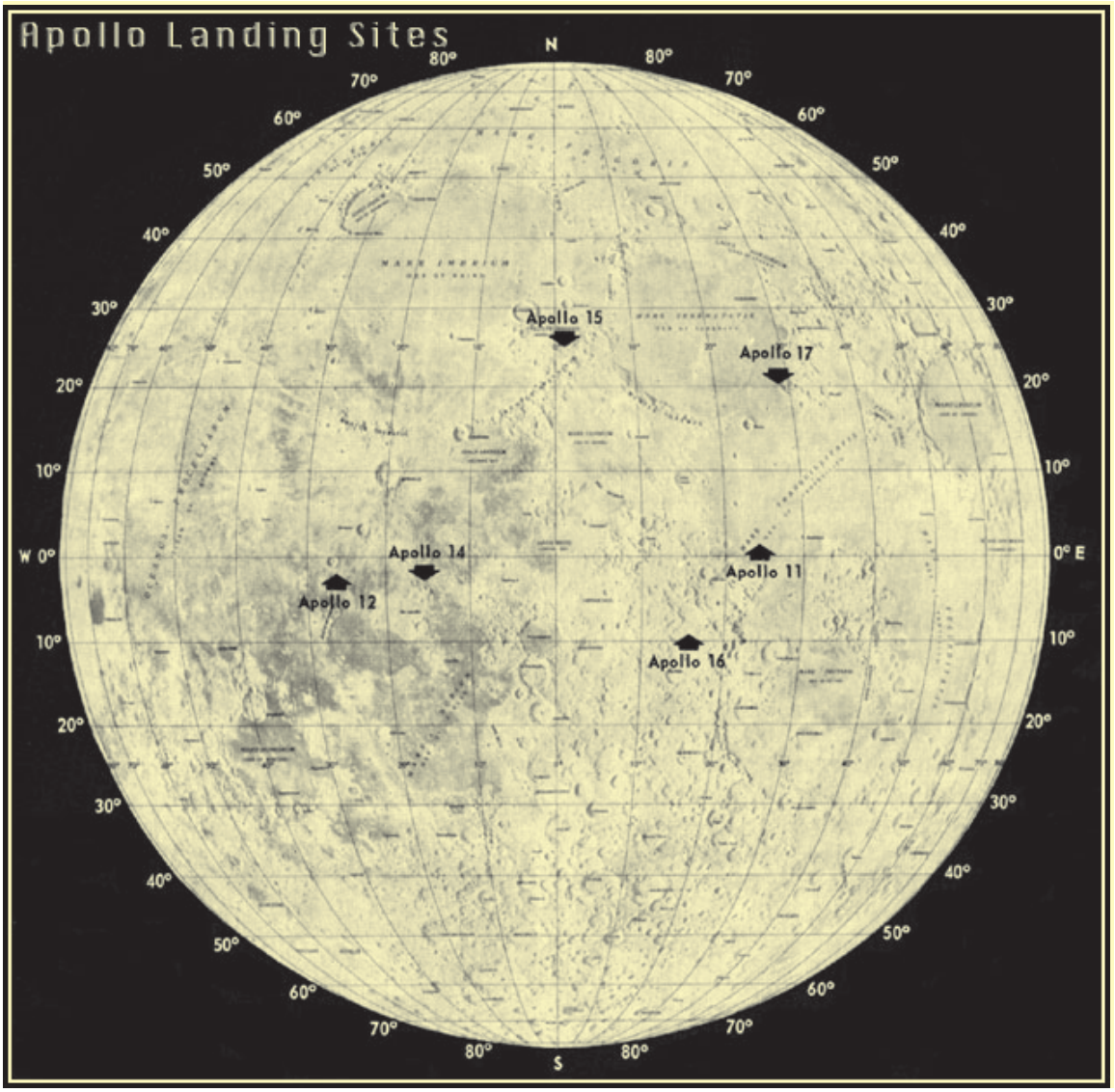
Roanoke Valley Astronomical Society

News About Amateur Astronomy
in Southwestern Virginia

Volume 26 – Number 7 **July 2009**

July 20, 1969

Apollo 11: Humankind's Greatest Achievement

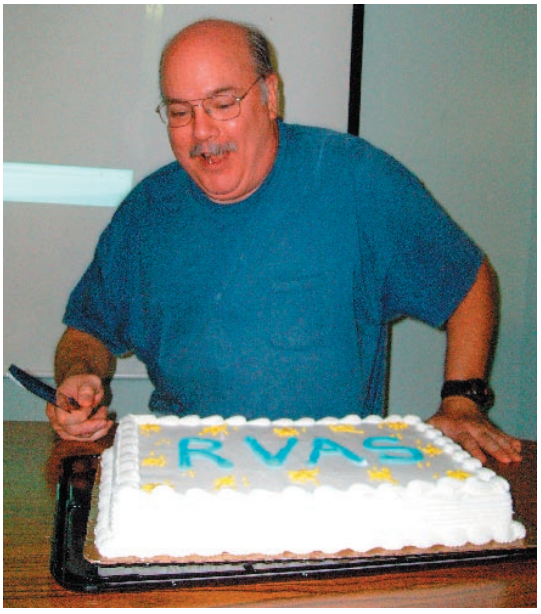


June RVAS Meeting Inducts New Officers for 2009 - 2010

By Genevieve Goss

In an unusual-but-most-welcome offering at the June meeting, RVAS honored club members with a pizza party for making this club year an outstanding cooperative effort in member involvement, public outreach, and newsletter and website excellence. Twenty-five members gathered to review the year in a slideshow of events such as the club picnic, public observing sessions (area schools, parks, the Mill Mountain Star, libraries and wineries), Astronomy Day, and 100 Hours of Astronomy.

Since the June meeting also marks the final month of the club year, members recognized **RVAS president Mark Hodges** for his successful presidency and long tenure in RVAS leadership, and the entire Executive Committee for their teamwork and dedication to the club. Mark was honored with a cake which was served to members after the pizza supper:



Following the brief business meeting, a new slate of officers was elected. Then, Randy Sowden and John Goss led a members' forum for ideas for the new club year. Those present offered many suggestions and absent members are welcome to email their ideas to Randy or any other EC member.

The new officers were all elected by an open show of hands. There were no subsequent protests, and all members seemed happy with the results. They should, as each officer was elected unanimously, even though the outgoing RVAS president made a last-minute offer for anybody else to be nominated, but none was.

The new officers will serve for the 2009 - 2010 term. They are as follows:

President — Randy Sowden
Vice President — John Goss
Secretary — Mary Crouch
Treasurer — Jeff Suhr
Member at Large — Dave Thomas
Immediate Past Prez — Mark Hodges
Past Prez — Paul Caffrey

Among the comments in the open members' forum:

- Paul Caffrey would like to see more club members participate in the Astronomical League's observing programs (http://www.astroleague.org/observing.html). He pointed out that there hasn't been an observing certificate awarded to a club member in a number of years.

