



Southeastern Space Supporter

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

Volume 6, Number 1 — January–February 1997

FIRST WORD

The Time Has Come for Action

(by Ronnie Lajoie, SSS Editor)

Before you start suspecting it, let me just come flat out and say it. Yes, this special issue of the *Southeastern Space Supporter* is not just an annual renewal issue — but also an advertisement and sales pitch for both the Huntsville Alabama L5 Society (HAL5) and its parent organization, the National Space Society (NSS).

In plain simple terms, HAL5 and the NSS need your time and your money — as much as you can give. Why? Because we, my friends, have reached a turning point in space history. Yes, this year, 1997, the human race is finally on the verge of a revolution in space exploration and development! And the time has come for **YOU** to be part of it!

A New Space Age is Dawning

The age of space access transportation provided only by giant aerospace corporations is over. The new age of private and amateur access to space will finally begin this year, in 1997!

HAL5 Program Night

Wednesday, January 22, 1997
7 to 8:30 p.m. (with social afterwards)
Huntsville Public Library Auditorium

“Microbial Life in the Universe”

Guest speaker will be Dr. Richard Hoover of the NASA Marshall Space Flight Center.

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

The age of solely government-sponsored space exploration missions is over. The new age of space prospecting for future space industrialization and colonization will finally begin this year, in 1997!

The age of manned spaceflight with only government-trained astronauts is over. The new age of privately-funded space expeditions and space tourism has begun, and could make its biggest gains (or setbacks) this year, in 1997!

It is time to rock the space boat, and all hands on deck are needed — including **YOURS!**

About this Special Issue

In this special issue, I will describe the many aspects of this new revolution, the organizations and individuals who are working very hard to make a difference, and where **YOU** can help ensure success. Not for just HAL5, or even for just the NSS and its chapters — but the entire grassroots space movement. The time has come for coordinated action!

In this issue, I hope to convince you to join or renew your membership to HAL5, to donate to HAL5 and HALO, to join NSS (if you are not currently a member), to subscribe to additional NSS publications, and to donate all or part of a HAL5 newsletter subscription to a college or school in your area (especially if you live in the South).

In this issue, I will describe the past, present, and future of HAL5 and its history-making Project HALO, will list the benefits of membership to HAL5, and describe the HAL5 donation program. I will also describe the major current activities of the NSS and its chapters, will list the benefits of membership to the NSS, and describe its many publications. Please read on! ☆

About HAL5

HAL5 was formed in 1983 and incorporated in 1984 as a not-for-profit 501(c)(3), grassroots, space educational and advocacy organization. HAL5 members share the enthusiasm that space development can stimulate our world with immeasurable benefits in the areas of education, energy, environment, industry, resources, and — ultimately — room to grow for our society.

HAL5 members believe that by educating and working with the public, the government, and private industry, we can speed up the date when routine, safe, and **affordable** space travel is available to **anyone** who wants to go.

HAL5's Educational Activities

Over the past 13 years, HAL5 has sponsored numerous educational projects and activities in Huntsville. It has hosted a continuing series of public lectures, forums, and events on space-related topics. (Please see box at left for this month's space topic). For years, HAL5 has also coordinated or provided space lectures for Huntsville's annual science fiction convention. HAL5 is devoted to speeding the transition of science fiction into science fact.

Four years ago, HAL5 hosted the 1993 International Space Development Conference (ISDC), the 12th annual conference of the NSS, and of one of its most successful. Over 700 space enthusiasts from Huntsville and around the nation and the world gathered at the Hilton to hear over 120 speakers lecture and debate on the benefits of space and on what it will take to get there.

In 1987, HAL5 supported a local grade school's "Get-Away-Special Canister"

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 — David Hewitt
Day: 430-2767, Eve: 430-2767

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

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January / February 1997

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
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.

project. In 1993, HAL5 hosted a highly successful "Junior Cadet Program" as part of the 1993 ISDC. Early in 1995, HAL5 purchased and donated a reusable tethered balloon to the Huntsville elementary school system. HAL5 has sponsored "Space Week" activities on numerous occasions, including this past March. HAL5 has also created a pilot program, called HALO Achievement (see right), designed to take space and science education into the grade-school classroom in the same manner as Junior Achievement does for business. In 1997, HAL5 plans to demonstrate this program at several schools.

