



Southeastern Space Supporter

Newsletter of HAL5 – the Huntsville Alabama L5 Society chapter of the National Space Society

Volume 8, Number 6 — November–December 1999

FIRST WORD

HALO Mentioned in *Guinness Book of World Records 2000*

(by Ron Lajoie, SSS Editor)

On October 13, Greg Allison received a very surprising email message from a person named Jacob Samorodin:

“You’re probably wondering why I’m sending you and your HALO project staff congratulations at this time. It’s simple! You’re historic amateur rocket-launch to the “edge of space” has made it into the pages of the GUINNESS BOOK OF WORLD RECORDS. Congrats...

In fact I wish it were possible that I could have succeeded in one of my high-altitude projects, but alas, the usual story: NO MONEY! So I’ve turned to theoretical and technical work. I’ve devised a new solid-propellant rocket formula and ways to make solid-propellant rockets more efficient (longer burning) without melting the rocket-motor or casing. Would your group be interested?”

Greg drove to the nearest bookstore and found the special Millennium edition of the *Guinness Book of World Records 2000* and purchased a copy. On page 183, there is the following entry:

MOST SUCCESSFUL AMATEUR ROCKETS

The *Halo* rocket, built by a US group called HAL5, reached an altitude of 36 miles on May 11, 1998. *Halo* was carried to a height of 11 miles 654 yd. by a helium-filled balloon before being launched. The height it achieved is just 14 miles short of NASA’s official definition of the beginning of space.

Okay, so they got the year wrong (it was 1997), and they only mention what we cannot prove (our peak altitude) rather than what we can prove (that it was the first successful amateur rockoon launch, as well as the first high-altitude launch of a hybrid rocket). But, hey, that is pretty good considering that they did not contact us and must have been working off the NSS press release. ☆

The Millennial Archive

Send Your Writings to the Moon!

(Beth Elliott, VP, Applied Space Resources)

[Editor’s Note: HAL5 received the following information package from Beth Elliott, Vice President of Communications at Applied Space Resources (ASR). ASR is developing the first private lunar sample return mission, Lunar Retriever I. Part of their financing plan is via the Millennial Archive, for which they have been encouraging NSS chapters like HAL5 to become involved. The HAL5 Executive Committee will vote on our level of participation early next year. The text from the package is contained in this article. For more, see their Web site at: <http://www.millennial-archive.com/>]

In millennia past, it took wealth, power or fame to have any hope of being remembered for all time. Yet monuments erode, history gets rewritten, and new generations find new heroes.

But now, at the turn of the millennium, human vision is combining with a new technology to make sure everybody can weave their names and stories into a lasting tapestry of humanity on the threshold of a new era. Everybody can weave their messages to the future into the Millennial Archive — a collection of stories, family histories and cultural statements, from individuals and groups using their own words and images. These inscriptions will be the words and images of individuals who want their stories and their families’ stories to live and speak for a thousand generations.

In 30,000 years, they can remember more than just your name! Best of all, it won’t take riches and political power to preserve your story. Your ideas, your

(see Archive, on page 8)

HAL5 Program Night

Thursday, January 6, 2000
7 to 8:30 p.m. (with social afterwards)
Huntsville Public Library Auditorium

“Yes, Jules (Verne), I am a Rocket Scientist!”

Guest speaker will be Chris Barker, president of Space America, Inc.

All HAL5 and NSS members are encouraged to attend, and to bring interested friends and co-workers. Open to the public. Free admission.



Happy Holidays!

Huntsville Alabama L5 Society

President — Greg Allison
Day: 544-4440, Eve: 859-5538
Vice-President — Gladys Young
Day: 852-0561, Eve: 852-0561
Treasurer — Ronnie Lajoie
Day: 971-3055, Eve: 721-1083
Secretary — Wade Dorland
Day: 551-0008, Eve: 534-2566
Membership — Philomena Grodzka
Day: 536-8638, Eve: 536-8638
Communications — Ellen Cozelos
Day: 726-6387, Eve: 883-4873

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The *Southeastern Space Supporter* is a bimonthly publication of the Huntsville Alabama L5 Society (HAL5), a not-for-profit 501(c)(3) organization devoted to the goal of seeing everyday people living in thriving communities beyond the Earth.

Any opinions expressed in this newsletter are those of the authors or of the Editor, and, unless expressly so stated, are not necessarily those of HAL5 or the NSS.

Visit the HAL5 Web Page on Internet via:

<http://hiwaay.net/~hal5/>

HAL5 encourages its members to speak out on space-related issues, and welcome submissions of both fact and opinion articles of interest to HAL5 members.

Submit letters or articles to: Ronnie Lajoie
162 Kirby Lane, Madison, AL 35757
Day phone/message: 256-971-3055
Night/Weekend phone: 256-721-1083
FAX number: 256-971-3333
Electronic mail address: hal5@hiwaay.net

Deadline for submittal is the last day of the following months: February, April, June, August, October, and December.

