The Astronews

HUI KILOLANI

Volume 59, Issue 4

April 2009

www.hawastsoc.org

President's Message

by Chris Peterson

There are many reasons to pursue astronomy, but one of the most ancient yet persistent is the desire to answer the question, "What's up there?" In particular, many of us want to know if there are other planets like ours and, if so, how many and where they are.

In the past 400 years, telescopes have greatly increased our knowledge of the universe, but it was only in the 1990s that the first planets were discovered orbiting other stars. Most have been discovered by carefully measuring the change in motion of the star caused by the gravity of the planet in its orbit. Bigger planets have bigger gravity fields, so early discoveries using this method have been biased toward the discovery of large planets.

Now the Kepler spacecraft has successfully launched. In a few years we should know much more about planetary systems around other nearby stars. Kepler will monitor 100,000 stars to detect the small dips in brightness caused when a planet transits the star, and this method can detect planets as small as Earth.

(Continued on page 11)

Upcoming HAS Star Parties

Club Party-Dillingham	**Apr. 18**
Public Party- Dillingham	**Apr. 25**
Kahala/Waikele Party	**May 2**

Inside this issue:

Upcoming Events:

☆The next meeting is at 7:30 p.m. on **Tuesday, Apr. 7** at the Bishop Museum.

☆Bishop Museum's next planetarium show with **Barry Peckham** is Friday, **Apr. 3 & 17** at 7:00 p.m.
www.bishopmuseum.org/calendar

☆The next Board Meeting is Sunday, **Apr. 5** at 3:30 p.m. at the POST building at UH.

400 Years to Mauna Kea: How the Telescope Changed Humanity

Peter Michaud
Public Information and Outreach Manager
Gemini Observatory

***The following is reprinted with permission from the author and The Hawaii Tribune-Herald*

The time was ripe for change 400 years ago - and I'm not talking no small kine change! It was time for a transformation that would do nothing less than shake the foundation of humanity's perception of itself.

While it would be simplistic to attribute this change to one person, invention, or event, it is true that one person, using one invention did profoundly alter the course of human history. That person was the Italian thinker/philosopher Galileo Galilei; that invention was the telescope.

First, let's get one misconception straight: Galileo didn't invent the telescope. That credit is usually given to a Dutch eyeglass maker named Hans Lippershey. However, it has been argued that others (before Lippershey) likely experimented with lenses and stumbled upon the discovery that the right combination of aligned lenses could make objects appear closer. Lippershey notwithstanding, by the early 1600s the telescope's invention was probably inevitable.

Another oft-stated "fact" is that Galileo was first to point a telescope skyward and study the sky scientifically. But lo, even that point is fuzzy. British historians now say that a British subject is due that bit of posthumous fame. Apparently, Thomas Harriot faithfully sketched the surface of the Moon several months before Galileo in early 1609.

All of these details are simply a distraction from the undisputed fact that Galileo was the first person to apply what we now call the scientific method to his observations of many objects in the sky. Galileo's observations of Jupiter, Saturn, the Moon, Sun and starry sky --and the revolutionary conclusions drawn from them-- started humanity on a humbling, inspiring and irreversible journey through the universe.

Galileo's observations and ideas, combined with the earlier work of Copernicus and later Newton (and generations of scientists since then), abruptly hurled humanity away from its self-appointed place at the center of the universe. Thanks to Galileo's initial push, we find ourselves residing in a rather less-than-significant locale orbiting an average star which

(Continued on page 5)

President Chris Peterson called the March 1, 2009 meeting of the Hawaiian Astronomical Society to order at 7:43 p.m. The meeting was held at the Atherton Halau on the grounds of the Bishop Museum. There were twenty-eight members and three visitors in attendance.

Hawaii Space Lecture Series: President Chris Peterson reports that the lecture on Wednesday, March 18th, will discuss "The New Solar System." This particular lecture for the Series is scheduled to take place at 7:30 pm, in the room 544, on the fifth floor of the Pacific Ocean Science and Technology Building, at the University of Hawaii at Manoa. For further information you can contact NASA PRPDC at 808-056-3132 or on the Web go to http://www.higp.hawaii.edu/prpdc <http://www.higp.hawaii.edu/prpdc> .