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- Clark Thomas advised members on preparing a 5-minute 'astro-talk' or newsletter article, reminding them that the best way to learn about something is to teach it.
- Genevieve Goss asked about reviving the RVAS' participation in the Night Sky Network (http://nightsky.jpl.nasa.gov/index.cfm).
- Cliff Becker inquired whether the club could occasionally meet offsite, perhaps at Wasena Park, for member observing.

Officers in attendance, past and present, from left to right: Paul Caffrey, Dave Thomas, Jeff Suhr, Randy Sowden, and Mark Hodges.

- Sharon Stinnette, generating a few chuckles with her unintentional pun, expressed support for developing a 'focus' on observing and telescope usage.
- Dave Thomas, in a discussion on club field trips, mentioned the Lynchburg Observatory as a nearby destination.
- Ed Stinson encouraged other club members to participate in public outreach sessions, saying that he was amazed at the public's appreciation for the opportunity.

Frank Baratta's Astro-Quiz

The meter is currently defined as the length of the path traveled by light in vacuum during a time interval of one 299,792,458th of a second. Why was such an improbable-appearing number chosen?

<u>Answer to Last Month's Astro-Quiz</u>: Solar flares are hugely powerful. If one happens to shoot out close enough to Earth, it has the ability to zap out large amounts of electricity. Luckily, Earth's magnetic field prevents the flare from reaching the ground and cooking us. However, flares can electrically charge the atmosphere, which can charge electrical facilities and fry transformers, creating a blackout. In fact, just such an event happened in Quebec in 1989, when a flare-induced electrical spike temporarily blacked out the entire city.

The Day We Humans Walked on the Moon

By Dave Thomas

Forty-eight years ago President John F. Kennedy announced to the world that the United States of America would land men on the Moon, and return them safely to Earth.

Eight years later, the United States achieved that heroic mission with technology fairly primitive by today's standards. It was a uniquely inspiring event that will be forever etched in our collective memory.

On July 16, 1969 the Saturn-powered Apollo 11 lifted off from Cape Kennedy, Florida. It had a three man crew: Neil Armstrong, Commander; Edwin Aldrin Jr., Lunar Module Pilot; and Michael Collins, Command Service Module Pilot.