Preferred format for plain text is ASCII (text with graphics is *MS Word* or *WordPerfect*) either sent by E-mail or on a PC diskette. Also acceptable are letters and articles sent by mail or faxed; however, the more retyping required, the less likely the acceptance. HAL5 is not responsible for receipt of mailed submissions; none will be returned unless sent with a SASE. Hand-delivered diskettes will be hand-returned. No compensation is paid for submissions.

SPACE NEWS**Lunar Data Support Idea That Collision Split Earth, Moon**

(NASA Press Release, March 16, 1999)

Analysis of data from NASA's Lunar Prospector spacecraft has confirmed that the Moon has a small core, supporting the theory that the bulk of the Moon was ripped away from the early Earth when an object the size of Mars collided with the Earth.

Scientists presented this result and other findings today in a series of papers at the 30th Lunar and Planetary Science Conference in Houston, TX. Their data show that the lunar core contains less than four percent of the Moon's total mass, with the probable value being two percent or slightly less. This is very small when compared with the Earth, whose iron core contains approximately 30 percent of the planet's mass.

"This is a critical finding in helping scientists determine how the Earth and Moon formed," said Dr. Alan Binder of the Lunar Research Institute, Tucson, AZ, principal investigator for Lunar Prospector.

Similarities in the mineral composition of the Earth and the Moon indicate that they share a common origin. However, if they had simply formed from the same cloud of rocks and dust, the Moon would have a core similar in proportion to the Earth's. A third theory suggests that the moon was captured fully intact by the Earth's gravity.

Based on information first gathered during the Apollo era, scientists suggested that the Moon was formed when a Mars-sized body hit the Earth during its earliest history. "This impact occurred after the Earth's iron core had formed, ejecting rocky, iron-poor material from the outer shell into orbit," Binder explained. "It was this material that collected to form the Moon.

"Further analysis of Lunar Prospector data to refine the exact size of the lunar core and the amounts of elements like

gold, platinum and iridium in lunar rocks — all of which are concentrated with metallic iron — is required," Binder added. "This will do much to pin down for good if the 'giant impact' model of the formation of the Moon is correct, or if the Moon formed in a different manner."

The current data come from gravity measurements conducted by Dr. Alex Konopliv of NASA's Jet Propulsion Laboratory, Pasadena, CA. His results indicate that the Moon's core radius is between 140 and 280 miles (220 and 450 kilometers). This result is consistent with independent magnetic data, evaluated by Dr. Lon Hood of the University of Arizona, Tucson, which suggest that the core radius is between 180 and 260 miles (300 and 425 km).

In other results from Lunar Prospector, Dr. Robert Lin of the University of California at Berkeley, Dr. Mario Acuna of NASA Goddard, and Hood also found that a broad section of the southern far-side of the Moon has large localized magnetic fields in its crust. These fields occur opposite the large Crisium, Serenitatis and Imbrium basins — three of the "seas" that cover much of the Moon's near side. This result supports earlier evidence linking strong magnetized concentrations on one side of the Moon with young, large impact basins on the other side.

Results of efforts to map the composition of the lunar crust have surpassed the expectations of the spectrometer team, led by Dr. William Feldman of the Department of Energy's Los Alamos National Laboratory in New Mexico. Data obtained are so good that the distribution of thorium has been mapped with a resolution of 36 miles (60 kilometers). At this amount of detail, scientists can detect individual deposits rich in thorium and related elements. Their current observations suggest that thorium was excavated by impacts of asteroids and comets, and then distributed around craters, rather than being deposited by volcanic activity. ☆

Web Site Moves to HiWAAY

(by Ron Lajoie, HAL5 Web site manager)

The HAL5 email and Web accounts have been forcibly moved to HiWAAY, who recently bought out ADViCOM, as well as both Traveler and Renaissance Internet providers. HAL5's new email address is **hal5@hiwaay.net** and the new Web site location is:

<http://hiwaay.net/~hal5/>

Fortunately, the new address for the Web site and all of its pages have the same address except that "**advicom**" has been replaced with "**hiwaay**". Please update your email address books and Web browser bookmarks accordingly.

The new Web site is up and running as before, except that the page counters and the CGI scripts (that allow the site to be search) no longer function. Both should be fixed in January. Please report all errors by sending an email message to **hal5@hiwaay.net**. The forum capability promised last January is on hold pending further research & testing.

A Story of HiWAAY Robbery

October was a weird month for the HAL5 Web site. Strange and sometimes conflicting email messages were being sent to the HAL5 email address.

On October 7, HAL5 was informed that "IBS Interactive/Advicom, is pleased to continue offering you Internet, News-group, and E-Mail service. In the next few weeks we will be upgrading our servers and connection equipment to the latest technology available to Internet Service Providers."

Well, things certainly changed two weeks later, but not the way IBS stated. On October 20, HAL5 was informed that "HiWAAY Information Services has acquired Renaissance Internet Services and ADViCOM in a purchase from IBS Interactive."

