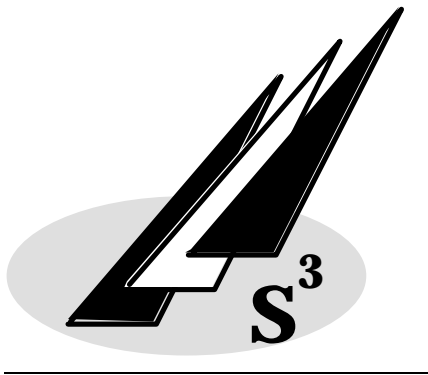


# *Southeastern Space Supporter*

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

Volume 5, Number 5 — September–October 1996



## **FIRST WORD**

### **HAL5 Growing Like Mad! Challenges NSS Chapters to Grow**

(by Gregory Allison, HAL5 President)

When HAL5 started to meet to formulate a chapter in 1983, the primary concern of many of the attendees was that it would never take root in Huntsville. Space was shop and people just wanted to get away from it when their day at work was done.

Today HAL5 is an extremely active organization with over 60 members. I challenge any other chapter of the National Space Society to demonstrate that they have half of the strength and stamina of HAL5! If any chapter can prove me wrong I will happily celebrate with you! We in HAL5 aren't trying to boast, we are just issuing a wake up call! We want challenges from other chapters! Unfortunately, I don't believe any can come close. Every year we grow stronger as many other NSS chapters seem to languish, wondering what to do next. Time has come to put this miserable trend to an end! Wake up chapters! You can grow strong too! HAL5 will be very happy to help you.

(see First Word on page 3)

### **HAL5 Program Night**

Wednesday, September 25, 1996  
7 to 9 p.m. (with social afterwards)  
Huntsville Public Library Auditorium

#### **“Mars as an Abode for Life”**

Guest speaker will be Mr. David Hathaway, a planetary scientist and astronomer with NASA Marshall.

HAL5 & NSS members are encouraged to attend. Open to the public and free.

### **HAL5 Kicks-off “Life in the Universe” Lecture Series**

(by Ronnie Lajoie, SSS Editor)

What an exciting time to be alive! Two very recent, similar yet unconnected, announcements are stirring up lots of conversations among people all over the world. People are finally asking that age-old question again: “Is there life elsewhere in the universe?”

### **Project HALO Main Event**

Sunday, September 22, 1996  
**Weather (no rain or wind) permitting**  
7 a.m. to 3 p.m., at northeast end of the  
Old Huntsville Airport, Airport Road  
**Launch of 19,000 ft<sup>3</sup> Balloon**

Featuring remote testing of gondola electronics and heated nitrous oxide tank. Open to the public and free.

### **(Ancient?) Life on Mars?**

By now you have all probably heard of the announcement that NASA made at a special news conference on August 6. A team of NASA scientists, after spending the last several years studying a meteorite believed to have come from the planet Mars, have concluded that the center of the meteorite *may* hold the fossilized remains of ancient Martian microorganisms. Twenty years after the Viking probe landings, we may finally have hints of life on another planet!

The days following the announcement were filled with special news reports both on television (CNN especially) and in newspapers (including the *Huntsville Times*). Even now, magazines such as our own *Ad Astra* and the Planetary Society's *Planetary Report*, are just being published, which go into more detail on the discovery and what it means for the future of our species.

HAL5 joined in the frenzy, wasting no time to assemble a panel of speakers to speak on the subject at our monthly Program Night on August 28. HAL5's new Vice-President Larry Scarborough and Programming Chairman David Dean, as well as our President Greg Allison, are to be commended for acting fast on this one.

### **New Branch of Life Here on Earth**

Equally as startling, although not as well publicized, was the announcement made by scientists on August 22 that microorganisms found in deep sea thermal vents, volcanoes, and hot springs are *so* different genetically from plants, animals — and even bacteria — that they have been given their own branch of life. This new branch has been named “archaea.” (For details, see the *USA Today* excerpt on page 6.)