As a space advocacy group, HAL5 has hosted events to build non-partisan political support for space. Many HAL5 members participate in letter writing campaigns to alert our governmental representatives of our interest in space. HAL5 hosts lectures designed to call the public attention to space-related issues and to urge them to contact their elected officials. HAL5 also distributes petitions and surveys on space exploration, development, and tourism.

In 1994, HAL5 began its biggest project ever, Project HALO (for "High-Altitude Lift-Off"). The goals of the project are no less than to provide cheap access to space for small clubs and student groups. This year, in 1997, HAL5 will construct its own hybrid rocket (fueled by only asphalt and laughing gas!) and will launch it into space from a high altitude balloon floating 20 miles up! (See article on page 3 for more details.)

Above all, HAL5 has pledged to keep Huntsville and its neighbors informed of the positive benefits of space research and development, whether by NASA, other governments, or private industry. HAL5 has also pledged to alert Huntsville and vicinity during the times for action, whenever letters, calls, and petitions can improve our chances for becoming a spacefaring civilization. And lastly, via Project HALO, HAL5 has pledged to lead the way in showing the public, the government, and private industry that cheap access to space can indeed be made a reality! ☆

HALO Achievement

This is HAL5's flag-ship educational project for Project HALO. The HALO Education Committee has developed a draft of the HALO Achievement pilot program, which seeks to educate kids in the class room on space science topics modeled after the Junior Achievement approach. In this hands-on team oriented approach, students will gain a broad knowledge of space while planning space missions.

At the fifth grade level, a series of nine sessions will lead the students into planning to send a cartoon character, Rascal the Rockoon Raccoon, to Mars.

Middle school students will develop their projects to fly on ground based rockets and high-altitude weather balloons. To coach them in project development, HAL5 will establish the Junior Cadet Foundry, which will be modeled on the Foundry project incubator workshop we initiated at the 1993 ISDC. With the Junior Cadet Foundry, we will coach the students all the way through the project development phase.

High school students will develop their projects to fly on high-altitude balloons and/or rockoons. They will participate through the Senior Cadet Foundry.

Where We Stand

The HALO Education Committee meets every Monday from 6 to 8 p.m. at the HATS Office (205-837-4287). We are currently adding graphics to our draft Rascal Mars Mission charts and practicing sessions in preparation for teaching at several elementary schools in the Huntsville/Madison County area.

Where YOU Can Help

We need help in converting the text-based charts into something 5th graders will appreciate. We need volunteers who like to work with students. We also need help raising enough money to make this a national educational program. Please contact Committee Chair Greg Allison at 205-859-5538 for details. ☆

HAL5's Project HALO

Project HALO, for "High Altitude Lift-Off", was conceived to explore the scientific and economic potential of using high altitude balloons as launch platforms for rockets. This concept, known as a "rockoon", was first used by Dr. James Van Allen in the 1950's to conduct pioneering studies of the upper atmosphere. Once large enough ground-launched rockets became available, the rockoon concept was abandoned.

HAL5 thus started Project HALO as a means to use today's better balloon and small hybrid rocket technology to push the rockoon concept to its full potential as an economical means of reaching extremely high altitudes — even space!

HAL5's Goals for Project HALO

By using volunteer labor and no funds from government nor the aerospace industry, HAL5 hopes to make space history this year, in 1997, by sending the first amateur rocket (and the first hybrid rocket ever) into space; that is, achieve an altitude of at least 50 nautical miles.

Aside from parachute and altitude-verification electronics (including a television camera), the only "payload" aboard the rocket will be a set of **HAL5 membership cards — so join now!**

It is our hope that Project HALO will demonstrate that extreme altitudes are reachable and affordable by amateurs; that by pushing rockoon technology to its limits, we will inspire ourselves, others, and those who participate with us — as either student experimenters, scientific researchers, or commercial developers — to push us all to reach even higher, faster, better, and cheaper!