Despite claims that "There will be no immediate changes of service or billing" HiWAAY began immediately to transfer email and Web accounts to their system,

with very little warning. On Friday, October 22, HAL5 was informed that "This weekend we will create a copy of all your current user accounts, including your web sites, on the HiWAAY user server. We will not remove your current accounts at ADViCOM at this time."

Then, on Monday, October 25, a revised email message was received stating "This weekend we created a copy of all your current user accounts, including your web sites, on the HiWAAY user server. ... Today we will mail a letter ... that will tell you about your HiWAAY account including your username, password, dial up numbers and how to make the changes to your account to dial into HiWAAY. ... Multitronics agreed to let us use the ADViCOM domain for another 5 months."

The letter arrived the next day, but I was too busy preparing a friend's visit and the upcoming Con†Stellation science fiction convention (held on Halloween weekend). In this middle of all this frantic preparation, on October 27, HAL5 received a revised again email message with the hilarious opening "The transition process is going a little slower than planned ..." — **NOT TO ME!**

According to their new schedule: "On Monday Nov 1 at noon, we plan to begin forwarding mail from your old ADViCOM accounts to your new HiWAAY account. Your ADViCOM account will still be active but no new mail will be saved into your ADViCOM account. At that time we will also copy all your web pages from the ADViCOM server to the HiWAAY user server." It also retracted its earlier statement and said "Since Multitronics/ADViCOM did NOT give us the complete rights to the advicom.net domain, you will have to change the e-mail address you give to your friends and family."

The Race to Save the HAL5 Web Site

Less than two weeks after receiving the first message, HiWAAY changed tactics from pleasant requests to direct orders. On Tuesday, November 2, a stern email message was received that said "It is

crucial that you go ahead and change your dial-up access to come into the HiWAAY access system as soon as you can." Of course, since they were already forwarding my mail and I had not time yet to set up the new account, I had no way to see this urgent message! Gah!

Fortunately for me, I had decided to try to TELNET to the new HAL5 HiWAAY account from my work computer. Using that method, I could use the Unix MAIL command to see how many messages I had and even read them. I could also list the "public_html" directory where the HAL5 Web site files are stored — but the directory was entirely EMPTY!

HiWAAY had still not moved the Web site files to the new account, yet their Tuesday message stated that "Thursday, Nov 4 at noon we will point all web requests to your personal and Business access web pages to your HiWAAY account web pages. After that, we will deactivate the ADViCOM accounts."

With less than two days left, I sent a frantic email to HiWAAY, only to receive a reply that "The files from your account ... have not been copied to your new account [because] the files in your directory on fly.hiwaay.net have changed since your account was created and we did not want to disturb anything you might have already setup." I can only assume that meant my reading of my mail via TELNET had changed the account, but this was already days after they were supposed to move the files.

Using the same TELNET command, I logged on to the ADViCOM account and used the Unix TAR command to archive the entire "public_html" directory and all of its subdirectories into one 5-MB binary file. I then used the FTP command to send the file over to the HiWAAY account. Fortunately, the TAR command worked the same on the new computer and the file was unpacked without incident. A quick Netscape test ensured me that the new Web site was up and mostly running. On Friday, the ADViCOM account died. Let us hope that HiWAAY will serve us well. ☆

Meandering Through The Universe

(copyright 1999 by Richard Richardson)

[Editor's Note: Richard Richardson from Alaska is a friend of Greg Allison and is Project HALO's most frequent donor, sending in a check for \$10 almost monthly. In addition to "thank you" letters, HAL5 recently rewarded him with a Certificate of Appreciation and a Space Shuttle tie pin.]

Kudos to the Huntsville Alabama L5 Society (a chapter of NSS) for their HALO Program! They are trying to reach space by launching a rocket from high altitude. Actually, that is only partially correct. Technically, the launch occurs from the surface of the earth, the first stage is a high altitude capable balloon. One of the other interesting aspects is the rocket fuel: asphalt.

They haven't reached space yet. But look at it this way, the US government should have been so successful in the beginning of its efforts to reach space. No matter how you slice it, these folks have "the right stuff"!

Though I wasn't specific about the details, this is exactly the kind of real, history changing, future making program that I have publicly and persistently argued for these last many years. The only difference is that I felt (and still feel) that 10,000, 50,000, or more space advocates/enthusiasts pulling together could do the job with relative ease.

However, over and over I have been told by everyone from famous science fiction authors, to NASA engineers, to notable space activists, to "just ordinary people" that it's either stupid or insane to believe that "amateurs" can actually "do" space. "Only governments (and now, 'businesses') can manage such daunting tasks!"

Baloney, says I! When a mere handful of "amateurs" can send a homemade rocket knocking on Heaven's door — as HAL5 has — I know I am vindicated. Though they fell just short of certified

"space" on their first attempt, and (in my opinion) the effects of working with a government agency spoiled their second try, these valiant crusaders will go to space and show the way to those who will see.

But to all you Luddites, I continue my chant: Get out of the way! You don't believe it's possible to be a part of the adventure of space and you would rather see space be forever out of reach than have anyone ever prove you wrong.