Near Pass – A thirty-five meter asteroid has passed within 38,000 miles of Earth was reported passing closest to the Earth at 12:30 on Tuesday March 1, 2009 by the Australian National University astronomer Rob McNaught. This asteroid is of the size of the object that caused the Tunguska event in the early twentieth century.

Visitors: We had three visitors at the meeting this month. John Guagliardi of Mililani, Sharleen Proctor of Pearl City and Dickison Richard of Kapolei joined us this evening.

Reminders: 2009 is the International Year of Astronomy and clubs and interested groups around the world are geared up. February activities include moon activities and discussions of the solar system. Getting newcomers started in astronomy is a focus. Teaching the use of Finder charts and star charts starts out the year's activities. The Hawaiian Astronomical Society will participate in the National Observe the Moon night later in the year, August 1st. This will be an active year and we hope many of our members come out and help celebrate with us on the North Shore of Oahu at our monthly Star Parties at Dillingham Airfield near Mokuleia. Should members not wish to venture so far, we offer monthly suburban star viewing usually during the first quarter moon phase, at Kahala Community Park and Waikele Regional Park.

FYI – The **Cassini** craft has sent back data that has identified a new moon in Saturn's G ring. It appears to be about 500 cubic meters in size. NASA has indicated that there is no real clear boundary for the size of moons in the rings. The Kepler mission's search for extra-solar planets planetary hunting mission is looking for planet orbits that transit stars blocking light. The mission is to establish a light curve thereby hopefully allowing them to discover Earth-sized objects more effectively. The Chandrayan Mission will use radar imaging or biostatic imaging during the Indian Space Mission. The Chinese Moon mission Chang Der concluded their mission and crashed their orbiter into the Moon's surface. This was not announced in advance.

Hawaii House Bill SB 536, relating to the establishment of a Starlight Reserve, has passed out of committee. It hopes to establish a light free or light restricted zones. We hope that this bill with help set some light pollution controls and restrictions.

March 28th is scheduled to be "**Earth-Hour, Lights Out**" night. It is hoped that all individuals in Honolulu will turn off all lights for one hour between the hours of 8:30 and 9:30 p.m. on the last Saturday in March.

School Star Party Report: Forrest Luke reported that there would be a star party at Punahou School on March 2nd and another one at Niu Valley Middle School on March 20th. A third school star party has been scheduled for the Hawaii High School Hikers at KMCAS on March 27th. Forrest requested sign-ups for astrono-

(Continued on page 7)

APOLLO UPGRADE
by Dr. Tony Phillips

The flight computer onboard the Lunar Excursion Module, which landed on the Moon during the Apollo program, had a whopping 4 kilobytes of RAM and a 74-kilobyte "hard drive." In places, the craft's outer skin was as thin as two sheets of aluminum foil. It worked well enough for Apollo. Back then, astronauts needed to stay on the Moon for only a few days at a time. But when NASA once again sends people to the Moon starting around 2020, the plan will be much more ambitious—and the hardware is going to need a major upgrade. "Doing all the things we want to do using systems from Apollo would be very risky and perhaps not even possible," says Frank Peri, director of NASA's Exploration Technology Development Program. So the program is designing new, more capable hardware and software to meet the demands of NASA's plan to return humans to the moon. Instead of staying for just a few days, astronauts will be living on the Moon's surface for months on end. Protecting astronauts from harsh radiation at the Moon's surface for such a long time will require much better radiation shielding than just a few layers of foil. And rather than relying on food and water brought from Earth and jettisoning urine and other wastes, new life support systems will be needed that can recycle as much water as possible, scrub carbon dioxide from the air without depending on disposable filters, and perhaps grow a steady supply of food—far more than Apollo life-support systems could handle. Next-generation lunar explorers will perform a much wider variety of scientific research, so they'll need vehicles that can carry them farther across the

(Continued on page 9)

Here's perhaps the ultimate in an all-terrain vehicle—including lunar terrain.

(400 Years IYA continued from pg. 2)

is one of as many as 200 billion stars in a normal spiral galaxy we call the Milky Way--itself one of trillions of galaxies in our universe.

Moving humanity from the center of the universe was no small feat. The scientists and thinkers who first hinted at the seemingly impossible reality that we did not hold a central place faced the collective ego of humanity. It would take a powerful argument to overturn the force of centricity that dominated the human perception of itself since the dawn of history.