Their destination was the Sea of Tranquility on the Moon. The exact site was chosen because it is a relatively flat, smooth surface, enabling a low approach angle that

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The Roanoke Valley Astronomical Society is a membership organization of amateur astronomers dedicated to the pursuit of astronomical obsrvational and photographic activities. **Meetings are held at 7:30 p.m. on the third Monday of each month, at the Center in the Square in downtown Roanoke, Virginia. Meetings are open to the public.** Observing sessions are held one or two weekends a month at a dark-sky site. Yearly individual dues are $20.00. Family dues are $25.00. Student dues are $10.00. Articles, quotes, etc. published in the newsletter do not necessarily reflect the views of the RVAS or its editor.

RVAS web page: *http://rvasclub.org*

Officers/Executive Committee/Editor

Randy Sowden, President (*president@rvasclub.org*)
John Goss, Vice President (*vicepresident@rvasclub.org*)
Mary Crouch, Secretary (*secretary@rvasclub.org*)
Jeff Suhr, Treasurer (*treasurer@rvasclub.org*)
Mark Hodges, Immediate Past President (*immediatepastpresident@rvasclub.org*)
Paul Caffrey, Past President (*pastpresident@rvasclub.org*)
Dave Thomas, Member at Large (*memberatlarge@rvasclub.org*)
Clark M. Thomas, RVAS Newsletter Editor (*cmtastronomy@hotmail.com*)

What Will the Next Year Bring?

Genevieve Goss provided us with a tally of many of the wonderful activities that RVAS members were active in during the last year. It's enough for several clubs! Let's hope that the next club year will be as active as this past year. It can indeed be, if you help your fellow members to spread the joy of our extremely cool hobby:

- picnic/new location;
- Williamson Road Library observing session;
- 2 Greenfield Elementary School observing sessions;
- Blue Ridge winery observing fall observing session;
- Dr. Beth Brown memorial observing session at William Fleming High School;
- International Year of Astronomy2009 kickoff in January;
- 100 Hours of Astronomy April 2-5 (downtown Roanoke, Mill Mountain Star and Roanoke College);
- Greenfield Park Lunar Observing Session;
- Astronomy Day at Elmwood Park in May;
- Star Trek Opening Night;
- Blue Ridge Winery spring observing session;
- Student Pulsar Club presentation;
- Many new writers for the newsletter.

Free Trip For Your Name to Mars

In only two more years, 2011, NASA will be sending many thousands of names to Mars as company for their next generation rover.

You can sign up quickly and easily, along with other individuals in your family, and your ET friends too. They'll give you a neat certificate.

http://marsprogram.jpl.nasa.gov/msl/participate/sendyourname/

Yes, It's Dues Time for 2009

Every year the club needs a fresh infusion of membership dues payments, just like a cactus needs rain at least once a year. We continue to be the best value in Roanoke. It's still just $10 for students, $20 for individuals, and $25 for entire families.

July 4th Outreach

On July 4th evening Roanoke City hosts the finest patriotic celebration it can, where Victory Stadium was, and across the river. Most importantly, it is a mass gathering of families, many of whom have never seen anything astronomical through a telescope.

John Goss has suggested at least four of us appear with our scopes to entertain and educate the swarm. This means YOU. The way such nights usually work is everything begins with clear skies, followed by thunderstorms. Let's hope for better weather this year!

Let John know you could be there. He will coordinate everybody: ecoacres@rbnet.com

A Cosmic Hangup

By Jack Gross

It seems to me that everything about Vulpecula is screwed up! Take the name for example, it means "little fox"; yet a young fox is usually called a kit, cub, or a pup.

I guess "the Cub" didn't sound very scientific to the Polish, astronomer Johannes Hevelius when he created Vulpecula . Perhaps Latin is more professional sounding. The constellation was originally known as Vulpecula et Anser ("the little fox and the goose"), and was shown as a fox with a goose in its jaws. Since then, the goose has been eaten (or perhaps PETA got involved) leaving just a fox. While the goose is no longer officially in the sky it does seem to be remembered in the name of the alpha star, Anser.

Because Vulpecula is a "new" addition, it has very little associated mythology, thus leaving you free to make up your own legend as I did. In the symbolism of times past, the fox represented a friar preaching from the pulpit and silly geese portray the congregation. So, you have a dogmatic friar and disgruntled peasants!

So, what else is up with this unusual constellation? Well, mostly it's known because of M27, the Dumbbell nebula. It also contains a little-known and often overlooked group of stars that created an interesting misunderstanding. Which finally brings us to our OOI (Object Of Interest). It is known as "Brocchi's Cluster", "Collinder 399", "Sydney Harbour Bridge" and also as the "Coathanger." I think all these these aliases are nothing but a feeble attempt to hide its troubled past. For many years this small grouping of ten stars, mostly fifth to seventh magnitude, masqueraded as a cluster. They were even cataloged as an open cluster by Per Collinder in 1931. In fact the group was considered to be a cluster for most of the twentieth century. However, some shrewd detective work done since 1998 using improved measurements of parallax and proper motion provided by the Hipparcos satellite have proven that this "cluster" is nothing but a chance alignment of stars, an asterism.