For those of you who aren't determined to see space closed forever, I encourage you to (judiciously) support efforts like HAL5's HALO Project. The door to space for space enthusiasts will only be opened if we (wisely) put our brains, our hands, our time, and our money where our mouths are (or should, at least, already be).

I've also long been saying that we could "do" space better, faster, and more efficiently, and do infinitely more to make each and every one of us a vital part of that adventure (as well as provide "spin-off" everyday life type benefits to ourselves) if we were united in a space business coop or family of coops. But research the history, the current state, and the economics of coops for yourself, then let me know what you think.

No Space-Based Laser Weapons

On a less controversial subject, I have mixed feeling about the space-based laser weapons being developed by the US military (and probably are on the drawing boards of other major world powers). There is a real and growing threat of missile attacks by "rogue" nations (and their cronies, in some cases).

But worse attacks could be relatively easily executed without using rockets at all. Meanwhile, if the more forward thinking have their way, resource development in space may not always go according to the preferences of the political and/or economic forces holding sway over government and military in the future. Think about it.

Why Space Activism Burnout? This is the Time to Get Excited!

It has come to my attention over the last year or so that many of our space advocacy leaders and activists are beginning to flirt with burn out. They have been working very hard for their visions of a space future. One may or may not agree with all of the details of any particular such person's vision, but let's face it folks, these people care, and they have been working to the brink (sometimes over the brink) of exhaustion. No one can deny that they have made happen many significant, positive changes in how people think about space, in space related law and legislation, in risk-takers' willingness to invest their lives and/or money in space enterprises, and in many, many other areas.

These people need all the help we can give them. They need our appreciation, our help, our involvement. They also need the input of our thinking so that they will be leading in the directions we want to go and so they will be leading with all the best possible ideas, both for our ultimate goals and for how to get there. Find a way that you personally can help!

These are exciting times what with Roton ships rolling out, Zenit boosters launching from the equator — in the middle of the ocean, real and ongoing exploration of Mars, new and/or innovative technologies and procedures used in actual space probe missions (ion thrusters and aerobraking, for two examples), more nations and nation groups planning and carrying out space exploration missions than ever before, "off-the-shelf" thinking beginning to replace "wouldn't this be neat — and expensive" thinking, space ports springing up in various corners of the world, and on, and on, and on. Hold your breath, people, we are on the bleeding edge of a new era of commercial space.

I only have two questions: Will there be a place in it for you and me? Do you want there to be? ☆

COMMITTEE ON
APPROPRIATIONS

SUBCOMMITTEE
ON INTERIOR

SUBCOMMITTEE ON
VA, HUD AND
INDEPENDENT AGENCIES



E-mail: Budmail@mail.house.gov
Web page: <http://www.house.gov/cramer>

Congressman Bud Cramer

5th District of Alabama

October 21, 1999

Mr. Gregory Allison, President
Huntsville Alabama L5 Society
PMB168
1019 Old Monrovia Road NW #168
Huntsville, AL 35806-3505

Dear Mr. Allison:

I would like to take this Opportunity to extend my congratulations to the Huntsville Alabama L5 Society on recently being recognized by the Guinness World Records 2000 Millennium Edition for launching a rocket to an altitude of just over 40 miles. This recognition demonstrates to everyone what can be accomplished when innovative thinking is combined with a strong sense of commitment. Private sector involvement such as yours in reducing the costs of space access is critical to the future of our Nation.

As you know, the \$10,000 per pound costs associated with getting to Earth orbit exclude small and mid-sized companies from participating in the commercialization of space. These costs also significantly contribute to the United States' rapidly declining share of the commercial space launch market. Reducing the costs of access to space is necessary to help the United States regain its lost share of the commercial launch industry, improve the economic competitiveness of the United States in the world markets, and strengthen and maintain the national security of the United States. Cheaper space access will also help provide more opportunities for space research that enhance our understanding of the Universe and the physical sciences, and will enable observations of the Earth to monitor and protect our global environment for future generations.

I would like to thank the Huntsville Alabama L5 Society for helping Huntsville once again live up to its reputation as the "Rocket City" and I wish you the best of luck in the future.

Sincerely,

A handwritten signature in black ink that reads "Bud Cramer".

Bud Cramer
Member of Congress

Huntsville Alabama L5 Society (HAL5)

your local chapter of the

National Space Society

presents



Yes, Jules, I am a Rocket Scientist!

a **free** public presentation by

Mr. Chris Barker

President and CEO, Space America, Inc.

Thursday, January 6, 2000

7:00 pm to 8:30 pm at the

Huntsville/Madison County Public Library

The public is invited. Admission is **FREE**. A social at Shoney's will follow the meeting.