Project HALO Phases

Project HALO will consist of several distinct steps, each of which in itself will provide opportunities for HAL5 to build the managerial and technical skills and resources to proceed to the next step. Each step will also provide unique opportunities for student involvement,

original space research at the edge-of-space, and perhaps suggest commercial uses of rockoons.

Phase 0: Balloon tests of rocket subsystems to altitudes of 20 miles.

Phase 1: Rockoon Proof-of-Concept: Rockets launched from balloons.

Phase 2: Operational hybrid rockoons providing cheap access to space.

Where We Stand

Project HALO was started in July 1994. Phase 0 began soon after and was completed in February 1996. At this moment, we are now nearing the end of Phase 1. The proof-of-concept rockoon flight is scheduled for February 22 and is currently awaiting FAA approval.

Hybrid Rocket Motor Status

For safety reasons, Project HALO is using a hybrid rocket motor, which combines a solid fuel grain with a liquid oxidizer. The fuel we are using is asphalt — better known as street tar! The oxidizer we are using is nitrous oxide — better known as laughing gas!

During the course of Phase 0, members of the HALO Propulsion Team, lead by Timothy Pickens, developed a hybrid rocket motor that successfully achieved 340 pounds of thrust. The motor has a specific impulse (pounds-of-thrust per pounds-of-fuel-flowed) of 220 seconds.

The culmination of Phase 0 activity occurred on February 17, 1996, when the flight-ready motor fired flawlessly at the volunteer-created HALO Rocket Motor Test Facility in north Alabama.

The first major Phase 1 activity occurred on April 13, 1996, when a test rocket using the flight-ready motor was successfully launched from the ground in Manchester, Tennessee. A prism-shaped launch gondola successfully guided the finned rocket into a vertical trajectory that sent the rocket over 20,000 feet up. (It landed less than a mile away.) This same rocket, launched from a high altitude weather balloon at 100,000 feet

(above 99 percent of the atmosphere), could have reached space!

Balloon Launch Systems Status

During the course of Phase 0, members of the HALO Balloon Team, lead by Bill Brown, successfully flew four high altitude latex weather balloons to the edge of space (near 100,000 ft). Three carried HAM radio electronics, which transmitted live color video back to the ground. Two balloons carried parts for testing rocket subsystems under extreme cold and near-vacuum conditions.

The first balloon-related Phase 1 activity occurred on September 22, 1996, when the Balloon Team successfully launched its first large polyethylene balloon. Carried aloft was an electronic package that included a GPS receiver, and an insulated canister with an filled oxidizer tank inside (it successfully kept warm).

The culmination of Phase 1 activity will hopefully occur on February 22, 1997 (FAA and weather permitting), when the flight-ready rocket will be carried aloft by an even larger polyethylene balloon from the coast of North Carolina to about 90,000 feet. From there, we hope to launch the first amateur rocket into space — and the first hybrid rocket ever!

How YOU Can Help

We need help finalizing the rocket and making others. Experience with CAD or machine shop tools (such as a lathe) is desired, but not required. Please contact Propulsion Team Lead Tim Pickens at 205-971-1566 for more details.

We need help finalizing the electronics for both the rocket and the balloon gondola. Experience with HAM radio equipment or circuit-board electronics is desired. Please contact Electronics Lead Clay Sawyer at 205-539-3889 or Greg Allison at 205-859-5538 for details.

Lastly, we also need help raising enough money to pay for this first launch and help pay for others to follow. Please mark your donation on the enclosed HAL5 Membership Renewal Form. ☆

HAL5 Membership Benefits

Why should you renew your HAL5 membership, or join for the first time? This is a very good question, especially in these tough economic times. In this article, I intend to convince you that you will get a lot of benefits for your membership dues.

Direct Benefits of HAL5 Membership

If you are employed between the ages of 22 and 64, membership to HAL5 costs \$20 per year. If you are under age 22, over age 64, retired (over age 55), or otherwise unemployed, membership costs only \$10 per year. What do you get for your money?

Much of your dues covers your subscription to the 8-12 page bi-monthly newsletter, the *Southeastern Space Supporter*, which costs about \$10 annually per person. HAL5 also offers an option to just subscribe to the newsletter for \$10 — this may be better for those of you who are employed but not living in the north Alabama region.