The timing of the second announcement could not have been better, for many scientists are now speculating that this “new” branch of life — which seems far older and more primitive than the ones which we are most familiar — may in fact be most similar to life on other planets and moons in our solar system!

The fact that archaea does not need oxygen to live is a major plus for scientists contemplating the oxygen-starved frozen tundra of Mars, the possible liquid water oceans beneath the surface of Jupiter's icy moon Europa, and the possible methane oceans of Titan, Saturn's cloud-shrouded giant moon.

For the first time in over three years, NASA leaders and even the President of the United States are openly discussing robotic, automated sample-return, and even human missions to the planet Mars — all in the very near future!

(see Lecture Series on page 6)

**Huntsville Alabama L5 Society**

President — Gregory Allison  
Day: 971-1041, Eve: 859-5538  
Vice-President — Larry Scarborough  
Day: 881-1944, Eve: 881-4363  
Treasurer — Alfred Wright  
Day: 876-8037, Eve: 420-6273  
Secretary — Ronald Creel  
Day: 881-8016, Eve: 881-8016  
Membership — Philomena Grodzka  
Day: 837-4287, Eve: 536-8638  
Communications — Peter Ewing  
Day: 842-6087, Eve: 536-5571  
Special Projects — Ronnie Lajoie  
Day: 461-3064, Eve: 721-1083  
Programming — David Dean  
Day: 922-4897, Eve: 379-3661

**Southeastern Space Supporter**

Volume 5, Number 5  
September / October 1996

The Southeastern Space Supporter is a bi-monthly 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://iquest.com/~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 35758  
Day phone/message: 205-461-3064  
Night/Weekend phone: 205-721-1083  
FAX number: 205-461-2551  
Electronic mail address: hal5@iquest.com

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

Preferred format for text is ASCII on a diskette or sent by E-Mail. Preferred format for text with graphics is Word on a 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.

**HAL5 Attends Star Trek 30**

(by Ronnie Lajoie, Events Coordinator)

On the weekend of September 7 and 8, HAL5 members attended the Star Trek 30th Anniversary Convention; to work!

After several vain attempts by me and President Greg Allison to secure a HAL5 exhibit booth at the convention, the National Space Society headquarters accidentally came to our rescue.

In one of HQ's many conversations with NASA, the subject of a NASA exhibit for the convention arose, and NASA generously offered the NSS some of their exhibit space. Karen Rugg, HQ's new Director of Communication and Marketing, telephoned me and innocently asked if HAL5 would be interested in manning an NSS booth at the *Star Trek 30* convention.

My jaw dropped for only a second; then I immediately said "Yes, of course!". The details were worked out via a three-way telephone conference between Karen Rugg, NASA Marshall Public Relations Director John Dumoulin, and myself (followed by several two-ways). NASA would provide a 30-inch square table with which HAL5 and NSS would split 50-50 their handout materials.

During setup, NASA increased the size of the our donated table to a full 8-foot

length — and we used every inch of it! They also changed their mind and let us put out the "Opening the Space Frontier" petition. We collected over 350 signatures during the convention!

Although the VBCC and NASA would not permit us to sell NSS or HAL5 memberships or merchandise, we were allowed to recruit by passing out forms, pamphlets, newsletters, and magazines. We were also permitted to hold a free raffle. HAL5 gave away four HALO T-shirts. NSS HQ gave away two "I Want to Go!" T-shirts and two autographed copies of the book *Lost Moon*. Over 800 raffle tickets were collected, which have been set back to NSS HQ.