Even though the jig is up, it's still a pretty neat asterism. Six of its brighter stars are lined up in a nearly perfect row, and four stars form a hook at the center. The thing really does look like a coathanger, which, by the way, was invented in 1903 by Albert J. Parkhouse, probably after he had locked his keys in his new Model A Ford.

THE COATHANGER:

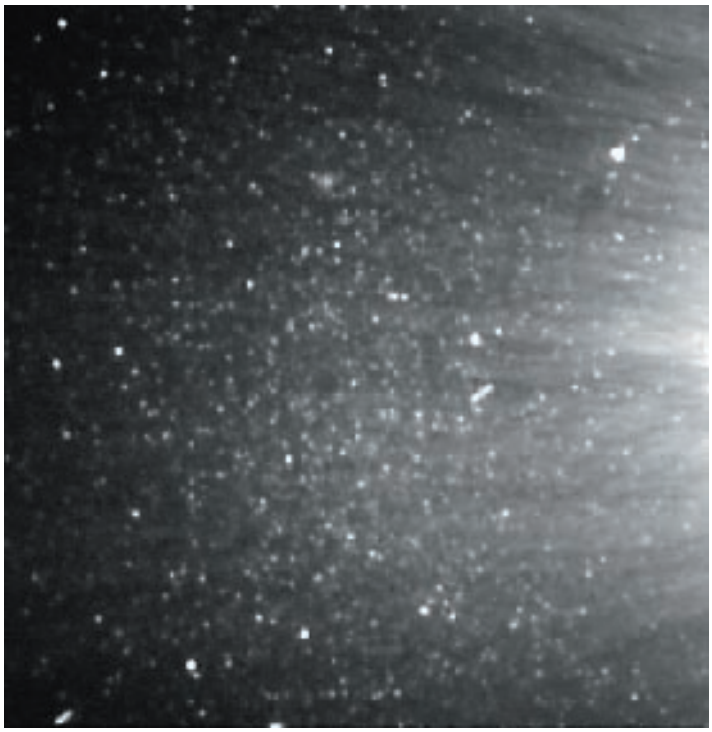
Right ascension: 19h 25m 24s, declination: +20° 11′ 00″, magnitude: 3.6 (visual), diameter: ~60′ It can be spotted it with a pair of binoculars about a third of the way along an imaginary line drawn from Vega to Altair. So, now that you have hung up your winter coat and your spring sweater, why not try your hand at finding this misunderstood little grouping, then check out a night photo of the Sydney Harbour Bridge.

Leo I Dwarf Galaxy

By Michael Good

The relatively nearby Leo 1 Dwarf Galaxy is a virtually impossible target visually. It was not seen visually until 1990! This faint object is located only twelve arc minutes from bright star Regulus in Leo.

On a suggestion from John Goss, I imaged this target. The attached grayscale is data from April 25, 26, and 27, 2009. I also took a fifteen-minute red and blue image, and created a synthetic green channel — but color data is a joke without HOURS of data (extremely faint at total magnitude of f11 spread out over an area), so here is the luminance only.



Two very small asteroids are visible in this image, appearing as short streaks diagonally crossing the field on two of the three different nights in which the data was captured (bottom left of center, and right of middle near glare from Regulus). I identified them via The Sky software.

The glare from Regulus made a very interesting pattern on the first night. I then SHIFTED the image on both subsequent nights, to hide from the glare, but retained the first night's data for the final image.

I have looked at other images of this galaxy, and my rendition captures quite a bit of details, including what look like three dark "streaks" above the upper right asteroid, which are actually dark voids (absence of stars) in the galaxy, possibly tidally induced. This was confirmed using DSS images.

It is interesting how FEW images I can find on this object. Sidney van den Bergh confirmed NO GLOBULARS in this dwarf, in Y2000. The smudge above the center of Leo I is a distant face-on spiral. I confirmed this after examining images from the Wiki link:

http://en.wikipedia.org/wiki/Leo_I_(dwarf_galaxy)

Included are several sites, including, if you choose, the "Articles and Images" link on Wiki. It takes you to WikiSky.Org, which has interesting zoomable imagery and articles.

I found the tiny background galaxy, and on this website can ID per the attached jpg. It is USNOA2 0975-06422758, mag 16.75.

http://server1.wikisky.org/starview?object=Leo+I

Sadly, I found NONE of the attached articles on dwarf galaxies included any references to Leo 1 whatsoever.

Selecting last image in the group of images then brings up a DSS viewer.

Makes an interesting target.

