



Southeastern Space Supporter

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

Volume 7, Number 5 — September–October 1998

FIRST WORD

Catch Up on Space News Issue

(by Ronnie Lajoie, SSS Editor)

While many HAL5 members were busily engaged in Project HALO (and are preparing to do so again), a lot of other significant events were occurring outside our chapter. Since last issue was devoted to the first attempt for the SL-2 mission, this issue will take a break from Project HALO and look at other space events which have happened recently.

John Glenn Finally Returns to Space After 36 Years

Of course, the biggest news outside of HAL5 is that astronaut John Glenn is returning to space — finally breaking the ban quietly established by President John F. Kennedy in 1962 (to protect this “national treasure”). On February 20, 1962, John Glenn became the first American to achieve Earth orbit. He and his space capsule *Friendship 7*

even established a new space endurance record — a whopping 5 hours!

For the first time in over a decade, the news media has really gotten caught up in the excitement. Hubble telescope and Mars Pathfinder missions did not generate the amount of press coverage expected for the Glenn flight. There has not been this much excitement about a

And with comments like “I’d go in a minute!” from media figures such as Hugh Downs, chairman of NSS Board of Governors, there is clearly a strong but unspoken interest in personal travel in outer space. With the \$10 million dollar X-Prize looming out there, it may not be long before the excitement of space travel for all finally becomes a reality. Ad Astra! ☆



John Glenn celebrates with President Kennedy in 1962. (photo from the March 2, 1962 issue of *Life* magazine.)

John Glenn on TV

(by Curtis Kling, NSS Discuss)

As a public service to space enthusiasts everywhere, I have compiled a schedule of television programs devoted next week to John Glenn, the STS-95 launch, and other space-related topics. I obtained the information from *TV Guide* magazine, which has Glenn and Walter Cronkite on the cover. Times are CST and subject to change, of course. Your VCRs may be very busy next week!

Monday, October 26

7:00 a.m. (NBC) - “Today” shows first of 3-part interview with Glenn

7:00 p.m. (Discovery) - “Return to Orbit” featuring Cronkite-narrated documentary about Glenn

8:00 p.m. (Discovery) - “Return to Orbit” featuring documentary about astronaut Andy Thomas aboard Mir

9:00 p.m. (Discovery) - “Return to Orbit” featuring behind-the-scenes of the Space Shuttle program.

(continued next page)

HAL5 Program Night

Wednesday, October 28, 1998
7 to 8:30 p.m. (with social afterwards)
Huntsville Public Library Auditorium

“Asteroids and Comets — Friends . . . or Foes?”

Guest speaker will be Greg Allison, Space Systems Engineer at Mevatec.

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

single individual going into space since Christa McAuliffe’s ill-fated “teacher-in-space” flight back in 1986.

Such events clearly indicate that the media and the public and mostly interested in space when it involves pioneers. Both Glenn and McAuliffe were pioneers on their respective flights. It shows that the public yearns for the glory days of early space exploration, when a few daring astronauts risked all to establish a beachhead on the space frontier.

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
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Southeastern Space Supporter

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 September / October 1998

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://advicom.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: 205-971-3055
 Night/Weekend phone: 205-721-1083
 FAX number: 205-971-3333
 Electronic mail address: hal5@advicom.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.

Tuesday, October 27

7:00 a.m. (NBC) - "Today" shows second of 3-part interview with Glenn
 8:00/7:00 p.m. (A&E) - "Biography" spotlights Glenn
 9:00/8:00 p.m. (PBS) - "Nova" - Mir's series of accidents and equipment failures
 10:00/9:00 p.m. (CNN) - "Perspectives" profiles Glenn

Wednesday, October 28

8:00/7:00 a.m. (NBC) - "Today" shows third of 3-part interview with Glenn
 7:00/6:00 p.m. (History) - "20th Century With Mike Wallace" explores the early days of the space program
 8:00/7:00 p.m. (NBC) - "Dateline NBC" has a segment about Gerry Cobb
 8:00/7:00 p.m. (PBS) - "Edge of Utopia", a chronicle of NASA
 9:00/8:00 p.m. (PBS) - "John Glenn: American Hero"

Thursday, October 29

Live coverage starting at 1:30 or 2:00 p.m. EST features these VIPs:
 ABC - Wally Schirra, Norm Daggart
 CBS - Gordon Cooper
 NBC - Scott Carpenter
 CNN - Walter Cronkite
 Fox News Channel - James Lovell
 Discovery Channel - Jerry Linenger and Blaine Hammond

NSS Live Internet Coverage of John Glenn Launch

(NSS Press Release, October 20, 1998)

The National Space Society today announces live online coverage of the STS-95 "John Glenn" launch of the space shuttle Discovery. A video broadcast and online chats will present the public the chance to witness the launch, while discussing the mission

with astronauts and other key members of the space community.