The next part of your dues covers your “space-qualified” membership card. Each card will be flown aboard a Project HALO rocket or high-altitude balloon. This year is especially exciting in that your card will be flown aboard the **first** (hopefully) amateur-built rocket ever to reach space (an altitude over 50 nautical miles) — as long as weight and volume permit. In case we lose the rocket, a duplicate set of membership cards will be flown aboard the balloon gondola, which is expected to reach 90,000 feet — 3 times higher than you normally fly in a commercial jet!

Another part of your dues covers your notices of HAL5 hosted or recommended programming activities. Flyers announcing space-related programs and conferences will be periodically inserted into your newsletter. At other times, postcard announcements will be mailed directly to you. If time is short, we may telephone you and/or send you E-mail. As long as you are interested, HAL5 will keep you informed of upcoming space-

related events in Huntsville and vicinity, as well as those times for action when space policy issues arise.

Discounts for HAL5 Members

HAL5 members will receive discounted prices on all HAL5 merchandise. Currently, we are selling Project HALO T-shirts at \$10 for members, and \$12 for non-members (plus \$3 shipping and handling where necessary). There is a plan afoot to offer these items for sale over the Internet via the World Wide Web — so order yours now while supplies last! Please mark your size and delivery option on the enclosed HAL5 Membership Renewal Form.

HAL5 members will receive discounted rates to all HAL5-sponsored events and conferences for which there is an entrance fee. HAL5 officers still hope to host a regional NSS conference to be held later this year — if we can get enough volunteer support!

HATS Services for HAL5 Members

One of the major benefits of being a HAL5 member is having access to the services of the Huntsville Association of Technical Societies (HATS).

HATS is a non-profit 501(c)(3) association of Huntsville area technical and professional societies dedicated to the advancement of science and engineering, and hosts the annual TABES (May) and STEDTrain (August) industrial and educational conferences.

HATS runs a Job Seeking and Referral Program (JSARP) which sends member resumes out to all of its technical societies. Craig Presson, a former HAL5 Vice-President, found a job via JSARP. If you need a job, this may be your best benefit yet!

Job Assistance and Referral Program

As a professional courtesy to members of HATS organizations, HATS puts their resumes on file at the HATS office. These resumes are available, at no charge, for review by employers.

The process begins when employers provide HATS with a list of keywords that describe the position they wish to fill. A computerized keyword search is conducted on the actual text of each resume on file. The resumes which reflect at least some of the keywords will then be faxed to the employer.

Keywords can be job titles, programming languages, software packages, college degrees, hardware, operating systems, or any other words pertinent to position you seek. If you need a job, or a better one, I urge you to submit your resume to the HATS JSARP program immediately. Your career, and your sanity, is at stake!

But, Who Pays for Project HALO?

Not one penny of your membership dues funds Project HALO. So where does it get its money. The initial funding for HALO came from HAL5's share of the net revenue of the 1993 ISDC. As of today, all of this money has been spent. Additional financial support has come from donations of dollars (from HAL5 members) and surplus equipment and parts (mostly from local companies). See article on page 6 for details.

By far the greatest asset to Project HALO, as was for the 1993 ISDC before it, is the small group of highly dedicated HAL5 and SEDS volunteers who are working long hours to help bring about personal access to space.

Once we have a successful flight under our belt, HAL5 will be seeking funding from a variety of sources. With adequate resources, Project HALO could help spawn a whole new industry!

It's Decision Time

I hope I have convinced you that you get a lot for your money. If you can spare the price of a movie video, it's time for you to rejoin or join HAL5! Please complete the enclosed HAL5 Membership Renewal Form and mail it, any other completed forms, and your check in the enclosed self-addressed stamped envelope. Thank You! ☆