Winners of *Project HALO* T-Shirts:

1. Crystal Ord of Huntsville, AL
2. John Burley, Jr. of Huntsville, AL
3. Ken Spivey of Marietta, GA
4. Deborah Terrell of Trinity, AL

Winners of NSS *I Want to Go* T-Shirts:

1. Alice Walthall of Tusculumbia, AL
2. Darlene Montgomery, Florence, AL

Winners of Autographed *Lost Moon*:

1. Jonis Cook of Indianapolis, IN
2. Gary Caballero of Madison, AL

I would like to thank the hardworking HAL5 volunteers who made the venture a success: Ron Creel, Larry Scarborough, Greg Allison, Alfred Wright, Peter Ewing, and Tim Pickens. ☆



HAL5 members Ewing, Creel, and Pickens at the NSS booth at Star Trek 30

(First Word, continued from page 1)

The key to HAL5's success is rather quite simple. To survive and grow chapters must devise or adopt projects which the members believe can aid in accomplishing their dreams. These projects must be both visionary and within the realm of what the group can accomplish. Vision and the smell of success are the best recruitment tools mankind has ever known (outside the spheres of greed and fear). The old "Build it and they will come" philosophy holds a lot of truth.

### Projects for NSS Chapters

It is the intent of HAL5 to offer and spread the HALO Achievement program detailed below throughout the NSS chapter system. The projects detailed below can really turn a chapter around! Just look at HAL5!

If these projects do not suite the taste of your chapter, we are willing to assist with our project incubator workshop, The Foundry. For more information check with Foundry Chairman Greg Allison, E-mail: ghallison@aol.com.

### HAL5 Reaches For The Stars!

The last few months have proved to be extremely fruitful for HAL5's High Altitude Lift-Off (HALO) Program. Through a series of proposals and negotiations, HAL5 has made tentative arrangements to secure funding for two more rockoon missions. There are still a few loose strings to tie up and requirements to be met, but the good news is that we appear headed for ever grander missions as detailed below.

### What is HAL5?

Are we a rocket club? If HAL5 is a rocket club one would have to admit that we are one of the strongest in the Southeast. Are we a public forum for space issues and topic of interest? Again, one would have to admit that we are one of the strongest in the Southeast. What we are is an extremely active public grassroots not-for-profit organization dedicated to opening the

space frontier for all those that would and can follow. HAL5 leads the way toward this vision through active demonstration (with the rockoon project) and education.

The latest issues of the *Southeastern Space Supporter* have been directed more toward our hardware activities. All the while HAL5 has been very active on the educational front. The following sections of this article will detail some of the scope of the HAL5 educational programs.

### Education Today

We live in an age of distractions to the educational process. More often than not it seems that the young students are more interested in the trappings of pop culture, such as fashion, music, television programming, and the sway of their peers, than in learning. Far too many are dropping out, falling under the influences of drugs, and joining gangs. Many view the term "Generation X" as referring to a lost generation.

With the prevalent themes of Gloom and Doom so often portrayed for our future, it is no wonder that so many students tune out and fall to the academic wayside. Why would one want to work hard for a future that offers no rewards for the effort? To maintain our economic competitiveness we must turn this around. Else, one has to wonder who will maintain the power plants and keep the planes flying when we grow old?

### HALO Achievement To The Rescue

Concerns for the future of our school children drove HAL5 to develop the HALO Program. It consists of (1) Project HALO which launches student experiments on ground-based rockets, tethered balloons, weather balloons which fly 20 miles high, to the edge of space, and rockoons (rockets launched from high altitude weather balloons) which fly on ballistic trajectories into space; and (2) Project HALO Achievement designed to take space education directly into the classroom.

The HALO Achievement Program is set up like a pyramid. The base is in the lower level grade classroom activities. At the apex of this pyramid is a proverbial "carrot at the end of a stick" designed to lure the students on through the program toward academic excellence. That carrot is the opportunity to fly experiments into space!

Project HALO Achievement, developed along the guide lines of the Junior Achievement Program, is designed to encourage students' academics through building an excitement for space. Like in Junior Achievement, the key to this program is the guest instructor concept. The guest instructor concept brings members of industry, government, and academia into the classroom to enrich the curriculum with real world experience. This program will demonstrate to the students the importance of the fields of science, mathematics, and language arts for the exploration and development of space.

The students will learn many basics of science, about energy, Planet Earth and how it fits into the space environment, how to combine ecology and biology to develop deep space life support systems they will develop a new appreciation for life on Earth and the environment, learn the effects of the space environment, rocketry, aerodynamics, about spaceflight, navigation, communications, psychological and sociological aspects of spaceflight, and about Planet Mars. Most of all, the students will learn that there is hope for the future, that they can make a difference.