That argument was helped along with the rapid development of the telescope as more and more powerful telescopic eyes looked to the skies. As they did, the universe began to reveal itself as much more complex and wonderful than anyone had imagined.

Among the first revelations: that there were literally thousands of fuzzy objects called nebulae scattered throughout the sky. Heated arguments ensued about their nature, but eventually it became clear that they were farther away than anyone (save a few brave thinkers) had ever dared speculate.

As telescopes grew larger, it became apparent that using lenses (as Galileo did) had limits. Fortunately, in 1669, Sir Isaac Newton devised an alternate design that used a concave mirror rather than a lens which would allow the telescope to reach its full potential.

Using Newton's mirrored (reflecting) telescopes, the science of astronomy flourished as more and more light was collected from space. Characterizing the nebulae resulted in catalogues of thousands of these fuzzy objects. However, a special class–the spiral nebulae–were especially puzzling, and would be the key to understanding the true magnitude and scale of our universe.

Back in the 1920s, astronomer Edwin Hubble began a systematic survey of spiral nebulae, taking their spectra using the 100-inch reflecting telescope on Mt. Wilson in California. Spectroscopy has the remarkable ability to determine such things as how fast an object is moving relative to us by spreading the object's light into a rainbow of colors called a spectrum. By noting how the colors were shifted from a reference spectrum, Hubble determined that no matter which spiral nebulae he looked at, these objects were moving away from us.

Hubble's diligent work using photographic plates to collect starlight through the 100-inch telescope led to the remarkable conclusion that the universe was expanding. The farther away we looked, the faster the galaxies were moving. This became the basis for the theory that the universe started from a single "Big Bang." But large telescopes were just beginning to emerge in Hubble's era.

The famous 200-inch reflecting telescope on Mt. Palomar in California continued to refine the work of Hubble and others in the mid-1900s. New understanding of the lives of stars, the planets of our own solar system and even the possibility of other planetary systems in space became active areas of research as large reflecting telescopes began dotting the mountaintops of the world.

The telescopes of today were the dreams of yesterday. As a kid growing up in the '70s, I remember being told that the largest visible-light telescope would always be the 200-inch Palomar facility. Of course, engineers proved that wrong by making thin, lightweight mirrors that are actively controlled (like the 8-meter Gemini and Subaru telescopes on Mauna Kea). Even larger segmented mirrors (like those in the twin 10-meter Keck telescopes on Mauna Kea) are leading the way toward 30-meter (and larger) telescopes in both hemispheres for the next generation of astronomers to use. In addition, telescopes that look at light which is invisible to the human eye (radio, x-ray etc.), many of which are in space, round out our view.

The telescopes of today up on Mauna Kea are giving us tantalizing hints at what lies ahead for astronomy. Already we are studying individual planets around other stars, capturing exploding stars at the end of their lives, catching the births of stars and planetary systems, and corralling the dim glow of galaxies from which light has been traveling for most of the 13-plus billion years that our universe has existed as we know it.

The telescope has taken us on a journey through time that shows no sign of ending. In fact, it just keeps getting more compelling as we continue the journey that Galileo began 400 years ago. ☆

Peter Michaud is the Public Information/Outreach Manager of Gemini Observatory and co-chairman for the International Year of Astronomy effort in Hawaii.
http://www.gemini.edu/

Planets Close To the Moon

Times are Hawaii Standard Time

Apr 6, 16h, M 5.5º SSW of Saturn (148º from sun in evening sky)

Apr 19, 05h, M 2.1º NNW of Jupiter (67º from sun in morning sky)

Apr 19, 12h, M 2.2º NNW of Neptune (64º from sun in morning sky)

Apr 21, 16h, M 4.6º NNW of Uranus (37º from sun in morning sky)

Apr 22, 04h, M 0.96º NNW of Venus (33º from sun in morning sky)

Apr 22, 04h, M 5.3º NNW of Mars (33º from sun in morning sky)

Apr 26, 06h, M 1.9º N of Mercury (20º from sun in evening sky)

Other Events of Interest

Times are Hawaii Standard Time

Apr 9, 04:55h, Moon Full

Apr 12, Easter Day, First Sunday after the first full moon after the vernal equinox.

Apr 14, 23h, Mars 0.43º SSE of Uranus (31° from sun in morning sky)

Apr 22, Lyrid meteors, Very favorable year.

