth (1.513 AU)
* Dec 05 - Asteroid 6758 Jesseowens Closest Approach To Earth (2.019 AU)
* Dec 06 - MESSENGER, Deep Space Maneuver 4 (DSM-4)
* Dec 06 - Asteroid 6471 Collins Closest Approach To Earth (1.290 AU)
* Dec 06 - Asteroid 78577 JPL Closest Approach To Earth (1.674 AU)
* Dec 06 - Asteroid 25143 Itokawa Closest Approach To Earth (1.867 AU)
* Dec 06 - Kuiper Belt Object 2004 XR190 Closest Approach To Earth (57.093 AU)
* Dec 07 - Asteroid 10051 Albee Closest Approach To Earth (0.788 AU)
* Dec 08 - Comet C/2007 M2 (Catalina) Perihelion (3.541 AU)
* Dec 08 - Asteroid 2007 EE26 Near-Mars Flyby (0.013 AU)
* Dec 08 - Asteroid 11881 Mirstation Closest Approach To Earth (1.757 AU)
* Dec 09 - Cassini, Orbital Trim Maneuver #176 (OTM-176)
* Dec 09 - Cassini, Distant Flyby of Calypso
* Dec 09 - 30th ANniversary (1978), Pioneer Venus 2, Venus Arrival (Atmospheric Probes)
* Dec 09 - 150th Anniversary (1858), Ausson Meteorite Fall (Hit Building in France)
* Dec 10 - Asteroid 9969 Braille Closest Approach To Earth (2.256 AU)
* Dec 11 - Annie Jump Cannon's 145th Birthday (1863)
* Dec 12 - Asteroid 5891 Gehrig Closest Approach To Earth (1.173 AU)
* Dec 12 - Asteroid 4628 Laplace Closest Approach To Earth (1.619 AU)
* Dec 13 - Cassini, Orbital Trim Maneuver #177 (OTM-177)
* Dec 13 - Geminids Meteor Shower Peak
* Dec 13 - Asteroid 162361 (2000 AF6) Near-Earth Flyby (0.074 AU)
* Dec 14 - Asteroid 2006 VB14 Near-Earth Flyby (0.093 AU)
* Dec 14 - Asteroid 5036 Tuttle Closest Approach To Earth (2.018 AU)
* Dec 14 - 5th Anniversary (2003), Nozomi, Mars Flyby
* Dec 15 - Orbiting Carbon Observator (OCO) Taurus Launch
* Dec 15 - Asteroid 2006 KZ39 Near-Mercury Flyby (0.044 AU)
* Dec 15 - Asteroid 4116 Elachi Closest Approach To Earth (0.978 AU)
* Dec 15 - Asteroid 447 Valentine Closest Approach To Earth (1.926 AU)
* Dec 15-19 -] American Geophysical Society Fall Meeting, San Francisco, California
* Dec 16 - Asteroid 4150 Starr Closest Approach To Earth (1.444 AU)
* Dec 16-21 - Conference on Elementary Particles, Astrophysics, and Cosmology, Miami, Florida
* Dec 17 - Cassini, Orbital Trim Maneuver #178 (OTM-178)

* Dec 17 - Asteroid 5203 Pavarotti Closest Approach To Earth (1.556 AU)
* Dec 17 - 50th Anniversary (1958), Project Mercury Created
* Dec 17 - 105th Anniversary (1903), Wright Brothers' First Airplane Flight
* Dec 18 - Asteroid 6223 Dahl Closest Approach To Earth (1.657 AU)
* Dec 19 - Comet Tsuchinshan 2 Near-Jupiter Flyby (0.328 AU)
* Dec 19 - 210th Anniversary (1798), Benares Meteorite Fall (Hit House in India)
* Dec 20 - Asteroid 2004 XL14 Near-Earth Flyby (0.061 AU)
* Dec 21 - Cassini, Titan Flyby
* Dec 21 - Winter Solstice, 21:12 UT
* Dec 21 - 30th Anniversary (1978), Venera 12, Venus Landing
* Dec 21 - 40th Anniversary (1968), Apollo 8 Launch (Frank Borman, Jim Lovell and Bill Anders)
* Dec 22 - Ursids Meteor Shower Peak
* Dec 22 - Asteroid 8103 Fermi Closest Approach To Earth (2.111 AU)
* Dec 22 - 20th Anniversary (1988), Discovery of the LEW 88516 Meteorite (Mars Meteorite)
* Dec 23 - Asteroid 1221 Amor Closest Approach To Earth (1.084 AU)
* Dec 23 - Asteroid 18106 Blume Closest Approach To Earth (1.549 AU)
* Dec 24 - Cassini, Orbital Trim Maneuver #179 (OTM-179)
* Dec 24 - Asteroid 232 Russia Closest Approach To Earth (1.703 AU)
* Dec 24 - Deep Space Network's 45th Birthday (1963)
* Dec 25 - Asteroid 4055 Magellan Closest Approach To Earth (1.306 AU)
* Dec 25 - 5th Anniversary (2003), Mars Express, Mars Orbit Insertion
* Dec 25 - 30th Anniversary (1978), Venera 11, Venus Landing
* Dec 27 - Asteroid 2004 LV3 Near-Earth Flyby (0.069 AU)
* Dec 27 - Asteroid 7032 Hitchcock Closest Approach To Earth (1.094 AU)
* Dec 27 - Asteroid 39382 Opportunity Closest Approach To Earth (2.273 AU)
* Dec 28 - Asteroid 2006 JY26 Near-Earth Flyby (0.096 AU)
* Dec 28 - Asteroid 6336 Dodo Closest Approach To Earth (1.435 AU)
* Dec 28 - Asteroid 18932 Robinhood Closest Approach To Earth (1.796 AU)
* Dec 29 - Moon Occults Jupiter
* Dec 31 - Asteroid 51826 Kalpanachawla Closest Approach To Earth (1.901 AU)

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