All of this is presented at their grade level. To keep the students' interest, the program combines several different formats, including class presentations and field day activities. The key format to build the students' interest and develop teamwork and leadership skills will be team projects. In this hands-on team-oriented approach, students will gain a broad knowledge of science and space while planning space missions.

At the fifth grade level a series of nine sessions will lead the student teams into

planning missions and simple spacecraft system concepts (based on what they learn about the space environment) to send a comic character, Rascal the Rockoon Raccoon, to Mars. Rascal will help us humor the students and keep their interest.

Middle school students will develop their projects to fly on ground-based rockets and high-altitude weather balloons. To coach them in project development we are establishing the Junior Cadet Foundry, which will be modeled on the Foundry project incubator workshop we initiated at the 1993 International Space Development Conference (ISDC). With the Junior Cadet Foundry we will coach the students all the way through the project development phase.

High school students would develop their projects to fly on high-altitude weather balloons, and rockoons. They would participate through the Senior Cadet Foundry. Just imagine high school students flying payloads into space!

Student involvement in this program runs deep. College students from the Students for the Exploration and Development of Space (SEDS) play a key role in the design, testing, and fabrication of the HALO rockoon system. SEDS students are also expected to fly experimental payloads on the rockoon missions into space.

It is planned to have various system components constructed by vocational-technical programs. In short, the HALO Program offers opportunities for hundred of thousands of students to touch space. The availability of these opportunities are up to us. It is only a matter of how much we are willing to assist them.

The fifth/sixth grade program is broken down into nine one hour sessions, of which three are optional. These sessions are listed as follows:

1. Introduction
2. Fundamental characteristics of Space

3. Training/Preparation
4. Planning Rascal's Mission
5. Why We Go To Space
6. Launch Phase
7. Field Day
8. Rascal En Route To Mars
9. Rascal Explores Mars and Returns Home

The students are broken down into six discipline oriented teams to assist Rascal accomplish his mission goal of reaching Mars. Accommodations have been made in these teams for students that have greater interest in the arts and humanities than in the pursuit of technical/scientific interest. Each team is equipped with its own workbook to guide members through the project. The student teams are broken down as follows:

- Spacecraft Structural Design Team
- Navigation and Mission Planning Team
- Communications and Publicity Team
- Raccoon Factors Team
- Energy Production and Management Team
- Environmental Control Team

#### **Status of HALO Achievement 5th Grade Program: Rascal To Mars!**

The fifth grade HALO Achievement Program, which HAL5 began developing in 1988 is now ready for classroom field testing. The student handbooks have already had a successful trial run through the Mountain Gap Elementary School's Science Club.

We now have teachers in three schools who want us to present this program to their classes as a part of our HALO Achievement pilot project curriculum development. HAL5 is now in the process of recruiting a panel of interested volunteers who could provide one or more hours for a pilot implementation of this project into local classrooms. If you or any you know is interested in volunteering, read on.

#### **HALO Achievement Field Day**

The HALO Achievement Field Day program is now two years old. It began with HAL5 donating a 7 foot diameter reusable balloon to the Helping Observe Planet Earth (HOPE), headed by Huntsville City School teacher Susan Cameroon. This project teaches grammar school students about ground truthing aerial and satellite data to learn about earth resources, vegetation, and pollution. HAL5 did not end its participation with the simple donation of a balloon. HAL5 members have actively gone to the schools and participated in the student experiments. HAL5 purchased another 7 foot diameter balloon to serve as backup in these events. The HAL5 HALO balloon has extended the HOPE project to Dalton Georgia.

#### **Edge of Space Balloon Experiments**

HAL5's HALO high altitude balloon experiment program has already conducted five missions to the edge of space twenty miles up into the stratosphere above 99% of the Earth's atmosphere. These flights have included three elementary and middle school high altitude student experiments. Students from the UAH SEDS group were actively involved in the design, contraction, and flight of three of the HALO rocket experiment packages which flew in this flight series.