Apr 24, 06h, Venus 4.1° NW of Mars (34° from sun in morning sky)

Apr 24, 17:23h, Moon New

Apr 25, 22h, Mercury at greatest elongation (20.4° east of the sun in evening sky)

Apr 28, 21h, Venus brightest, Magnitude -4.5

Mercury has its best evening apparition of the year during the last half of April.	**Venus** rapidly rises in the morning sky, reaching its brightest on April 28 at a magnitude of -4.5.	**Mars** is still low in the east before sunrise. Look for it near Venus the last week of the month.
Jupiter is moving higher in the eastern sky before dawn.	**Saturn** reached opposition last month and is well placed for viewing most of the night.	**Uranus** is low in the east before dawn, near Venus and Mars.
Neptune is close to Jupiter in the morning sky before dawn.	Dwarf Planet **Pluto** rises near midnight and can be viewed in the predawn hours.	Dwarf Planet **Ceres** reached opposition on Feb 25 and is still well placed for viewing in the evening sky.

(Minutes continued from page 3)
mers to help out. We hope that some astronomers will help out at the Bishop Museum on the evening of March 28th for their Science Saturday.

IFA Open House – Sunday April 5th is scheduled to be the IFA Open House from 11:00 am to 4:00 pm. HAS will set up an association table and Gretchen West is looking for helpers.

Night Sky Network – John Gallagher spoke briefly the monthly teleconference. Anyone interested in these should contact At-Large member John Gallagher. Science Cafe: Carolyn Kaichi announced another Science Café in March at P.F. Chang's near the Ward Center. Meetings and discussions cover topics of local and global interest with experts in their field of study.

Guest Speaker – Brian Day liaison with the LCROSS Mission came to inform us about the upcoming LCROSS Mission and how HAS member can help. Mr. Day outlined the objectives of the robotic manned mission to the lunar surface. He gave specifics about site considerations and how they related to previous missions. The Lunar mission to look for water ice at the Southern Lunar Polar Regions is a precursor to further manned missions to the Moon. Mr. Day gave club members information about the mapping of the surface features and how amateur astrophotographers can play a part in the mission from their viewing sites here in Hawaii. The creation of a database of information about the lunar surface by professional astronomers and amateur astronomers can help in the success of the upcoming mission. LCROSS is urging amateur imagers to participate in building an imaging database of lunar Polar Regions so that when the Lunar Crater Observation and Sensing Satellite lunar reconnaissance orbiter and impactor hopefully make their mark on the southern polar regions of the lunar surface, changes may be more easily seen and understood. Hawaii astronomers will have an almost perfect view of the lunar impact when the LCROSS mission is accomplished. We are hoping to have a speaker at the March meeting to give us further details.

As there was no further business, the meeting was adjourned at 8:40 p.m. Refreshments were served.

Respectfully Submitted,
Gretchen West

Meteor Log- April 2009 *by Mike Morrow*

April is about like Fepruary as one may see more sporadic fireballs than usual. The months main event is a moonles Lyrid return.

Wednesday Apr. 22nd, the Lyrids. Radiant 18h04m, +34 deg. Rates are variable averaging about 15 and hour, but may be q;uite a bit higher. Lyrids are swift, occasionally spectacularly bright, with about 20-25% leaving persistent trains. The maximum will be about 1AM local time in Hawaii (that is 11hrs UT)

That is about it for this month as the only other shower the Pi Puppids on Thursday the 23rd with radiant 07h20m, -45 deg will have a maximum about 16 hrs UT. The radiant is about 20 degrees south of Sirius.

If you are interested in observing meteors contact Tom Giguere at 672-6677, or write Mike Morrow, P.O. Box 6692, Ocean View, Hawaii 96737