In partnership with Space Adventures, Ltd., the Microsoft Corporation, and InterVU, Inc., the NSS will host a live online video broadcast of the STS-95 launch, complete with exclusive interviews with astronauts and veteran space reporters. The broadcast will begin at T-minus 4 hours (9:00 AM CT) on October 29. The webcast can be viewed at:

[//www.nss.org/askastro/webcast.html](http://www.nss.org/askastro/webcast.html)

using the Microsoft Media Player. The player can be downloaded for free at the site.

In conjunction with the webcast, TIME.com will present a live forum hosted by Yahoo! Chat with three-time shuttle astronaut and NSS President, Charles Walker. Walker was the first industry-sponsored astronaut, serving as payload specialist on Space Shuttle missions STS 41-D, 51-D, and 61-B.

The chat will begin on October 29, at 12:30 pm CST at the TIME.com Auditorium on Yahoo! Chat at <http://chat.yahoo.com/>.

The NSS's Space Exploration Online, a forum on America Online, will also present live chats with astronauts, shuttle technicians, and on-site reporters.

Featured are discussions with space shuttle crawler engineer Bob Poston on October 26 at 6:00 PM CT, and former NASA Johnson Spaceflight Center Flight Dynamics Officer Roger Balettie on Thursday, October 29th at 8:00 PM CT. A full schedule of the events, as well as access to the chats, can be found at keyword: space

The NSS is an independent, nonprofit space advocacy organization. Its 20,000 members and 75 chapters around the world actively promote a spacefaring civilization. More information about STS-95 and John Glenn can be found as part of the NSS's Ask An Astronaut website at <http://www.nss.org/askastro>. God Speed John Glenn! Ad Astra! ☆

1998 HAL5 Survey Results

(By Ronnie Lajoie, Survey Coordinator)

In January, HAL5 mailed to each member a survey form. As this issue goes to press, only 13 out of 80 were returned (16 percent). This is a drop from the last survey, when one-half (20 of 42) were returned. Unlike the past two surveys, these survey results thus may not be representative of the views of the HAL5 membership as a whole, or at least of the vocal part of it.

Most of the responses did not come from HAL5 officers or Project HALO team members, who were apparently too busy preparing for the first attempt for the HALO SL-2 rockoon mission. The results therefore are biased towards the less active members in our society.

The details of the survey results are shown in the table at right. For each survey statement the table shows the average numerical response from the 1996 and 1998 surveys, where 1 is a strong Agreement with the statement and 5 is a strong Disagreement. (Agreements are not always desired.) An average near 3 means either an Unsure response (from people selecting 3's) or a Split response (from people selecting 1 or 2's and 4 or 5's).

HAL5 Program Nights

Speaking of split responses, there was a yet another split between respondents in attendance of the monthly Program Nights as well as for the socials at Shoney's afterwards. The major reason for many members not attending the Program Nights is that they have other commitments (family, training class, church activity, etc.). So far, no member has sent a complaint about the quality of the Program they missed.

The 4th Wednesday is good for some and not for others. An attempt was made to find another slot, but none was available — at least at the Huntsville Public Library. As in 1996, the 7-9 p.m. timeslot was preferred by most respondents, as was the format and location: the Huntsville Public Library.