Our second high altitude balloon launch (launched in March 1995) included a student x-ray film experiment to look at x-ray penetration at 100,000 feet versus ground level.

In March of 1996, the fourth high altitude HALO experiment, conducted at the completion of the first annual HAL5 Race for Space, HAL5 flew corn seed and potato experiments for the 5th grade classroom of Ms. Bridges of Williams Elementary School. A Madison Cross Roads Middle School student flew an experiment of Triop Shrimp eggs.

(see Education on page 7)

**HAL5 CALENDAR OF EVENTS (Post Me!)****September 1996**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
15	16	17 <b>HALO Technical Comm. Meeting</b> Noon at Ponds	18 <b>HALO Balloon Work Party</b> 6 pm at Tim's	19 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	20	21 <b>HALO Balloon Work Party</b> 6 pm at Tim's
22 <b>Project HALO Balloon Launch</b> 7a at Old Airport	23	24 <b>AIAA Space Conf. &amp; Exhibit</b> 5:30 pm at VBCC	25 <b>HAL5 Program Night</b> 7 pm at Library	26 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	27 <b>Big Spring Jam</b> at Big Spring Park near VBCC	28 <b>Big Spring Jam</b> at Big Spring Park near VBCC
29 <b>Big Spring Jam</b> at Big Spring Park near VBCC	30	Project HALO Main Event at Old Airport <b>Launch of 19,000 cu.ft. Balloon with gondola electronics and nitrous tank</b> Sunday, September 22, 7 a.m. to Noon		HAL5 Program Night at Huntsville Public Library <b>"Mars as an Abode for Life"</b> with guest speaker <b>David Hathaway, NASA</b> Wednesday, September 24, 7 to 9 p.m.		

**October 1996**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Project HALO Main Event <b>Static Firing of HALO Rocket Motor to Test Spin-Up Blades</b> Saturday, October 12 in Gurley		1	2 <b>HALO Rocket Work Party</b> 6 pm at Tim's	3 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	4	5
6	7	8	9 <b>HALO Rocket Work Party</b> 6 pm at Tim's	10 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	11 <b>HALO Balloon School Demo</b> 12p at Mt.Gap	12 <b>HALO Rocket Motor Firing</b> 12p at H.Pickens
13 <b>Huntsville Air Show</b> Hsv. Airport	14 Columbus Day	15	16 <b>HALO Rocket Work Party</b> 6 pm at Tim's	17 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	18	19
20	21	22	23 <b>HAL5 Program Night</b> 7 pm at Library	24 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	25	26
27 Daylight Savings Time Ends	28	29	30 <b>HALO Rocket Work Party</b> 6 pm at Tim's	31 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	HAL5 Program Night at Library <b>"Life in the Universe"</b> with speaker <b>Richard Hoover (maybe)</b> Wednesday, October 23, 7 to 9 pm	

**November 1996**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Project HALO Main Event <b>Final Dress Rehearsal via Ground Launch of HALO Rocket to test all Subsystems</b> Sunday, November 3, 10am to 3pm at TBD		Con*Stellation Science Fiction Convention <b>featuring Stanley Schmidt, editor of Analog magazine, science track, &amp; more</b> November 8-10 at Tom Bevill Center, UAH			1	2
3 <b>HALO Rocket Ground Launch</b> 10a - 3p at TBD	4	5 Election Day PLEASE VOTE!	6	7 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	8 Inputs to HAL5 newsletter due	9 <b>Con*Stellation SF convention</b> at Bevill Center
10 <b>Con*Stellation SF convention</b> at Bevill Center	11 Veterans' Day	12	13	14 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	15	16

(Lecture Series, continued from page 1)

HAL5 made its own announcement with a banner article in the Science Times section of the *Huntsville Times* (Monday, August 24). President Greg Allison told editor Martin Burkey about HAL5's new "Life in the Universe" series of lectures, which would allow the general public to hear from local experts and to ask questions and debate.