For more information: call Ronnie Lajoie at 256-721-1083 or email: hal5@hiwaay.net

HAL5 CALENDAR OF MEETINGS AND EVENTS

November 1999

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
21	22 □	23	24	25 Thanksgiving Day	26	27
28	29 ☉ ☾ First Flight over South Pole 1929	30				

December 1999

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1	2 HAL5 Program "Space Biology" 7 pm at Library	3	4 Chanukah Begins
5	6	7 ☿ Galileo arrives at Jupiter, 1995	8	9 HAL5 & Project HALO Meeting Noon at Ponds	10	11 HAL5 Xmas Party 6-9p at Bossards
12	13	14	15 ☉ ☽	16 HAL5 & Project HALO Meeting Noon at Ponds	17	18
19	20	21	22 □ Brightest Full Moon in 133 years	23 HAL5 & Project HALO Meeting Noon at Ponds	24 Christmas Eve	25 Christmas Day
26	27	28	29 ☉ ☾	30 HAL5 & Project HALO Meeting Noon at Ponds	31 New Year's Eve	1 New Year's Day

January 2000

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2	3	4	5	6 ☿ HAL5 Program "Space America" 7 pm at Library	7	8
9	10	11	12	13 HAL5 & Project HALO Meeting Noon at Ponds	14 ☉ ☽	15
16	17 Martin Luther King Jr. Day	18	19	20 □ HAL5 & Project HALO Meeting Noon at Ponds	21	22
23	24	25	26	27 ☉ ☾ HAL5 & Project HALO Meeting Noon at Ponds	28	29

(Archive, continued from page 1)

creativity, your faith, your heritage — whatever you cherish — can live on to tell future generations who you are. And the Millennial Archive's interpretive key, based on the universal language of mathematics, will keep the meaning of your personal statement alive and accessible for the life of this monument to the human spirit. Future historians will certainly note the missions that opened space to commercial development, and museums will display the artifacts associated with those historic missions — and your Message can be among those artifacts.

The Millennial Archive A Revolution in Deep Time Archiving

Sharing your message to the future for a truly indefinite period of time requires an extremely durable archival system. The Millennial Archive will use a system tested on several thousand images from the Library of Congress and designed to serve as timeless, secure, fire- and corrosion-proof storage that does not require specific environmental conditions. In addition, Applied Space Resources has designed enhancements for storing a copy of the Millennial Archive in harsh lunar conditions as insurance against loss due to war, political upheaval or societal degradation or collapse.

No tape or disc storage medium exists that can be counted on to last more than a few decades. Moreover, the codes for interpreting digital data can be lost — and do get lost. Tragically, much of the digital data from the NASA missions to Mars of a mere quarter century ago became un-usable because we can no longer read the magnetic tapes on which the data was stored.

Storing 1000s of Images on One Disc

The Millennial Archive, on the other hand, will consist of actual visual images the eye can read under ordinary (400x) magnification with an inexpensive student microscope. Its Eternity Discs, which will be archived terrestrially by an organization such and

carried to the Moon on Lunar Retriever I, will be durable two-inch nickel discs full of gray-scale images from a silicon master. The silicon masters will be etched by gallium implantation and depth-enhanced by an etch-stop technique using focused ion beam technology in the semiconductor industry for manufacturing integrated circuits. Your individual Keepsake Disc can then be easily and accurately replicated from the original master disc.

The computer-controlled focused ion beam machinery that will etch your Personal Page onto an Eternity Disc uses a 50-nanometer beam spot size, which could allow it to store approximately 90,000 8-1/2 x 11-inch pages scanned at 300 dots per square inch on one of our durable two-inch nickel discs. It is capable of writing a 25-nanometer spot size, which would allow storing approximately 350,000 pages on a two-inch disc at 300 dpi.



However, should the Millennial Archive have to be rediscovered, ASR wants it to be apparent that the discs contain miniaturized images. And, we want you to be able to see your message to posterity on your very own Keepsake Disc replica with an ordinary student microscope ... and to be able to show it to your children and their children. For that reason, we have settled upon a beam size that will store approximately 17,000 pages at 300 dpi on each disc.

Random Access to Millions of Images

A code assigned to your Personal Page will yield the vertical and horizontal coordinates on the disc on which it was etched. Meanwhile, future historians, librarians and other researchers studying the Millennial Archive will be able to retrieve images at up to 30 pages per second using currently existing CCD camera technology and disc carousel add-ons. They will be able to view Personal Pages, digitize them, print them out as hard copies—they will even be able to interface the reader with computer network servers, and thereby use your Personal Page as a knowledge resource. As generations go by, what you say to the future now, at the turn of the millennium, will be of ever-increasing value to posterity.

Designed to Last Thousands of Years

With reasonable care in handling, the Millennial Archive could be just such a resource indefinitely. Should civilizations fall and rise again, however, it may be the Eternity Discs in lunar storage on the Sea of Nectar that will tell your story to the next civilization that once again takes that giant step for all humankind. The copy of the Millennial Archive that ASR will attempt to deliver to the Moon with its planned 2002 launch of Lunar Retriever I will be set within a ceramic base to minimize temperature fluctuations and covered with lead foil to protect it from cosmic radiation. This package will sit inside the part of ASR's lunar lander that will be on the Moon.