HAL5 CALENDAR OF MEETINGS AND EVENTS

January 1997

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Project HALO Main Event — Balloon Test Day #5 Final test of HALO rocket electronics on-board a high-altitude balloon in preparation for space launch on February 22 (pending FAA approval) 9a – 2p, Saturday, January 25 in Mississippi (south of Memphis, TN)				16 HAL5 Executive Comm. Meeting Noon at Ponds	17	18 NASFA Program Elastic Universe 6p at TBE Bldg 1
19	20 Education Team Meeting 6 pm at HATS	21 Project HALO Tech. Meeting Noon at Ponds	22 HAL5 Program “Life in Universe” 7 pm at Library	23 HAL5 Executive Comm. Meeting Noon at Ponds	24 Voyager 2 at Uranus, 1986	25 Project HALO Balloon Launch from Mississippi
26	27 Education Team Meeting 6 pm at HATS	28 Project HALO Tech. Meeting Noon at Ponds	29 HALO Rocket Work Party 6 pm at Tim’s	30 HAL5 Executive Comm. Meeting Noon at Ponds	31 Explorer 1 launched, 1958	February 1

February 1997

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2 Ground Hog Day	3 Education Team Meeting 6 pm at HATS	4 Project HALO Tech. Meeting Noon at Ponds	5 HALO Rocket Work Party 6 pm at Tim’s	6 HAL5 Executive Comm. Meeting Noon at Ponds	7 First untethered spacewalk, 1984	8
9	10 Education Team Meeting 6 pm at HATS	11 Project HALO Tech. Meeting Noon at Ponds	12 HALO Rocket Work Party 6 pm at Tim’s	13 HAL5 Executive Comm. Meeting Noon at Ponds	14 St. Valentine’s Day	15
16	17 Education Team Meeting 6 pm at HATS	18 Project HALO Tech. Meeting Noon at Ponds	19 HALO Rocket Work Party 6 pm at Tim’s	20 HAL5 Executive Comm. Meeting Noon at Ponds	21	22 Project HALO Space Launch North Carolina
23 UAH SEDS Space Week Begins	24 Education Team Meeting 6 pm at HATS	25 Project HALO Tech. Meeting Noon at Ponds	26 HAL5 Program Night 7pm at Library	27 HAL5 Executive Comm. Meeting Noon at Ponds	28	March 1 UAH SEDS Space Week Ends

March 1997

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2 Alabama Aerospace Week Begins	3 Education Team Meeting 6 pm at HATS	4 Project HALO Tech. Meeting Noon at Ponds	5 HALO Rocket Work Party 6 pm at Tim’s	6 HAL5 Executive Comm. Meeting Noon at Ponds	7	8 Alabama Aerospace Week Ends
9	10 Education Team Meeting 6 pm at HATS	11 Project HALO Tech. Meeting Noon at Ponds	12 HALO Rocket Work Party 6 pm at Tim’s	13 HAL5 Executive Comm. Meeting Noon at Ponds	14	15
16 Goddard flies first liquid-fuel rocket, 1926	17 Education Team Meeting 6 pm at HATS	18 Project HALO Tech. Meeting Noon at Ponds	19 HALO Rocket Work Party 6 pm at Tim’s	20 HAL5 Executive Comm. Meeting Noon at Ponds	21	22
23 Palm Sunday	24 Education Team Meeting 6 pm at HATS	25 Project HALO Tech. Meeting Noon at Ponds	26 HAL5 Program Night 7pm at Library	27 HAL5 Executive Comm. Meeting Noon at Ponds	28 Good Friday	29 Mariner 10, first flyby of Mercury, 1974

The HAL5 Donation Program

As the previous articles indicate, HAL5 is involved in a lot of activities. Any time you can donate to assist in these activities is very much appreciated! To those that are currently doing so — thank you, Thank You, **THANK YOU!**

If you cannot donate your time, however (and we do understand the limits placed on all of our members' free time) — and even if you can — please consider making a donation of money and/or equipment to HAL5 or Project HALO.

Up to now, Project HALO has been funded from HAL5's share of the net revenue of the 1993 ISDC. These funds have now been all spent. Additional funds have come via monetary donations from individual HAL5 members (see list to right) — and we thank all of you! HAL5 has also received donations of surplus test equipment and support for last year's "Race for Space" from local companies — and we thank you too!