### HAL5's August 28 Program Night

First in the series was "Life on Mars? How to Answer the Question" which featured local experts from NASA and the space industry. The well publicized event drew a crowd of 40; good, but smaller than expected. HAL5 member Tim Pickens video-recorded the event; interested members should call him at 971-1566 to request a copy of the video.

#### Life on Mars?

Huntsville's NASA Marshall Space Flight Center (MSFC) did not supply any of the scientists who were involved in either research; however, MSFC does have scientists who are knowledgeable about the subject. Among them is Richard Hoover, a proponent of life-bearing comets, and David Hathaway, an astronomer and planetary scientist. They were joined by Mark Wilson, a microbiologist with Boeing.

Mark Wilson first spoke on what is required for microorganisms to live, including water, the right pH (which they can control), nutrients, and a source of energy. He also spoke on the particular compounds found in the Martian meteorite.

Richard Hoover then described the Martian meteorite and claimed that it contains structures similar to anaerobic bacteria on Earth.

David Hathaway talked about the Drake equation and the origin of life. He also showed that the meteorite has the same relative concentrations of gases as the Martian atmosphere, confirming it is from the planet Mars.

### How to Answer the Question

MSFC has been the primary NASA center in studying human trips to Mars. One of its key managers is Alan Adams. One of Alan's key engineers is Ben Donahue, a spacecraft designer and propulsion expert with Boeing.

Alan Adams spoke about NASA's plans for sending humans to Mars. He said that there is interest in moving up the date of the first mission from 2018 to 2009, if the technology can be readied.

Ben Donahue talked about the technical issues of getting to Mars. He described the history of Mars mission planning and showed current spacecraft designs.

### HAL5's September 25 Program Night

Next in the series is "Mars as an Abode for Life" and will feature a return visit from NASA MSFC astronomer David Hathaway. He will go into more detail on the findings of the Martian meteorite, the environment (past and present) of Mars, and the search for life in the universe. All HAL5 members are encouraged to attend, and to bring a friend — or two! ☆

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### Heat-Loving Microorganisms Labeled 3rd Branch of Life

(excerpt from *USA Today*, August 23)

Scientists confirmed Thursday the existence of a third major branch of life — a poorly understood kingdom of microorganisms that constitutes half of all living things on Earth.

Until now, biologists taught that life stems from only two branches: single-celled organisms with a nucleus from which plants and animals evolved; and single-celled organisms with no nucleus from which bacteria evolved.

The third branch is called archaea (which means "ancient" in Greek) and its members include microorganisms that live on deep sea [thermal] vents in

near-boiling waters, inside volcanoes, and in bubbling hot springs. The organisms do not need oxygen or sunlight and thrive on chemicals from the Earth's core.

Confirmation that archaea are a separate branch, reported in today's *Science*, was made by Craig Venter of the Institute for Genomic Research. "Two-thirds of its genes are totally new to science," Venter says. It's the "equivalent of opening a new porthole on Earth and discovering a wholly new view of the universe."

### Deep-Sea Discovery Began the Study

In 1977, Dudley Foster rode the deep-sea submarine Alvin to an underwater volcanic landscape and collected samples from around deep-sea thermal vents that were teeming with a form of life that seems closer to an alien species than anything else on Earth.

Foster returned to the surface with *Methanoccus jannascii* on board. It feeds on carbon dioxide, nitrogen, and hydrogen vented from a volcanic plume on the ocean floor and gives methane gas as waste. It lives in waters as hot as 185°F and at pressures 1½ miles deep.

### Archaea May be Oldest Life on Earth

Carl Woese, University of Illinois, has been studying the genetic structure of *Methanoccus* for 13 years. Two-thirds of the genes bear no resemblance to any known genes. Woese says the coding of *Methanoccus* that is similar to humans and bacteria appears more primitive, suggesting that it may be the oldest form of existing life on Earth. Woese says there are 500 known species of archaea, and that it accounts for about half of the biomass of this planet.