The chances of a meteorite impact intensive enough, and at just the right spot on the lander, to take out the Millennial Archive should be minimal. Over an extended period of time, however, the cumulative effect of cosmic ray bombardment might be sufficient to eventually degrade the images on the actual discs. In worst-case scenario calculations, readability appears to be capable of standing up for 30,000 years. Scientists have suggested a lifetime of a million years; for practical purposes, however, ASR is using the conservative 30,000 year figure as a benchmark.

Get your own Personal Page aboard the Millennial Archive!

A Personal Page on the Millennial Archive is your opportunity to represent humankind at an historic and momentous gateway in time. The Archive is a collection of individual and cultural statements representative of Humanity at the start of a new age. It is your opportunity to preserve your identity for a thousand generations side-by-side with great works of world culture selected by Project Gutenberg and others. Your unique message to the Future will be stored on a dedicated Personal Page aboard the Millennial Archive.

Simply give us a single 8-1/2 x 11-inch page with anything you want on it and we will nano-engrave it onto the discs of the Millennial Archive for only \$37.95! (Well almost anything. It has to be legal for us to publish.) You will also get a certificate of participation about four weeks after your submission. Your submission will be included in the Millennial Archive and sent to the surface of the Moon aboard the Lunar Retriever I spacecraft for safekeeping. You can also obtain additional products, upgrades and add-ons for your personal page.

Submission Methods

There are five ways to send us material for your Personal Page.

1. On-line Page Designer: This online form will automatically build a Personal Page for you. Check out a demo of how your page might look!
2. URL: We will archive the first 8½" by 11" page from the web site found at this address.
3. E-mail: We will archive the first 8½" by 11" page from a file you send us.
4. Downloadable Form: This pre-formatted form can be printed and completed at your leisure.
5. Plain Paper: For the truly creative — Start with a blank piece of paper ... the rest is up to you.

[Editor's Note: each page is scanned at 300 dpi greyscale, so keep that in mind if you want to submit a photograph.]

Those other space time capsules

There are other "space time capsules" hoping you'll send your message to the future with them, but only the Millennial Archive is designed to actually get it there. Here's why:

The Millennial Archive is designed to travel into Deep Time. Your message will be stored on special metal discs designed to withstand the effects of time, even on the surface of the Moon. Scientists tell us that, left undisturbed, the Millennial Archive and your message may well last millions of years. Some other space time capsules use plastic CD-ROM discs likely to degrade in a few short decades.

The Millennial Archive is designed to communicate across Deep Time. Languages change and evolve constantly — we have trouble reading authors from only a few hundred years ago, like Shakespeare or Chaucer. The Millennial Archive's "mathematical Rosetta Stone" will teach future generations how we speak today. A dictionary and encyclopedia, and a collection of humanity's greatest literature selected by Project Gutenberg, will explain our culture — the context for understanding your message. Some other space time capsules store messages in digital formats that could be obsolete within a decade or two — adding the challenge of reading your message at all to translating the language you speak.

The Millennial Archive is designed to be found in Deep Time. Your message will be stored on the surface of the Moon in a visible location attached to the first commercial lunar spacecraft. You and your descendants will be able look at the Moon and point to where the Millennial Archive stands guard as generation after generation go by. Some other space time capsules have no fixed destination — they will float around the earth, drift off into space or crash into asteroids.

The Millennial Archive is designed to minimize your risks in Deep Time. We know space flight still has its risks, and we don't feel it's right for you to take those risks. Besides insuring our launch against loss or failure, we put your money in escrow until a copy of the Millennial Archive is safely delivered to the Moon. If we don't get to the Moon by 2005, you get your money back! Some other space time capsules don't even say what they're doing with your money, or what happens to it if they don't get launched.

Donations to Groups Like HAL5

Millennial Archive donates 10% of each sale to various charities and non-profit organizations. The electronic check-out form allows you to select from a list of preferred charities and non-profits. If you have a favorite not-for-profit organization you believe we should include, send an email to charity@millennial-archive.com with the organization's name, address and phone number.

If you would like to help promote space, your may choose for your donation such organizations as Planetary Society, Search for Extraterrestrial Intelligence (SETI), Space Frontier Foundation, the National Space Society, ProSpace, the Artemis Society. Or you can select from more traditional organizations, such as Greenpeace, Make a Wish Foundation, American Cancer Society, American Red Cross, Boy Scouts of America, Girl Scouts of America, or the Big Brothers and Big Sisters of America. You may also select from UFO organizations, such as CAUS, CSETI, MUFON, or The Starchild Project.

Donations will be made on a quarterly basis beginning January 1, 2000. We will produce a statement each quarter which will be available by mail. To receive the current statement, send a SASE to: Millennial Archive Charity Donations, P.O. BOX 480, ANDES, NY 13731.