From a history-making standpoint, it is very important for the first flight of the HALO rocket into space (SL-1) to be a totally amateur effort — having neither funds nor rocket parts donated from NASA or the aerospace industry. Thus far, we have been highly successful in this regard. Only in this way, can we prove to the world that such a flight is feasible without government or industry support. Only in this way can our rocket find a honored place in the Air & Space Museum in Washington D.C., possibly alongside Robert Goddard's first rocket!

We Do Need YOUR Support Though

Your donation made to "HAL5 Project HALO" will allow us to launch SL-1 and complete Phase 1 (Rockoon Proof-of-Concept) on schedule; then proceed on to Phase 2 (Operational Rockoons), when we can start launching student and amateur space experiments.

If you desire, you may earmark your donation for either the "Technical" or more "Educational" (i.e., HALO Achievement) parts of Project HALO.

Other activities of HAL5 are funded from the HAL5 account, as long as there are adequate funds. Your donation to "HAL5" will allow us to host more ambitious monthly programs, advertise our activities and promote our cause more effectively, and initiate new HAL5 projects. If desired, you may earmark your donation for HAL5 "Programs", "Advocacy", or "Projects".

Donor Status will be Cumulative

Your status as a HAL5 or HALO donor will be cumulative. We at HAL5 believe that you are equally generous whether you make one big donation or many little ones over the years. Thus, your total contribution to HAL5, or to HALO, is used to determine your donor status. Tables 1 and 2 summarize the cumulative donation requirements for each donor level. Note that Corporate donor levels are purposefully set to ten times that of individual donor levels.

Table 1. Individual Donor Levels

Donor Level	Total Contribution
Donor	\$ 0 – \$ 49
Contributor	\$ 50 – \$ 99
Supporter	\$ 100 – \$ 249
Provider	\$ 250 – \$ 499
Guarantor	\$ 500 – \$ 749
Patron	\$ 750 – \$ 999
Sponsor	\$ 1,000 – \$ 1,499
Benefactor	\$ 1,500 – \$ 1,999
Bestower	> \$ 2,000

Table 2. Corporate Donor Levels

Donor Level	Total Contribution
Donor	\$ 0 – \$ 499
Contributor	\$ 500 – \$ 999
Supporter	\$ 1,000 – \$ 2,499
Provider	\$ 2,500 – \$ 4,999
Guarantor	\$ 5,000 – \$ 7,499
Patron	\$ 7,500 – \$ 9,999
Sponsor	\$ 10,000 – \$14,999
Benefactor	\$ 15,000 – \$19,999
Bestower	> \$ 20,000

Donors to HAL5 and Project HALO

Since 1989, the following donations have been made to HAL5, its 1993 ISDC, and its Project HALO. (Prior donations are still being researched.)

Individual donors to HAL5:

- Robert Ehresman — Provider
- Ronnie Lajoie — Supporter
- Alfred Wright — Contributor
- Peter Ewing — Donor
- David Smitherman — Donor
- Ed Stluka — Donor (in memorial)
- James Hopkins — Donor
- Ethan Scarl — Donor
- David Schultz — Donor

Corporate donors to HAL5 (6 to ISDC):

- The Boeing Company — Supporter
- Teledyne Brown — Supporter
- Thiokol Corporation — Supporter
- GenCorp Aerojet — Supporter
- Grumman Corporation — Supporter
- McDonnell Douglas — Supporter
- Alpine Cleaning Systems — Donor

Individual donors to Project HALO:

- Timothy Pickens — Bestower
- Ronnie Lajoie — Sponsor
- Larry Scarborough — Provider
- Peter Ewing — Supporter
- Rick Kauffman — Supporter
- Ethan Scarl — Contributor
- Steve Arnold — Donor
- Julian Campbell — Donor
- Ray Moses — Donor
- Richard Braastad — Donor
- John Pavlick — Donor

Corporate donors to Project HALO:

- HATS organization — Supporter
- MHC&S Load Cell — Donor
- The Boeing Company — Donor
- McDonnell Douglas — Donor
- Toroid Corporation — Donor
- Wyle Laboratories — Donor
- Thiokol Corporation — Donor

Please donate whatever amount you can to HAL5 and/or Project HALO. This is the year we need your financial support the most. This is the year we can make real space history — especially with Project HALO and HALO Achievement. It's for a good cause — Space for us all — in our lifetimes! Ad Astra! ☆

About National Space Society

The National Space Society (NSS) is a grassroots organization of over 27,000 members and 80 chapters in the United States, Canada, Mexico, Australia and the United Kingdom. NSS publishes the bimonthly *Ad Astra* magazine, and co-sponsors the annual International Space Development Conference (hosted by the Orlando, Florida chapter in May 1997).