April 2009

Printable View

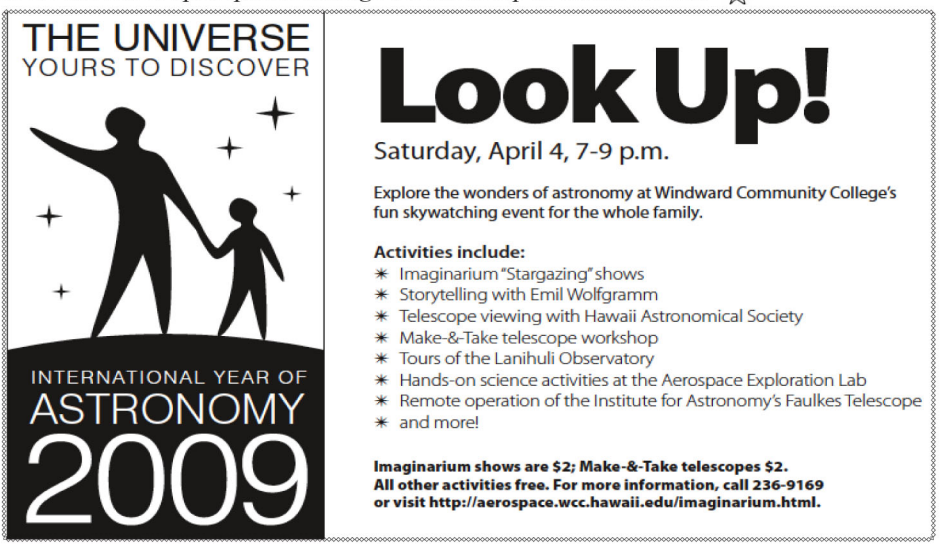
	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Week 14	29	30	31	1	2 100 Hours of Astronomy	3 100 Hours of Astronomy	4 100 Hours of Astronomy 7p Windward Community College
Week 15	5 100 Hours of Astronomy 11a Ifa Open House	6	7 7:30p HAS Meeting	8	9 Full Moon	10	11 1p Mad About Science
Week 16	12	13	14	15	16	17 7p Hanahauoli School (Makiki)	18 6:30p Dillingham Club Star Party 8p PBS Documentary - 400 Years of the Telescope
Week 17	19	20 National Dark Sky Week	21 National Dark Sky Week	22 National Dark Sky Week	23 National Dark Sky Week	24 National Dark Sky Week 7p Pearl Harbor Elementary (Star Party)	25 New Moon National Dark Sky Week 6:30p Dillingham Public Star Party
Week 18	26 For more events look here. National Dark Sky Week	27	28	29 7p Lanakila Elementary (Star Party)	30 7p Ala Wai Elementary (Star Party)	1 7p Mililani Mauka Elementary (Star Party)	2 1p Astronomy Day Displays & Solar Viewing 7p Kahala & Waikele Public Star Party

HAS Yahoo Group

http://tech.groups.yahoo.com/group/HawaiianAstronomicalSociety/

(Space Place continued from page 4)
lunar surface. ETDP is building a new lunar rover that outclasses the Apollo-era moon buggy by carrying two astronauts in a pressurized cabin. "This vehicle is like our SUV for the Moon," Peri says. The Exploration Technology Development Program is also designing robots to help astronauts maintain their lunar outpost and perform science reconnaissance. Making the robots smart enough to take simple verbal orders from the astronauts and carry out their tasks semi-autonomously requires vastly more powerful computer brains than those on Apollo; four kilobytes of RAM just won't cut it. The list goes on: New rockets to carry a larger lunar lander, spacesuits that can cope with abrasive moon dust, techniques for converting lunar soil into building materials or breathable oxygen. NASA's ambitions for the Moon have been upgraded. By tapping into 21st century technology, this program will ensure that astronauts have the tools they need to turn those ambitions into reality.

Learn more about the Exploration Technology Development Program at www.nasa.gov/directorates/esmd/aboutesmd/acd/ technology_ dev.html. Kids can build their own Moon habitat at spaceplace.nasa.gov/en/kids/exploration/habitat. ☆



Mark your calendar for a teleconference on Tuesday, April 21, 2009 - Our Sun with Dr. Laura Peticulas. Contact Night Sky Network Coordinator, John Gallagher, 683-0118, for details. Details are also posted on the HAS Yahoo Group Calendar.

As part of IYA, many mainland PBS stations will be airing a documentary "400 Years of the Telescope" on **April 10, 2009**. However, in Hawaii, this program is scheduled to be aired on Saturday, April 18, 2009 at 8:00 pm on the local PBS station KHET.

Get ready for IYA **100 Hours of Astronomy**, 2-5 April 2009. This around the clock, world-wide event with 100 continuous hours of public outreach activities including live webcasts, observing events, lectures, etc is targeted to get as many people to look through a telescope as Galileo did for the first time 400 years ago. HAS members are encouraged to take an active role in this event by reaching out to enlighten their neighbors, friends, associates, and anyone on the street to the wonders of both the day and night skies. Get those telescopes out of the closet and put them to work. Register your activity at http://www.100hoursofastronomy.org .