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Closing from Letter from Beth Elliott

I'm sure you'll do a lot of creative brainstorming with these materials, and Alonzo Fyfe (afyfe@appliedspace.com) and I will be more than happy to discuss any ideas or answer any questions. Let us know if you want to set up a phone call in addition to e-mailing. Best regards, Beth Elliott. ☆

2001 and Beyond

(by Arthur C. Clarke, 14 March 1999)

Despite all claims to the contrary, no one can predict the future, and I have always resisted all attempts to label me a prophet: I prefer "extrapolator".

What I have tried to do, at least in my non-fiction, is outline possible "futures" — at the same time pointing out that totally unexpected inventions or events can make any forecasts absurd after a very few years. The classic example is the statement in the late '40s by the then chairman of IBM that the world market for computers was about five (or was it six?). I have more in my own office, and they are still breeding like rabbits ...

But perhaps I'm in no position to criticize Thomas Watson. In *Transit of Earth* (1971), I put the first Mars landing in 1994; now we'll be lucky if we make it by 2010. On the other hand, when *Prelude to Space* was published in 1951, I thought I was being wildly optimistic by suggesting a moon mission in 1978. Neil and Buzz beat me by almost a decade.

Still, I take a modest pride in the fact that communications satellites are placed exactly where I suggested in 1945, and that the name "Clarke Orbit" is now often used, if only because it's easier to say than "geostationary orbit". And the chapter "The Country Syndrome" in my 1990 novel, *The Ghost from the Grand Banks*, may well have been the first account, outside technical literature, of the now-dreaded millennium bug — its cause and its cure.

Even so, the chronology that follows should be given with a "health warning". Some of the events listed (particularly the space missions) are already scheduled, and will occur on the actual dates given; I believe all the other events could happen, although several I hope will not.

In spite of the temptation, I have omitted many interesting and all-too-possible disasters, because optimism about the

future is always desirable; it may help to create a self-fulfilling prophecy.

2001: Next millennium and century begin. Cassini space probe begins exploring the planet's moons and rings. Galileo probe continues surveying Jupiter and its moons. Life beneath the ice-covered oceans of Europa appears increasingly likely.

2002: The first commercial device producing clean, safe power by low-temperature nuclear reactions goes on the market, heralding the end of the Fossil-Fuel Age. Economic and geopolitical earthquakes follow and, for their discovery of so-called "Cold Fusion" in 1989, Pons and Fleischmann receive the Nobel Prize for Physics.

2003: The motor industry is given five years to replace all fuel-burning engines with the new energy device. The same year, NASA's robot Mars Surveyor (carrying Lander and Rover) is launched.

2004: First human clone.

2005: First sample launched back to Earth by Mars Surveyor.

2006: Last coal mine closed.

2007: NASA's Next Generation Space Telescope launched.

2008: On his 80th birthday, July 26, film director Stanley Kubrick, who made *2001: A Space Odyssey*, receives a special Oscar for lifetime achievement.

2009: A city in a Third World country is devastated by the accidental explosion of an A-bomb in its armory. After a brief debate in the UN, all nuclear weapons are destroyed.

2010: The first Quantum Generators (tapping space energy) are developed. Available in portable and household units from a few kilowatts upwards, they can produce electricity indefinitely. Central power stations close down and the age of pylons ends as grid systems are dismantled.

In spite of “Big Brother” protests, electronic monitoring virtually removes professional criminals from society.

2011: Largest living animal filmed: a 75m octopus in the Mariana Trench. By a curious coincidence, later in the year even larger marine creatures are discovered when the first robot probes drill through the ice of Europa, and an entire new biota is revealed.

2012: Aerospace planes enter service. The history of space travel has repeated that of aeronautics, although more slowly, because the technical problems are so much greater. From Gagarin to commercial space flight has been twice as long as Wright Brothers to the DC3.

2013: Despite the understandable apprehensions of Buckingham Palace, Prince Harry becomes the first member of the British royal family to fly in space.

2014: Construction of Hilton Orbiter Hotel begins, by assembling and converting the giant Shuttle tanks previously allowed to fall back to Earth.

2015: An inevitable by-product of the Quantum Generator is complete control of matter at the atomic level. Thus the old dream of alchemy is realized on a commercial scale, often with surprising results. Within a few years, since they are more useful, lead and copper cost twice as much as gold.

2016: All existing currencies are abolished. The megawatt-hour becomes the unit of exchange.

2017 December 16: On his 100th birthday, Sir Arthur C Clarke is one of the first guests in the Hilton Orbiter.

2019: A major meteor impact occurs on the North Polar ice cap. There is no loss of human life, but the resulting tsunamis cause considerable damage along the coasts of Greenland and Canada. The long-discussed Project Spaceguard, to identify and deflect any potentially dangerous comets or asteroids, is finally activated.

2020: Artificial Intelligence (AI) reaches the human level. From now onwards there are two intelligent species on planet Earth, one evolving far more rapidly than biology would ever permit. Interstellar probes carrying AIs are launched towards the nearer stars.

2021: The first humans land on Mars, and have some unpleasant surprises.