Venter speculates that lifeforms similar to *Methanoccus* and other archaea could exist beneath the surface of Mars or on Jupiter's moon Europa since they require no oxygen or carbon-based foods. "Our understanding of this organism significantly increases the likelihood that life exists on other planets," he says. ☆

(Education, continued from page 4)

### **HALO Balloon Launch 5 (BL-5)**

HAL5 plans to conduct two more high altitude balloon flights before the first rockoon mission. The next mission, HALO BL-5, is slated for Sunday, 22 September at 7:00 AM from the old Huntsville Airport, off Airport Road.

Weather permitting we will launch a huge 19,000 cubic foot clear plastic weather balloon carrying a oxidizer tank thermal maintenance experiment, and a complete balloon gondola avionics experiment. The gondola avionics package will be equipped with a Global Positioning Satellite (GPS) receiver, color video camera, with a live video downlink, a transponder, rocket launch control electronics, radio down link, cold gas jet reaction control system, and recovery systems. This will be a must see flight. Student groups are invited to come and watch this mission.

### **HALO Achievement Ground Based Rocket Flight Experiments HALO Ground Launch 1 (GL-1)**

HAL5 flew its first full scale ground launch of the HALO Phase I rocket, mission number GL-1, near Manchester Tennessee on 13 April 1996. (Phase I is "proof-of-concept"; Phase II is for operational suborbital microgravity missions.) The rocket was estimated to have reached almost 30,000 feet. The rocket produced 340 pounds of thrust and fired for well over 20 seconds. Students from the UAH SEDS organization were intimately involved in the design, testing, and construction of this rocket. It was a hybrid rocket with liquid nitrous oxide as the oxidizer and asphalt as the solid fuel grain.

### **HALO Ground Launch 2 (GL-2)**

HAL5 plans to conduct another ground based flight, HALO GL-2, of its full scale HALO Phase I rocket on 3rd the November. The mass of the rocket will be increased and the oxidizer will be

reduced to keep the maximum altitude below 10,000 feet, to expedite FAA approval. We are looking for student experiments to fly on that mission.

### **HALO Achievement Rockoon Spaceflight Experiments**

HAL5 is now planning three rockoon missions. Most of the funding appears to be near at hand.

### **HALO Space Launch 1 (SL-1)**

The Phase I proof of concept mission, SL-1, is planned before the end of this

### **HAL5 Needs You!**

HAL5 is currently actively engaged in many very important space projects, but we are short-handed — **We Need You!**

The cornerstone of HAL5's activities is Project HALO, which includes both a technical part and an educational part. Both parts need more volunteers.

- To help on HALO rocketry, please call rocket leads Tim Pickens at 971-1566 or Alfred Wright at 420-6273.
- To help on HALO balloons, please call balloon lead Bill Brown at
- To help on HALO gondolas, please call lead Larry Scarborough at 881-4363.
- To help on rocket/gondola electronics, please call Clay Sawyer at
- To help on HALO Achievement, please call Greg Allison at 859-5538.

Members can send E-mail to HAL5 via "hal5@iquest.com" or Fax to 461-2551.

year — the good Lord, weather, and FAA willing. This mission will be spin stabilized and will therefore offer no chance for microgravity experiments; however, small experiments requiring exposure to the space environment would be quite suitable. One might note that America's first satellite, Explorer I was spin stabilized. On board experiments lead Dr. James Van Allen to discover the Van Allen radiation belts. HALO SL-1 is anticipated to reach an altitude exceeding 70 statute miles.

### **HALO Space Launch 2 (SL-2)**

Missions HALO SL-2 and HALO SL-3 will be launched from a barge in international waters in the Gulf of Mexico. Both of these missions are planed to provide microgravity for a few minutes. Each offers excellent opportunities for student payloads. HAL5 has briefed these missions to UAH SEDS and has begun discussing how these flight opportunities can provide validation of experiments slated to fly later on the Space Shuttle Get-Away-Special (GAS) Can missions. HAL5 is also beginning to open dialog with Huntsville City and Madison County Schools for high school experiment proposals.