Comparison of Average Responses for 1996 and 1998 Surveys

QUESTION	1996	1998
1) I regularly attend the (mostly) monthly HAL5 Program Nights	S-2.9	S-3.6
a) The 4th Wednesday of the month is a good day for me.	S-2.3	S-2.7
b) The 7-9 pm time slot is a good time for me.	A-1.6	S-2.6
c) The Huntsville Public Library is a good location for me.	A-1.3	A-1.2
d) I would pay a small admission fee (\$1-2) to attend event.	S-2.6	A-1.8
e) I like the 1-2 person lecture/forum format of the programs.	A-1.6	A-1.4
f) I attend and like the post-program socials at Shoney's.	S-3.0	S-3.4
2) I would like HAL5 to be more involved in the following:		
a) Educational programs	A-2.3	A-2.4
b) Conferences	A-2.3	A-2.0
c) Political activism	D-3.2	S-2.6
d) Hands-on technical projects	A-1.7	A-1.6
3) I would like <u>myself</u> to be more involved in the following:		
a) Educational programs	S-2.9	S-3.3
b) Conferences	A-2.6	S-2.7
c) Political activism	D-3.8	S-3.3
d) Hands-on technical projects	A-2.3	A-2.7
e) Project HALO (High Altitude Lift-Off)	A-2.4	A-1.7
f) HAL5 World Wide Web site design / maintenance		D-3.7
4) I regularly read the HAL5 <i>Southeastern Space Supporter</i> .	A-1.5	A-1.3
a) I want more. I would prefer a monthly newsletter.	S-3.1	A-2.4
b) I would prefer a quarterly newsletter or less.	D-4.0	D-4.4
c) My newsletter arrives in time for me to attend events.	A-1.7	S-2.8
5) I like the format of the <i>Southeastern Space Supporter</i> .	A-1.5	A-1.1
a) I like the format of the HAL5 Calendar of Events.	A-1.4	A-1.1
6) I like the content of the <i>Southeastern Space Supporter</i> .	A-1.6	A-1.2
a) The newsletter provides me with the information I want.	A-1.8	A-1.1
b) I would prefer more articles on local space activities.	A-2.3	A-1.9
c) I would prefer more articles on national space news.	S-3.0	S-2.7
d) I would prefer more articles on NSS space activities.	S-2.8	A-2.4
d) I would like to see advertisements for space books and art.	U-2.7	U-2.4
e) I would like to read HAL5 member ambitions and desires	A-2.6	A-2.4
f) I would be willing to write articles for the newsletter.	S-2.8	D-3.5
7) I am satisfied with the services I get with my membership.	A-1.7	A-1.2

A = Agree, D = Disagree, S = Split response, U = Unsure, don't agree / disagree

Unlike 1996, most respondents said they would be willing to pay a \$1-2 admission charge to cover such fees. So far, HAL5

is not being charged for use of the Library's auditorium, mainly because we use it only for holding the free public

lectures. When we just want to hold a membership-only meeting, we use the meeting room at the HATS office.

HAL5 Activities

As in 1996, technical projects scored highest (8 agrees and no disagrees), thanks to the successes of Project HALO. 8 respondents agreed to volunteer on Project HALO, while only 2 responded they could not participate.

With the 1993 ISDC now a distant, but pleasant, memory, many members are becoming more interested in hosting conferences or workshops again (8 to 1). 4 respondents agreed to volunteer. HAL5 began planning a regional space development conference in 1996, and is still looking for volunteers. Those 4 will be contacted soon!

Educational programs have dropped to third place (6 to 2), but are still a favored activity. 3 respondents agreed to volunteer, while 4 had to disagree. HAL5 is looking for members to lead one or more of our current educational activities, which include public lectures, school visits, and our Project HALO Achievement program.

HAL5 members are even warming up to political activism (4 to 2, with 2 agreeing to volunteer to help. Even so, political activism remains HAL5's least favored activity among members.

Members who want to be politically proactive, and are willing to take a leadership role, should discuss the matter with the Executive Committee. There are supplies left over from the ISDC which can be used for such activities, as well as funds which can be used to reimburse reasonable expenses.

HAL5 Newsletter

As in 1996, most (12 to 1) of the respondents regularly read and like this newsletter. Thank You! Many (5 to 2) would like a monthly newsletter and, as in past surveys, no one wants to make the newsletter go quarterly. The

newsletter will likely remain a bimonthly publication.

HAL5 Newsletter Delays

Unlike 1996, respondents were split about getting their newsletter on time, and three wrote in complaints. This is unfortunate, but not surprising to me as your editor. I have been very much aware of how I have failed many times in 1997 and 1998 to live up to my goal to have your newsletter in your mail box at least one week before critical upcoming events. This very issue will show up in your mailbox on the Tuesday before the Wednesday program.

Believe me, it is not for lack of interest — I enjoy doing this. It is due to an increasing number of conflicting activities on my part, and to a reduced level and timeliness of contributing articles on behalf of other members of the society (due to their increasing number of conflicting activities).