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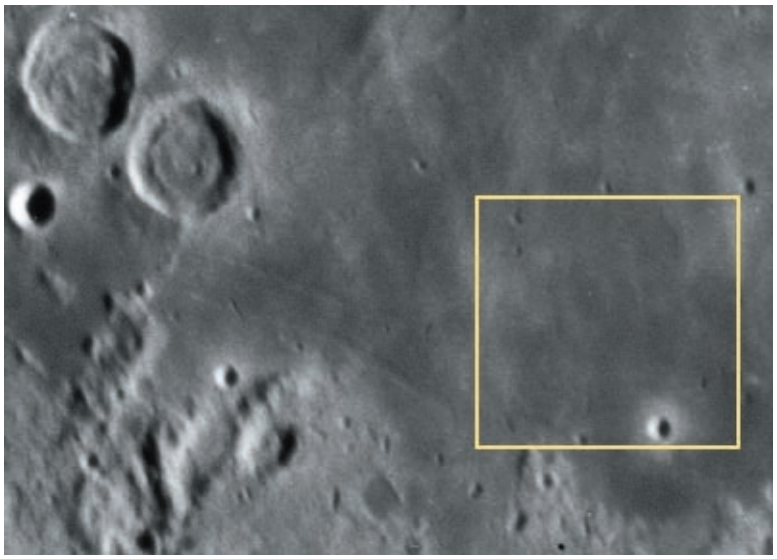
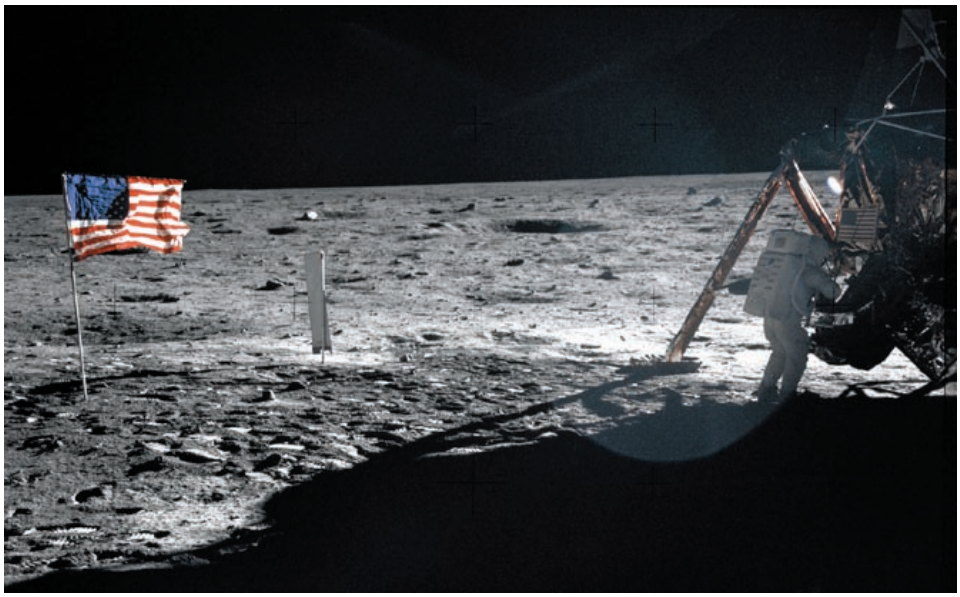
would take a minimum amount of fuel. The mission was also based on a "free return," meaning that the spacecraft would be on a path around the Moon that would allow it to return to Earth if not inserted into Lunar orbit.



On July 20, 1969, after attaining Lunar orbit twenty-four hours earlier, Armstrong and Aldrin descended in the Lunar Module to the Moon's surface on the Sea of Tranquility.

Before touchdown Armstrong had to take manual control of the Lander to avoid some large boulders on the surface. After a few anxious seconds he made a perfect landing on the dusty surface of the Sea of Tranquility, and uttered the famous words, "Houston, Tranquility Base here. The Eagle has landed."



It would be good to note here that conspiracy theorists who claim the landing was faked point to the lack of a crater from the rocket exhaust of the Lander. That would appear to be a good point. However, pressure of the exhaust was only 1.5 psi, so it stirred up only a little dust, and would not have blasted a crater.

Almost seven hours after touchdown Neil Armstrong emerged from the Lunar Module in view of a live television camera on the module. As he set foot on the surface he uttered the simple but profound phrase, "That's one small step for a man, one giant leap for mankind."

After two and one half hours on the surface proving that space-suited astronauts could maneuver without great difficulty, and gathering 40 pounds of rock samples, the crew reentered the Lunar module, and rocketed back to the Command and Service Module. They left behind a flag and a plaque that read "Here Men From Planet Earth First Set Foot Upon The Moon. July 1969 A.D. We Came In Peace For All Mankind."

After docking with the Command Module, the ascent stage of the Lunar Module was jettisoned in readiness for their journey back to the blue Pacific.