HALO SL-2 will be cosponsored by the NSS. It will be launched 125 miles due west of Tampa Florida, from a ocean-going barge in the Gulf of Mexico, to put it within the 300 mile range of Orlando for a live launch video downlink to the 1997 International Space Development Conference, the annual meeting of the NSS during Memorial weekend.

This mission will consist of a single stage 350 pound thrust 30 second burn enriched Hydroxyl-Terminated Poly-Butadiene (HTPB) and nitrous oxide hybrid rocket launched from a 146,000 cu. ft. weather balloon at a 100,000 foot altitude. This mission will have active guidance provided and providing microgravity for a five pound payload. The apogee is expected to be about 70 statute miles.

This rocket will have a total weight of about 95 lb. Of this the fuel weight is to be 56.66 lb yielding a dry or post mission weight of about 38 lb. The launch tube and gondola firing electronics will weigh less than 20 lb.

### **HALO Space Launch 3 (SL-3)**

This mission will be launched from a ocean-going barge deep in the Gulf of Mexico, about 200 miles south of New Orleans. This mission will consist of a 1,000 pound thrust 40 second burn

HTPB and nitrous oxide hybrid rocket, launched from a 450,000 cu. ft. weather balloon at a 100,000 foot altitude.

This mission will have active guidance provided and providing microgravity for a five pound payload. The apogee is expected to be about 150 statute miles.

Planned launch date: Mid October 1997

The 1,000 pound thrust 40 second burn HTPB/nitrous oxide hybrid rocket is intended to be the first stage of a two stage rocket. The second stage would be the 350 lb. thrust 30 second duration motor of the HALO SL-2 mission. We intend to fly the two stage configuration in early 1998.

It is imperative that we find the keys to motivate young students to achieve in academic excellence. That is not only the key to maintaining our civilization, but the key to a brighter future. If the young people today do not take up the challenge to achieve who will run the power plants and air traffic control systems in the future?

**VOLUNTEERS REQUESTED**

HAL5 is looking for volunteers to assist with both the technical and educational

aspects of the HALO Program. To learn more call Greg Allison at (205)859-5538 or email at: ghallison@aol.com. To find our HAL5 home page just browse on HAL5.

Steve	Arnold	(R)
Gary	Dion	(N)
David	Yeoman	(N)
Chris	Grossaint	(S)

**FINAL WORD**

May you not lie one day in a nursing home, freezing, hoping an airplane will not crash through your roof! Help us inspire a new future. Then you can witness our descendants building cities in space, and know you helped make it happen! The key to our collective futures lies in our children.

Upstra! ☆

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**Record HAL5 Membership Continues into September!**

(by Alfred Wright, HAL5 Treasurer)

As of September 16, we now stand at 62, plus 4 newsletter subscriptions. The following is a list of additions to the current paid membership of HAL5, which includes 32 renewals and 24 new members, for a total of 62. Also shown is a new subscriber to our newsletter. Welcome to all our new and renewed members and subscribers!

(N) - New Member  
 (R) - Renewed Member  
 (S) - Newsletter Subscriber

HAL5 welcomes back its previous members Charles (Ted) Paludan, Steve Mustaikis, who recently took a job with Lockheed's rocket team, and recipient of the first NSS Wernher von Braun Award, presented at the 1993 ISDC.

HAL5 also welcomes its new members. Franz Gisin (from Idaho), Keith Murdock Jernigan hails from Arab, Alabama; and David Robinson from Fultondale, near Birmingham. Gary Dion is a student at Mississippi State University working the summer at NASA Marshall.nd years. ☆  
 1, 1997.

<p><b><u>Special Announcements</u></b></p> <p><b>Project HALO Balloon Launch</b>  <b>Sun., Sep. 22, 7 am at Old Airport</b></p> <hr/> <p><b>Program "Mars as Abode for Life"</b>  <b>Wed., Sep. 25, 7 pm at Hsv. Library</b></p>
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**Huntsville Alabama L5 Society**  
 1019-A Old Monrovia Rd, Suite 168  
 Huntsville, AL 35806  
 ADDRESS CORRECTION REQUESTED

<p>Place              First Class              Stamp              Here</p>
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