Since it is clear that most members enjoy the newsletter, all I can do is ask for your support (and articles, stories, cartoons) to help me put the newsletter together. I hope one of you volunteers would like some experience in editing and publishing a newsletter.

Every respondent likes the overall format of this newsletter and of the Calendar of Events. This is great news. This format has served us well for four years and makes editing the newsletter a very efficient process — once the articles have been provided (hint, hint).

HAL5 Newsletter Content

Every respondent likes the content of this newsletter and agree that it provides them with the information they want. As in 1996, articles on local space activities are the most preferred (8 to 0), with articles on member ambitions/desires still second (7 to 1). Some respondents (5 to 0) would like to see advertisements in the newsletter. Paid ads are unlikely given the size of our distribution, but we will continue to insert special offers from NSS and HAL5 on occasion.

The club remains split in regards to articles on national space news (5 to 4), mainly because *The Huntsville Times* and national magazines such as *Space News* already provide many HAL5 members with this information. Unlike 1996, there is a stronger interest in hearing about NSS activities (5 to 2). I would guess that this is partly because *Ad Astra* magazine may not satisfy them, partly because *Inside NSS* newsletter is comatose, and partly because many respondents live outside of Huntsville. As this issue attests, we will insert NSS and national space news during lulls in HAL5 activities.

Even fewer respondents are willing to write articles now (2 to 6) than in 1996. Writing an article is NO BIG DEAL. Try it — you'll like it! Where else do you have a practical guarantee to get your article published? It does not have to be long, in fact shorter is probably better given the limitations on our page count. I appreciate ALL articles, no matter how short — as long as they have something to do with space. My mail box is always available, both physical and electronic. See the sidebar on page 2 for details.

HAL5 Membership

The best news of the survey is that most respondents are still happy (3) or very happy (10) with their membership to HAL5 (despite the late newsletters). This is great news for us in the Executive Committee, to whom are only contact with many of you is through this newsletter. We appreciate all comments and suggestions for making HAL5 a better society.

Your Executive Committee has an open invitation for members to join us at our weekly meetings at Noon on Thursdays, at the Holiday Inn Ponds Restaurant near Madison Square Mall — especially if you have an idea for a HAL5 activity or project. As always, our monthly meetings are **every 4th Wednesday** (make a mental note) at either the Library or the HATS office, and are open to members and non-members alike — so next time bring a friend! ☆

HAL5 CALENDAR OF MEETINGS AND EVENTS

October 1998

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
18	19	20 Project HALO Tech. Meeting Noon at Ponds	21 Orionid Meteors	22 HAL5 Executive Comm. Meeting Noon at Ponds	23 Orionid Meteors	24
25 Daylight Savings Time Ends	26	27 AIAA Space Conf. & Exhibit VBC thru Thurs.	28 HAL5 Program "Asteroids" 7 pm at Library	29 HAL5 Executive Comm. Meeting Noon at Ponds	30 Von Braun Space Forum VBC North Hall	31 Halloween

November 1998

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 Taurid Meteors	3 Election Day VOTE Pro-Space	4 Taurid Meteors	5 HAL5 Executive Comm. Meeting Noon at Ponds	6	7
8	9	10 Project HALO Tech. Meeting Noon at Ponds	11 Veterans' Day	12 HAL5 Executive Comm. Meeting Noon at Ponds	13	14
15	16	17 Project HALO Tech. Meeting Noon at Ponds	18	19 HAL5 Executive Comm. Meeting Noon at Ponds	20	21
22	23	24 Project HALO Tech. Meeting Noon at Ponds	25 No HAL5 Program Night	26 Thanksgiving Day	27	28
29	30	AIAA Defense and Civil Space Programs Conference and Exhibit Tuesday, October 27 through Thursday, October 29 at the Von Braun Center, downtown Huntsville, Alabama For information, call AIAA HQ at 1-800-639-2422 or email custserv@aiaa.org				

December 1998

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 Project HALO Tech. Meeting Noon at Ponds	2 Pioneer 11 Jupiter flyby, 1974	3 HAL5 Executive Comm. Meeting Noon at Ponds	4	5
6	7 Galileo arrives at Jupiter, 1995	8 Project HALO Tech. Meeting Noon at Ponds	9	10 HAL5 Executive Comm. Meeting Noon at Ponds	11	12
13 Hanukkah, Geminid meteors	14 Hanukkah, Geminid meteors	15 Project HALO Tech. Meeting Noon at Ponds	16	17 HAL5 Executive Comm. Meeting Noon at Ponds	18	19
20	21 Winter solstice 7:56 PM CST	22 Project HALO Tech. Meeting Noon at Ponds	23 No HAL5 Program Night	24 No HAL5 Meeting	25 Christmas Day	26

Congress Finally Approves the Commercial Space Act

The U.S. House of Representatives approved on Monday, October 5, a conference report on previously-approved legislation that should make it much easier for private companies to launch spacecraft and do space-related business, with the Senate following suit three days later.