The 3rd International Sidewalk Astronomy Event will be held on April 4, 2009 in conjunction with IYA 100 Hours of Astronomy. This is a **24-hour Global Star Party** in which all astronomers are encouraged to make their telescope available for solar viewing (with proper filters) and for night time viewing of celestial objects. Individuals desiring to participate should setup their telescope anywhere where people gather such as street corners, malls, parks, fairs, theaters, schools, museums, libraries, etc. Be sure to register your event at http://www.100hoursofastronomy.org . What is Sidewalk Astronomy? - goto to http://www.sidewalkastronomy.us/id1.html

HAS Financial Report for the month ending as of Mar. 15, 2009

Initial Balance:	**$4,821.58**
Receipts:	
Dues Received	123.00
Magazine Payment	100.95
Total Income:	**$223.95**
Expenses:	
Magazine Subscription	32.95
Mailing Labels	32.86
Gate Lock	15.68
Refreshments	14.22
T-Shirt Supply	95.71
Total Expenses:	**$95.71**
Final Balance	**$4,949.82**

There were six new members this month. They were **Jennifer and Midori Norris; Irring Hallman; Ronald** and **Echo Richmond** and **John Guagliardi**. Thanks and clear skies to all renewing their membership during the month.

Upcoming School Star Parties 2009

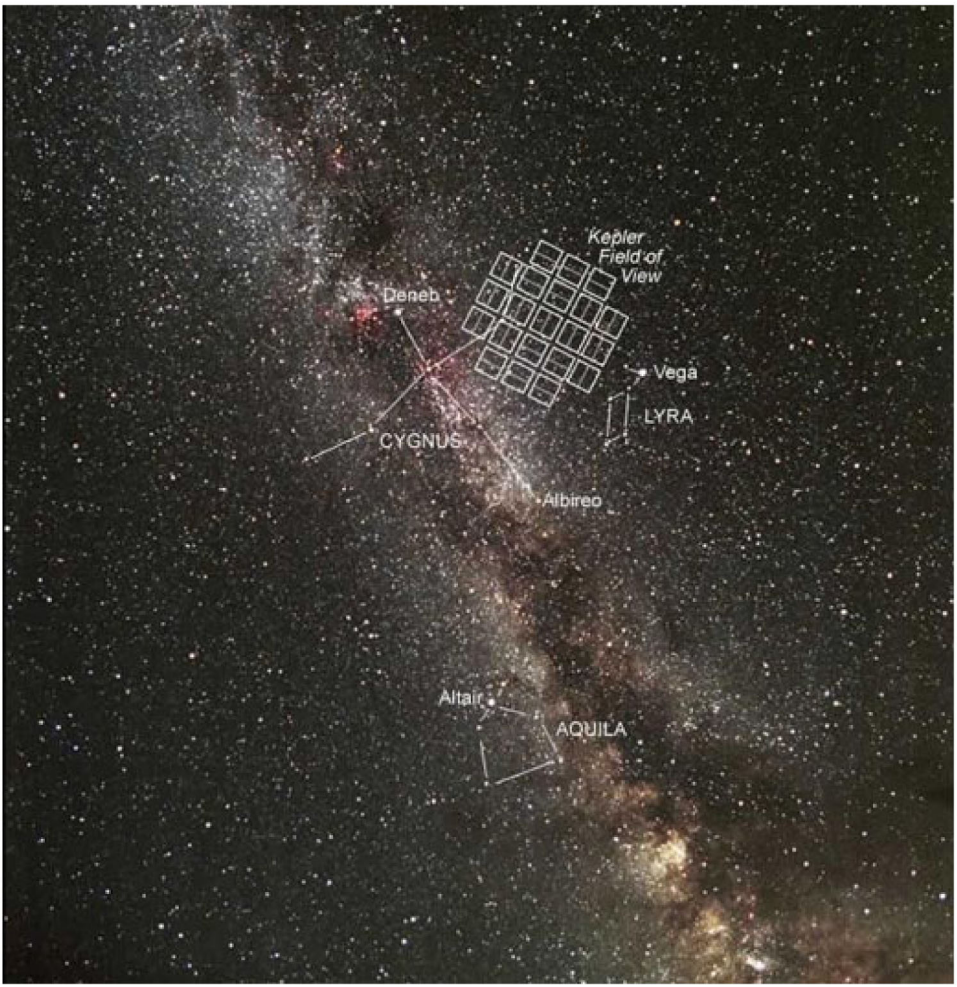
Sat.	**4/4**	WCC IYA Event 7-9 PM
Sun.	**4/5**	IfA Open House 11 AM - 4 PM
Fri.	**4/17**	Hanahauoli School (Makiki) approx.100
Fri.	**4/24**	Pearl Harbor Elementary
Wed.	**4/29**	Lanakila Elementary
Thurs.	**4/30**	Ala Wai Elementary
Fri.	**5/1**	Mililani Mauka Elementary