Just 195 hours after liftoff from Earth, the three Astronauts were safely back on Earth, having fulfilled the visionary task set forth by President Kennedy less than a decade earlier.

Humans and Comphumans in Space

By Clark M. Thomas

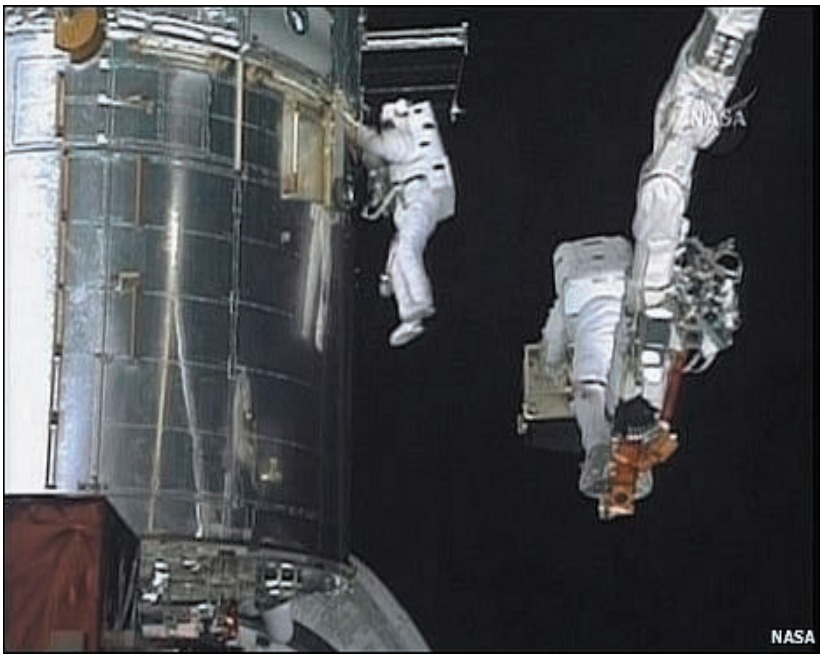
Who was the first human in outer space? Why, it was Yuri Gagarin. The first man to walk on the moon? Neil Armstrong. And the first self-conscious philosopher machine in space? Say, what???

Let's be honest with ourselves. Silicon calculators in space have advanced the cause of science much more than biosphere-hugging humans.

Nevertheless, without the human dramas unfolding in space, or on the way there, it would be hard to vacuum out all those billions of dollars from taxpayer pockets. Who would watch live TV with only hard-working robots?

I remember many years ago jumping up from my chair to nervously stare at my television screen just before the Challenger was set to launch. Yes, I had seen and virtually ignored several other Shuttle launches from my television, but this time I had a creepy premonition. The shock I then and there experienced watching the heroic Challenger crew get blown to bits has never left my emotional consciousness.

I recently watched NASA TV as the Atlantis was preparing to leap into space to service the Hubble one last time. Yes, I would have watched that launch anyway, just because it was the Hubble they were visiting.



Astronauts Michael Good (left) and Mike Massimino repair Hubble's existing spectrograph during the mission's fourth spacewalk on May 17, 2009.

The vision of heroic astronauts strapped into their seats next to vast quantities of explosives, and heading toward dangerous space, set me up for tears of joy when the thundering rocket did gracefully send off its humans.

We have been tossed into a strange new world of hypo-income and hyper-debt. Every solution to our economic dilemma has a high future cost. Every future trip by humans into space has a steep price tag that future taxpayers may increasingly question. Why not? Compare the scientific productivity (if any) of the megabillions spent/wasted on the Space Station, versus the awesome return for the $10 billion spent on the Hubble. Yes, the Hubble could never have achieved all of its marvelous discoveries without servicing

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missions. Therefore, it could be said that manned flight and machines have found their finest intersection in this project. But what about the future of space?

Within thirty years there will appear a new species of life form, which we will have created "in the image of God," as secondary creators. The emergence of self-conscious, philosophical life will be a virtually unintentional derivative of sophisticated engineering to accomplish operational space objectives.

HAL's eye in *2001*

These philosophically conscious computers will be created to inhabit deep space probes to Mars, Jupiter, and beyond. Whereas we can communicate with only a couple of seconds delay even to astronauts on the Moon, it takes hours to talk back and forth with anybody, or anything, several planets away. Imagine the years of "time delay" when communicating with interstellar probes, which could be launched within the lifetimes of many reading this essay.

Those first probes will have sophisticated digital computers, not humans. Later, interstellar probes will be co-inhabited by comphumans, the emergent computer life forms, but still not by humans.