H. R. 572 was approved by a voice vote in the House October 5. The resolution called for the approval of H.R. 1702, the Commercial Space Act, and minor Senate amendments to the bill.

On Thursday, October 8, the Senate approved the legislation on unanimous consent, leaving only the President's signature standing between it and enactment. President Clinton is expected to sign the legislation.

H.R. 1702 passed in the House last fall and was approved by the Senate in late July. The bill covers a number of aspects of commercial space efforts, from the licensing of reusable launch vehicles to the purchase by the government of commercial launch services and scientific data.

The bill gives the Federal Aviation Administration (FAA) the authority to license the reentry of reusable launch vehicles. The FAA currently has the authority to license launches, but not reentries.

The ability to issue launch and reentry licenses was seen by many analysts as the key section of the bill. With new reusable launch vehicles being developed by private industry, such regulation is critical to permit them to be launched from the United States.

In one case, Kistler Aerospace, developer of the K-1 reusable launch vehicle, has planned to launch from Australia instead of the United States, thanks to a regulatory environment more conducive to commercial space ventures. Other launch firms have also considered offshore launch sites. ☆

Congress Approves NASA Budget for 1999

The U.S. Congress approved earlier this month NASA's 1999 budget, increasing its budget by \$200 million from the Clinton Administration's first request and making a number of administrative changes, including a new name for a NASA field center.

H.R. 4194 includes \$13.665 billion for NASA in 1999, \$200 million more than first requested. The space agency received \$13.638 billion in 1998 and \$13.7 billion in 1997.

Human space flight, which includes the space shuttle and International Space Station, will receive \$5.48 billion in 1999, \$200 million less than in 1998 and \$30 million less than what the Clinton Administration requested. The space station will be fully funded in 1999 at \$2.27 billion, while the space shuttle program gets \$3.059 billion, slightly less than requested but about \$100 million more than in 1998.

Space, Aeronautics, & Technology, the section of NASA that does research and development and funds space science missions, will get \$5.654 billion in 1999, \$200 million more than requested and \$100 million more than 1998.

A number of specific projects got funding increases beyond what was originally requested. The Mars Surveyor 2001 program got a \$20 million boost, which may be enough to include a Sojourner-like rover on the lander component of that spacecraft. The Next Generation Space Telescope, space solar power research, and near-Earth asteroid tracking programs also got funding boosts.

Technology projects also got funding boosts. Congress directed \$20 million to be spent on NASA's contribution to the Military Space Plane program, while liquid flyback boosters and hybrid propulsion also got funding increases.

The spending bill also included a number of administrative measures.

Notably, the bill calls on NASA to rename the Lewis Research Center in Cleveland to the "John Glenn Research Center at Lewis Field", after the retiring senator and former astronaut who will be flying on STS-95 on October 29.

H.R. 4194 also restricts NASA from spending funds from other projects on the space station, as members of Congress signal their disapproval with how the project is being managed. The bill also calls on Congress to separate space station funding from other programs and present it in a separate account starting in fiscal year 2000.

However, the final version of the bill removed a provision inserted into the House version that would have prevented NASA from spending money researching the Triana spacecraft, a controversial Earth-observing mission conceived and promoted by Vice President Al Gore. ☆

NASA's New "Office of Aero-Space Technology"

(NASA Press Release, October 14, 1998)

NASA has renamed the Office of Aeronautics and Space Transportation Technology (OAST) the Office of Aero-Space Technology (OAST) and reorganized it to better meet the Agency's goals. In announcing the reorganization, OAST Associate Administrator Spence M. Armstrong said, "When NASA Administrator Dan Goldin asked me to take this position, he told me there were three objectives that he wanted to see accomplished within the first months of my tenure.