2023: Dinosaur facsimiles are cloned from computer-generated DNA. Disney’s Triassic Zoo opens in Florida. Despite some unfortunate initial accidents, mini raptors start replacing guard dogs.

2024: Infra-red signals are detected coming from the center of the galaxy. They are obviously the product of a technologically advanced civilization, but all attempts to decipher them fail.

2025: Neurological research finally leads to an understanding of all the senses, and direct inputs become possible, bypassing skin, eyes, ears and other organs. The inevitable result is the metal “Braincap”, of which the 20th century’s Walkman was a primitive precursor. Anyone wearing this helmet, which fits tightly over the skull, can enter a whole universe of experience, real or imaginary — and even merge in real time with other minds.

Apart from its use for entertainment and vicarious adventure, the Braincap is a boon to doctors, who can now experience their patients’ symptoms (suitably attenuated.) It also revolutionizes the legal profession; deliberate lying is impossible. As the Braincap can function properly only on a completely bald head, wig-making becomes a major industry.

2040: The “Universal Replicator”, based on nanotechnology, is perfected: any object, however complex, can be created — given the necessary raw material and the appropriate information matrix. Diamonds or gourmet meals can, literally, be made from dirt. As a result, agriculture and industry are phased out, ending that recent invention in human

history — work! There is an explosion in arts, entertainment and education.

Hunter-gathering societies are recreated and huge areas of the planet, no longer needed for food production, are allowed to revert to their original state. Young people can now discharge their aggressive instincts by using crossbows to stalk big game, which is robotic and frequently dangerous.

2045: The totally self-contained, recycling, mobile home is perfected. Any additional carbon needed for food synthesis is obtained by extracting carbon dioxide from the atmosphere.

2050: Escape from Utopia. Bored by life in this peaceful and unexciting era, millions decide to use cryonic suspension to emigrate into the future in search of adventure. Vast “hibernacular” are established in Antarctic and in regions of perpetual night at the lunar poles.

2057 October 4: Centennial of Sputnik 1. The dawn of the space age is celebrated by humans not only on Earth, but on the moon, Mars, Europa, Ganymede and Titan — and in orbit round Venus, Neptune and Pluto.

2061: The return of Halley’s Comet; first landing on nucleus by humans. The sensational discovery of both dormant and active life forms vindicates Hoyle and Wickramasinghe’s century-old hypothesis that life is omnipresent throughout space.

2090: Large-scale burning of fossil fuels is resumed to replace carbon dioxide “mined” from the air and, hopefully, postpone the next Ice Age by promoting global warming.

2095: The development of a true “Space Drive”, a propulsion system reacting against the structure of space-time, makes the rocket obsolete and permits velocities close to that of light. The first human explorers set off to nearby star systems that robot probes have already found promising.

2100: History begins ... ☆

HAL5 Membership Report

The following is a list of additions to the current paid membership of HAL5, which includes 34 renewals and 13 new members, for a total of 47 for 1999, plus four newsletter subscribers. Welcome to all our new and renewed members and subscribers!

Cary & Fran Bruton (R)
 Bruce Randolph (N)

(N) - New Member
 (R) - Renewed Member

HAL5 welcomes back past members Cary & Fran Bruton, thanks to a donation from Greg Allison. Since it is so late in the year, Greg's donation covers their year 2000 membership also. The Brutons donated the use of their large field for our history-making launch of our Project HALO SL-1 rockoon.

HAL5 also welcomes its new member Bruce Randolph, who is receiving a gift membership (to NSS as well) as a thank you for his many donations of hardware to Project HALO. Since it is so late in the year, this "thank you" covers his year 2000 membership as well. ☆

Pee Wee's Little Adventure

(by Ronnie Lajoie)

What do you get when you combine a bicycle, a hybrid rocket, Tim Pickens, and Glen May — TROUBLE! Only these creative geniuses could create a rocket-powered bicycle in less than a day! Tim's article will follow soon! In the meantime, enjoy the photos! ☆



Glen May and Tim Picken's Hybrid Rocket-powered Bicycle



YEE-HA!!!!

Upcoming Events of Interest to HAL5 Members

- Thu., Dec. 2 — **HAL5 Program on "Commercial Biomedical Experiments in Space"** by Marianne Lewis, at Huntsville Public Library, 915 Monroe Ave.; free; questions: 256-971-3055
- Thu., Jan. 6 — **HAL5 Program on "Yes, Jules, I am a Rocket Scientist"** by Mr. Chris Barker, President/CEO of Space America, Inc., at Huntsville Public Library, 915 Monroe Ave.; free; 971-3055
- Thu., Feb. 3 — **HAL5 Program on "Space History and the Bible"** by Dr. George McKay, HAL5 member, at Huntsville Public Library, 915 Monroe Ave.; free; questions: 256-461-5934

Special Announcement

HAL5 January Program Night

"About Space America, Inc." by

Chris Barker, President/CEO

Thursday, January 6, 7-9 pm

Huntsville Alabama L5 Society
 PMB 168, 1019 Old Monrovia Road
 Huntsville, AL 35806
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