If there ever were another Hubble conceived several decades hence, then Earth would send out a crew of comphumans to set up and service it as needed. Our silicon astronauts could do the job for much less money, and without risk to human life. However, there would be a risk to the taxpayer financial pipeline from entirely cutting out the flesh astronauts. With politics in mind, we will have to make room for humans on such flights. Instead of comphumans controlling robotic arms, for example, humans will do it.

Interestingly, we are backing into the future of cybernetics. We are already planning for "intelligent" machines on Mars. Oh yes, we already have basic decision making software built into our Martian hardware.

Let's move forward to the late 2030s, where we Earthlings are finally getting serious about Mars. Even if we humans show up for an extended stay, the whole landing area will need to have been prepared by robots and comphumans who are much better suited to a harsh environment.

Maybe that's the solution: Make the machines do all the hard work, and let the humans claim all the glory! That script has worked in the past. Why not in the future too?

If you would like to learn more about the emergence and philosophical relevance of comphumans, check out these two books. The first was written in 1995, and the second in 2006:

http://astronomy-links.net/HandC.html

http://astronomy-links.net/HR21st.pdf

Lunar Reconnaissance Orbiter Heads to the Moon

NEWS FLASH: NASA's Lunar Reconnaissance Orbiter (LRO) launched at 5:32 p.m. EDT Thursday, June 18, aboard an Atlas V rocket from Cape Canaveral Air Force Station in Florida.

The United States has begun a program to extend human presence in the solar system, beginning with a return to the Moon.

Returning to the Moon will enable the pursuit of scientific activities that address our fundamental questions about the history of Earth, the solar system, and the universe—and about our place in them.

Returning to the Moon will allow us to test technologies, systems, flight operations, and exploration techniques to reduce the risk and enable future missions to Mars and beyond.

The first step in this endeavor is the Lunar Reconnaissance Orbiter (LRO), an unmanned mission to create a comprehensive atlas of the Moon's features and resources to aid in the design of a lunar outpost.

LRO follows in the footsteps of Ranger, Lunar Orbiter, and Surveyor. These predecessors to the Apollo missions searched for the best possible landing sites. The goals of LRO go beyond the requirements of these previous missions because building a lunar outpost means spending extended periods on the lunar surface. LRO focuses on the selection of safe landing sites, identification of lunar resources, and studies of how the lunar radiation environment will affect humans.

Mission Profile

The trip to the Moon took approximately four days. LRO then entered an elliptical orbit, also called the commissioning orbit. From there, it will be moved into its final orbit: a circular polar orbit approximately 50 km (31 miles) above the Moon's surface. LRO will spend at least one year in low polar orbit collecting detailed information about the Moon and its environment.

The LRO payload, composed of six instruments and one technology demonstration, will provide key data sets to enable a safe and productive human return to the Moon.

Instrument Payload

COSMIC RAY TELESCOPE FOR THE EFFECTS OF RADIATION

The Cosmic Ray Telescope for the Effects of Radiation (CRaTER) will characterize the lunar radiation environment allowing scientists to determine potential biological impacts. CRaTER will also test models of radiation effects and shielding, and measure radiation absorption by human tissue-like plastic, aiding in the development of protective technologies to help keep crews safe.

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DIVINER LUNAR RADIOMETER EXPERIMENT

The Diviner Lunar Radiometer Experiment (DLRE) will measure surface and subsurface temperatures from orbit. It will identify cold traps and potential ice deposits, as well as rough terrain, rock abundance, and other landing hazards.

LYMAN ALPHA MAPPING PROJECT

The Lyman Alpha Mapping Project (LAMP) will map the entire lunar surface in the far ultraviolet spectrum. LAMP will search for surface ice and frost in the polar regions and provide images of permanently shadowed regions illuminated only by starlight and the glow of interplanetary hydrogen emission, the Lyman Alpha line.

LUNAR EXPLORATION NEUTRON DETECTOR

The Lunar Exploration Neutron Detector (LEND) will create high-resolution maps of hydrogen distribution, and gather information about the neutron component of the lunar radiation environment. LEND data will be analyzed to search for evidence of water ice near the Moon's surface.

LUNAR ORBITER LASER ALTIMETER

The Lunar Orbiter Laser Altimeter (LOLA) will measure landing site slopes, lunar surface roughness, and generate a high resolution 3-dimensional map of the Moon. LOLA also will measure and analyze the lunar topography to identify the permanently illuminated and permanently shadowed areas.

LUNAR RECONNAISSANCE ORBITER CAMERAS

Two narrow-angle cameras (NACs) on the Lunar Reconnaissance Orbiter Camera (LROC) will make high resolution black-and-white images of the surface, capturing images of the poles with resolutions down to 1 m (3.3 feet). Up to 10% of the lunar surface will be imaged with the NACs. A third, wide-angle camera (WAC), will take color and ultraviolet images over the complete lunar surface at 100 m resolution. These images will show polar lighting conditions, identify potential resources and hazards, and aid selection of safe landing sites.