"First, Goldin wanted me to personally be an advocate for the Reusable Launch Vehicle programs to effect a cheaper means of access to space. Secondly, he wanted to see more synergy between the traditional Aeronautics role and the Space Transportation Technology role, which had been added to the office's responsibility as a result of an earlier Headquarters reorganization. Lastly, Goldin wanted to see progress in achieving the ten goals that NASA had established for the office just over a year

ago. Specifically, he wanted to see 'road maps' or plans to achieve each goal and asked me to reorganize as necessary to achieve them."

To accomplish these objectives, Armstrong sought the advice and consultation of the office's executive board. The board quickly recognized and accepted that the enterprise needed to have a management focus that highlighted achieving its goals rather than the traditional method of overseeing individual programs.

The ten goals that NASA established for the enterprise include eight goals that deal with aviation, one with access to space and another with space transportation. NASA will work closely with the FAA and other government agencies and industry partners to develop the technology necessary to attain these goals. ☆

NASA Suggests Life May Exist on Europa

(Knight-Ridder Tribune, October 17, 1998)

Some scientists are coming to believe that the most likely place to find extraterrestrial creatures living in our solar system is not a big planet such as Mars or Venus but a little, ice-covered moon of Jupiter named Europa.

New findings from NASA's Galileo spacecraft buttress the theory that under Europa's frozen crust lies a deep ocean of liquid water that quite possibly harbors simple microorganisms similar to those swarming beneath the sea on Earth.

The case for life on Europa -- which is slightly smaller than our own moon -- is still inconclusive, but steadily growing stronger, according to reports delivered at a conference of planetary scientists sponsored by the American Astronomical Society here this week. "The circumstantial evidence is becoming compelling," said Chris Chyba, a space geologist at Stanford University.

Clark Chapman, a Galileo project scientist from the Southwestern Research

Institute in Boulder, Colorado, said the "evidence suggests -- but has not yet proved -- that Europa is the most likely currently habitable place in the solar system beyond Earth."

Mars may once have harbored primitive life, many astronomers say, but the Red Planet is now too cold and dry for living creatures, at least on the surface. Billions of years ago, Venus used to be cool enough to support some form of life, but a runaway "greenhouse" effect has turned our nearest neighbor into a uninhabitable inferno.

The scientists here cautioned that it is too soon to declare that Europa definitely has liquid water -- an essential ingredient for life -- much less to conclude that anything is living there. "It's right to be skeptical," said Chyba, who puts the odds of finding life on Europa at 50-50. "A liquid ocean is so important. So many of us want it to be there."

Nevertheless, Galileo has sent back images showing that melted water apparently broke through Europa's ice crust frequently in the past, leaving tell-tale cracks, ridges, domes and icebergs behind. In places, the surface resembles the broken ice pack floating in Earth's Arctic and Antarctic seas.

"I think it's an ongoing process," said Richard Greenberg, a member of the Galileo team from the University of Arizona's Lunar and Planetary Laboratory. "Water breaks through the surface, bubbling and refreezing. It keeps going as long as there is enough heat."

The melting is apparently caused by heat rising from "hot spots" below the ocean caused by radioactive decay of the moon's rocky and metallic core. In addition, Jupiter's mighty gravity is constantly squeezing its satellite, warping the brittle crust and creating even more heat.

The case for water -- and possibly life -- on Europa also rests on these lines of evidence:

- Unlike Mars or Jupiter's other moons, the crust of Europa is remarkably free of impact craters -- the result of a collision with an asteroid or comet -- indicating that it has been resurfaced within the past 1 million years. "Europa is geologically very young and active," said Chapman. Such recent activity makes it more likely that Europa has enough inner warmth to keep water liquid.
- Furthermore, the few craters that do exist are smooth and shallow, lacking the raised rims and central peaks of craters on a rigid surface such as the Earth or our moon. J. M. Moore, a scientist at NASA's Ames Research Center in Mountain View, Calif., said this implies that Europa has an icy crust 6 to 10 miles thick, floating on top of a fluid ocean.
- Scattered about the surface are raised domes that may have been created when the ice over a "hot spot" thinned and water broke through.
- Multiple regions of jumbled blocks of ice, dubbed "chaoses," appear to be the result of daily tidal pushing and pulling as the moon swings around Jupiter, 416,000 miles away.
- Radar studies of Europa's interior show that its inner core must be surrounded by a layer of water or ice 50 to 120 miles thick. If the frozen crust is no more than 10 miles thick, as scientists suspect, the rest must be slushy ice or water.