*If you are interested in helping out at a school star party, sign up at the HAS meeting or contact the star party coordinator, FORREST LUKE at **623-9830** or lukef003@hawaii.*

(President ontinued from page 1)

Not all planets will reveal themselves in this way. Mature planetary systems should have planets with orbits more-or-less in the same plane, but that plane could be oriented in any direction. Only systems oriented so that planets cross the face of the star as viewed from Earth can be detected in this way. There is only a 0.5% chance that an Earth-size planet with an Earth-like orbit around a Sun-like star would have the proper orbital geometry to be detected by Kepler, so that's why the spacecraft will monitor so many stars. If every star had such a planet, Kepler would discover about 500. Of course, we doubt that our sister planets are so numerous, but any planets we do find will surely be studied in more detail by other means later. Every year brings us better answers to that old question.

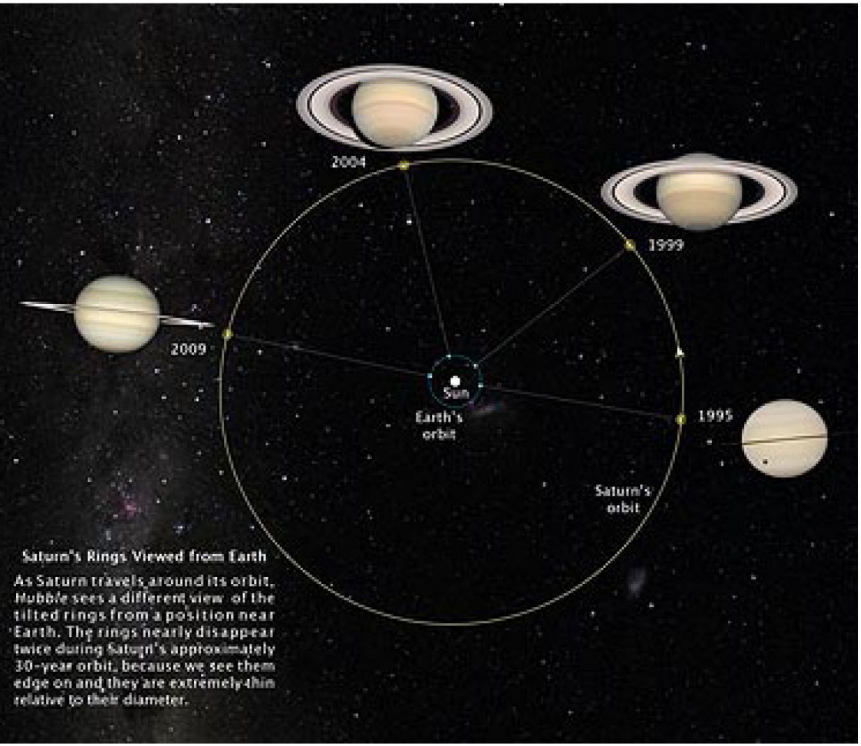
Chris



The Milky Way region of the sky where the Kepler spacecraft/photometer will be pointing. Each rectangle indicates the specific region of the sky covered by each CCD element of the Kepler photometer. There are a total of 42 CCD elements in pairs, each pair comprising a square. Credit: Carter Roberts / Eastbay Astronomical Society/NASA.

Hawaiian Astronomical Society
P.O. Box 17671
Honolulu, HI 96817-0671

Place stamp here. Post Office will not deliver mail without proper postage



courtesy: NASA