If there was ever a time to be a member of the NSS, this is it. The NSS is now a major voice in the inner circles of space politics — and the more members we have the louder that voice.

This year, 1997, the United States will hold a space summit to decide the future of our national space program. If you have ever dreamed of personally going into, perhaps living in, outer space — this is your chance, via NSS, to make your desires known to the people who can grant them — or forbid them.

This year, 1997, will see four NASA space probes out prospecting the planets and asteroids for resources for future space colonists — at least, that is the message we in the NSS want to convey to the world. When Lunar Prospector arrives at the Moon — we want people to know it is looking for materials for future colonization. When Mars Pathfinder lands on Mars and releases the rover Sojourner — we want people to know they are examining Martian in-situ resources. When Mars Surveyor enters orbit about Mars — we want people to know it is looking for good landing sites. When the NEAR probe passes by an asteroid — we want people to know it is looking for mineral wealth.

This year, 1997, the world will be looking up again and again. NSS provides the vision for people to look up with hope rather than dread. NSS needs your membership now more than ever, to carry our vision of a hopeful future to the very pinnacles of world government. The time has finally come for us to claim the universe for ourselves and for our children — before someone else has it turned into a galactic preserve! ☆

Benefits of NSS Membership

As a NSS member, you will be entitled to a wide range of benefits, including:

- ◆ *Ad Astra*, the bi-monthly magazine of the NSS. Each brilliantly illustrated issue contains more than 60 pages full of articles and visions of our exciting future in outer space; plus the latest information on what NASA, the space industry, and the NSS are doing to make it happen.
- ◆ Member-only discounts on NSS-sponsored regional and national space conferences and on a wide and intriguing array of space-related books, merchandise and memorabilia.
- ◆ Low-price rates on a subscription to *Inside NSS*, the monthly newsletter for NSS chapters and space activists; and on a membership to Spacecause, the space activist arm of the National Space Society.
- ◆ *NSS in Cyberspace!* Via the Internet, we will keep you informed on many upcoming activities on both our Web site (<http://www.nss.org/>) and our Space Exploration Online on America Online (keyword:Space), including conversations with current and former astronauts, NASA officials, space entrepreneurs and visionaries, free software downloads and more.

Most importantly, as a member of NSS, you will have a more powerful voice in space policymaking. NSS is the most respected citizen's activist organization on space in Washington. Our strength, however, comes from the active participation of our members. Their opinions on critical issues impacting space exploration and development will be solicited and promptly conveyed to those who care and do make a difference.

Please join the NSS by completing the enclosed NSS Membership form. A NSS brochure is also enclosed. Do NOT fill out the brochure's form, especially if you are joining HAL5 too. HAL5 members get a \$5.00 instant rebate (discount) for joining NSS via HAL5. If you are already an NSS member, please sign up a friend. ☆

Other NSS Publications

If there was ever a time to subscribe to other NSS publications, this is it. This year, 1997, will be a very active one for the NSS and its chapters. In addition to *Ad Astra*, the NSS publishes a free monthly electronic newsletter called *SpaceViews*, which is available over the Internet. To subscribe, send the E-mail message "subscribe" to this address:

spaceviews-request@world.std.com

NSS also publishes a 16-page monthly paper newsletter called *Inside NSS*. *Inside NSS* is the fiber that binds together all the far-flung segments of the NSS, HQ-to-chapters, chapters-to-HQ, and chapters-to-chapters around the country and around the world.

Inside NSS is dedicated to providing NSS' most active members with current, factual and full (as much as space permits) information about the actions officially taken or not taken by NSS leaders and staff.

Being part of the information flow should help members (a) feel a more integral part of the organization, (b) have a better feel for which leaders are doing (or not doing) what, (c) be aware of all the different things involved in running NSS, so that they are better prepared to make suggestions and assume leadership at both the national and local levels, and (d) realize that they, too, have good ideas and, in fact, might even be able to improve on current leadership.