"A global ocean under thin ice can explain everything," said Greenberg, summarizing the evidence collected to date.

"Twenty years ago, we thought there was only one planet in the solar system capable of supporting life. Now we know there may be as many as a half dozen," said Bruce Jakosky, a planetary scientist at the Univ. of Colorado. ☆

HAL5 Membership Report

The following is a list of additions to the current paid membership of HAL5, which includes 41 renewals and 14 new members, for a total of 55, plus 5 newsletter subscriptions. Welcome to all our new and renewed members!

- James R. Hopkins (R,C)
- Peder L. Kilness (R)
- George McKay (R)
- Clayton Sawyer, Jr. (R,S)

- (C) - HAL5 Communications Chair
- (R) - Renewed Member
- (S) - HAL5 Secretary

All four are renewing members. This year's 41 renewals is just one shy of last year's record of 42 — and the year is not over yet. If you know of a member who still has not renewed, please remind them for us, and have them contact one of the officers (see page for phone numbers).

Three of the four renewals (James, George, and Clay) are members of the Project HALO team. Clay Sawyer, in particular, has provided a tremendous amount of volunteer labor and donations to the electronics side of Project HALO. Along with his teammates, Gene Young, John Price, and Johnny Jones, Clay built the hardy HALO SL-2 rocket avionics module. That package not only survived a major impact with a steel barge deck; but kept on operating as well. It was checked-out soon after the return to Huntsville as is ready to fly again.

Last year's membership peaked at 82. Although we will not beat that record this year, 55 members is our second highest total in our 13 year history.

HAL5 is still a very strong NSS chapter, and continues to be among the most important chapters in the National Space Society. You should all be proud! ☆

Greg Allison Becomes NSS Director and Officer — Again

(by Ronnie Lajoie, NSS Board of Advisors)

Members of the National Space Society get to vote every two years for who serves on the Board of Directors (BOD). In the last election, Greg Allison was elected to a 4-year term as an at-large member of the BOD. Greg previously held a 2-year term on the BOD as our Region 5 Director. Greg Rucker holds that slot until the year 2000.

Vice-President for Chapter Affairs

The BOD votes for Officers to serve on the NSS Executive Committee. The Officers are usually members of the BOD, but special exceptions can be made. One such exception was almost made for me, who was recently offered the role of Vice-President for Chapter Affairs. The VP for Chapter Affairs is the highest position obtainable by a chapter leader. The VP oversees the work of the Chapters Coordinators. The VP is the only official representative for chapters on the Executive Committee.

I am currently finishing out my second 2-year term as Chair of the NSS Chapters' Assembly. That position is to a union-leader what the VP position is to an upper manager. I believe that the two positions cannot be held by the same person. For this and other reasons (HAL5, work) I declined the offer.

Fortunately, there was another candidate that, certainly in the near term, is the best one for the job — Greg Allison. Greg has proven himself to be a capable leader in many regards. Greg has the vision and the stamina to take chapters where they need to go. In the end, NSS got the best of both worlds, for Greg and I share the same vision for chapters. In a sense, they got a "two-for-one" deal.

Board of Governors to Meet

The NSS Board of Governors (BOG) consists of "very important people" specially researched and selected by NSS Officers. These people are asked to represent the National Space Society in their normal (and sometimes special) dealings with the upper echelons of government, industry, and society.

The BOG meets usually only every two years to review the progress of NSS and to make recommendations for changes (if necessary) in its overall mission and plans. The BOG is scheduled to meet this October 30 in Orlando, Florida. The meeting is tied to the relaunch of Senator John Glenn, the first American astronaut to reach orbit, and a member of the NSS Board of Governors.

HAL5 may have an opportunity to have Project HALO featured as a key example of the types of important work being done by NSS chapters. Our chapter system is one of the few unique things that separate NSS from the growing list of grassroots space societies. As possible, we at HAL5 will use this opportunity to promote Project HALO (and possibly request funding). We will tell you of the outcome of this activity in the next issue. ☆

Special Announcement

HAL5 October Program Night on

“Asteroids and Comets —

Friends or Foes?”

Wednesday, October 28, 7–9 pm

Huntsville Alabama L5 Society
 1019-A Old Monrovia Rd, Suite 168
 Huntsville, AL 35806
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