MINI-RF TECHNOLOGY DEMONSTRATION

The Miniature Radio Frequency Technology Demonstration (Mini-RF) is an advanced synthetic aperture radar that operates in both the X and S bands of the radio spectrum. It will be used to image the polar regions and search for water ice. In addition, it will used to demonstrate the ability to communicate with an Earth-based ground station.

Data Return

With a comprehensive data set focused on supporting the extension of human presence in the solar system, the Lunar Reconnaissance Orbiter will help identify sites that are close to potential resources and have high scientific value, favorable terrain, and the environment necessary for safe future robotic and human lunar missions.

All initial data sets will be deposited in the Planetary Data System, a publicly accessible repository of planetary science information, within six months of primary mission completion.

The processed data sets will provide a deeper understanding of the Moon and its environment. This will clear the way for a safe human return to the Moon, and for future human exploration of our solar system.

SOURCE OF DATA (COPIED AND PASTED):
National Aeronautics and Space Administration
Goddard Space Flight Center
8800 Greenbelt Road
Greenbelt, MD 20771
NASA Facts
FS-2007-11-098-GSFC (rev. 10/08)

For additional information on LRO, visit:
http://lro.gsfc.nasa.gov

Buzz Aldrin's Alternate Vision for NASA

Neil Armstrong was not the only "first man on the Moon." Buzz Aldrin was there with him. While Armstrong has since been reclusive, Aldrin has not hesitated to speak out. In the August 2009 issue of *Popular Mechanics* he lays out anoher vision for NASA that challenges the Bush-era NASA priorities.

Celebrating this month the fortieth anniversary of Armstrong/Aldrin should be more than a look backward. We are now in the 21st century, and it is time to look forward with limited national treasure, and with others (China, India, Russia, Japan, Europe) having now joined us in space.

Aldrin thinks NASA's going back to the Moon is a costly diversion. He has an alternative plan that includes swinging by near-Earth asteroids, comets, and also landing on Phobos — with much less attention paid to the Moon by government. He would have private ventures and multi-national efforts working to commercialize the Moon, leaving deeper space and science to cooperating national governments.

He frowns on the idea of Space Race II to the Moon. Been there, done that. Instead of competing with the Russians and Chinese, why not cooperate with them (using a lot of their cash) by going together as Earthlings to Mars?

Aldrin has three stages in his plan.

(1) The short-term goals would include extending shuttle flights through 2015, until the new Orion capsule can go up on Delta and Atlas rockets upgraded for human flight. He would see us promoting private efforts for low Earth orbits, and for preparing to go much farther.

(2) Medium-term goals would see commercial ventures on the Moon, and the development of a runway lander for recyclable space vehicles.

(3) Long-term goals would see exploration modules developed for up to three years of manned flight. Astroids and Phobos would be visited, and robots would initially be deployed to Mars itself, preparing for one-way human travel and permanent residency/

The Obama administration, in concert with the reality of scarcity economics and international politics, may favor much of Aldrin's alternate vision. For now, it's full steam to the Moon, again.

Here's Aldrin's full article:

http://www.popularmechanics.com/science/air_space/4322647.html

Really cool photo of shuttle recently "flying" back to Florida, by Steve Manuel.

Calendar of Events

Submitted by Frank Baratta

MONTHLY MEETING: Monday, July 20th, at 7:30 p.m., Fifth Floor Meeting Room, Center In The Square, Downtown Roanoke. *This evening will celebrate the exact 40th anniversary of the historic first walk by a human being on another natural object in space.*

✔ RVAS WEEKEND OBSERVING SESSIONS:

Unless otherwise noted, observing sessions are held at Cahas Mountain Overlook, milepost 139 on the Blue Ridge Parkway. The Moon phases and the calendar are out of synch this month, so only one weekend is conducive to observing.

★ **Friday and Saturday, 17th and 18th. Sunset is at 8:39 p.m. Astronomical twilight ends at 10:25 p.m. The Moon sets at 4:26 and 5:36 p.m., respectively.**

★ **August Sessions: 14th and 15th; 21st and 22nd.**

✔ **RVAS EXECUTIVE COMMITTEE MEETING: To be announced.**

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✔ **Other Programs:**

ROANOKE CITY PARKS DEPT. PUBLIC STARGAZE: Saturday, July 18th, 9:30 p.m., Cahas Overlook, milepost 139, Blue Ridge Parkway. For City, County and other area residents; RVAS members welcome. Call 540-774-5651, for more information. (Next session: August 15th, 8:45 p.m., Cahas Overlook.)

FRANKLIN COUNTY PARKS DEPT. PUBLIC STARGAZE: Next Session will be Saturday, August 22nd, 8:45 p.m., Franklin Co. Recreational Park.