Inside NSS allows chapters doing interesting things to (a) pass the info along to others, so they can try them in their own regions without having to re-invent wheels, and (b) enable members to begin recognizing which NSS members in other parts of the country are actually doing things.

Inside NSS reminds members that they are not alone out there in thinking space IS important to our future. To subscribe to *Inside NSS*, please check the appropriate box on the enclosed NSS Membership Form. ☆

Moon Miners' Manifesto

If there was ever a time to subscribe to *Moon Miners' Manifesto (MMM)*, this is it. This year, 1997, and next will be very active ones for the Lunar Reclamation Society, which produces *MMM*. They are the host of the 1998 ISDC to be held during Memorial Day weekend in Milwaukee, Wisconsin. The theme is "Space: Under Development".

MMM is published monthly, except for January and August, when the sister newsletter, the *Moon Miners' Review (MMR)*, is published instead. *MMM* contains over 20 pages of articles devoted to concepts for colonization of the Moon and utilization of lunar resources, mostly by editor Peter Kokh (also Chairman of the 1998 ISDC).

If you ever dreamed of living on the Moon — or just visiting — *MMM* is the newsletter for you. Where else can you read about the emotional impacts of living inside a lunar lavatube?

MMM also contains the monthly newsletter of the Artemis Society, called *Pleiades*. Artemis is the only grassroots organization in the world actively working towards sending its own privately-funded manned space habitat to the Moon.

One low subscription rate of \$15 gets you all this information! To subscribe to *Moon Miners' Manifesto / Pleiades*, please check the appropriate box on the enclosed NSS Membership Form. ☆

The "NSS Visions" Slide Set

NSS's "Campaign to Open the Space Frontier" was launched by NSS Executive Committee Chairman Robert Zubrin at the 1996 ISDC in New York City with presentations of the slide show that is the center of the campaign.

The 26-slide show, conceptualized and designed by Zubrin, is intended for use by activists, chapters, and educators to conduct a series of public outreach events. The slides contain a visual chronology of space history and its hopeful future, from the Moon speech of President John F. Kennedy to the establishment of human colonies on the outer planets and among the asteroids.

At the 1996 ISDC, Karen Mermel made a brief presentation on her plans to put the NSS slide show on CD-ROM for use on home computers. More on this subject later as this project develops.

Copies of Slide Show Available

Members can order the Slide Show from NSS HQ for \$25 a set; \$15 each for bulk orders (over 10 sets). HAL5 will be bulk ordering sets of slides once we have 11 requests (or close to it).

To order via HAL5, please mail the completed "NSS Slide Show" form (back of NSS Membership Form) to HAL5 in the enclosed SASE, or call Ron Lajoie at 461-3064 to request a set; he will compile them and send our combined request to NSS HQ. ☆

LAST WORD**Dawn of the New Space Age**

If there was ever a time to be a member of HAL5, this is it. This year, 1997, will be the year we make space history. This year, we will definitely carry an amateur hybrid rocket aboard a high altitude balloon and launch it into space!

This year, 1997, we will open the door to a whole new market — low-cost access to space for individual and student payloads. This year, 1997, we will demonstrate HALO Achievement in several elementary schools in the Huntsville/Madison County area.

To ensure the success of all of this, we need your membership to HAL5 and your generous donations to Project HALO and HALO Achievement. Please join or renew and donate as much as you can. Anything is very much appreciated.

HAL5 also needs your body and mind as well. Please donate your time and ideas as you can. If you are good with tools, computers, artwork, students, or even just a telephone — we can use you!

The current members of the HALO team have donated an enormous number of volunteer hours — and all their efforts are very much appreciated. Whether you are part of HAL5 or not, you should be extremely proud and thankful to these people who are working so hard to open the space frontier in our lifetimes. Ad Astra per Ardua and HALO! ☆

Special Announcement**Time to Renew Your Membership****HAL5 Program Night on****"Microbial Life in the Universe"****Wednesday, January 22, 7–9 pm****HATS / HAL5**

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