

Southeastern Space Supporter

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

Volume 7, Number 3 — May–June 1998

FIRST WORD

First SL-2 Attempt Has Mishap

(by Ronnie Lajoie, HALO member)

A mishap during the first launch attempt for the Project HALO Sky Launch 2 (SL-2) rockoon mission sent the balloon to 100,000 feet carrying the gondola with damaged antennas — but no rocket.

During the balloon launch, the balloon rose vertically and did not pass over the gondola as had been planned. Instead of lifting off gently, the gondola and rocket were dragged up along the side of the launcher, snagging several times.

When the first major snag released, the gondola and rocket were both propelled upward and back towards the balloon. When the second snag caught, it stopped the gondola, but not the rocket, which was only hung on the gondola by a hook. The rocket arced over and landed on the deck of the barge, suffering some damage, but hopefully nothing major (the oxidizer tank has still to be tested).

HAL5 Program Night

Wednesday, July 22, 1998

7 to 8:30 p.m. (with social afterwards)
Huntsville Public Library Auditorium

**“Affordable In-Space
Transportation:
Space Travel on a Tight Budget”**

Guest speaker will be Ronnie Lajoie, Space Systems Engineer for Boeing. Ronnie will discuss the results of a study examining over 60 ways to get to high Earth orbits, the Moon, and Mars.

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

The gondola rose with the balloon to 100,000 feet, still happily transmitting video back to the ground. Since its downlink antenna was damaged on the second major snag, the transmissions were extremely poor (see GIF photo).

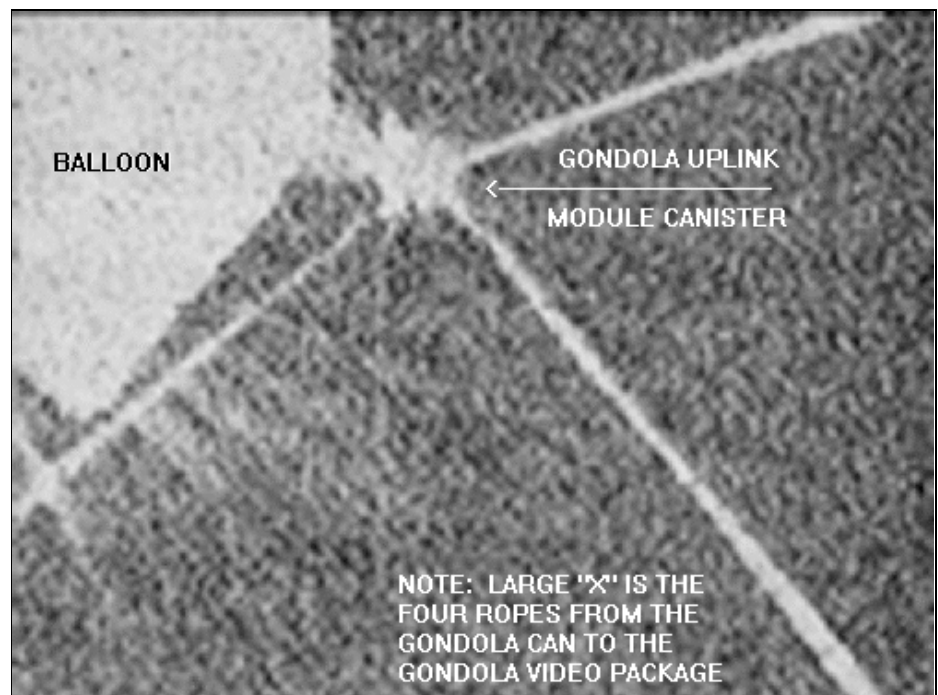
The gondola parachuted back to the Gulf of Mexico and was recovered, but salt water entered the can and ruined all the electronics. The rocket electronics amazingly survived the impact with the barge deck and never touched salt water. All hardware can be repaired or replaced given both sufficient time and money.

The entire Project HALO team is extremely disappointed, and is taking a break to recover physically and emotionally from this ordeal. In the next issue, we will go into more detail on all the hard work performed by the team to prepare the rocket, gondola, and launcher, and to make this heroic first attempt to launch the SL-2 rockoon. ☆

Greg Allison Named HAL5's Professional of the Year

HAL5 is pleased to select Mr. Gregory H. Allison as the 1998 HAL5/HATS Professional of the Year. Greg is one of the founders of HAL5 and has served as its President for most of its life. Through his leadership and devotion, HAL5 has become one of the leading chapters of the National Space Society.

Greg served as Chairman of the highly successful 1993 ISDC. From 1994 to 1995, he served as the NSS Southeast Regional Director. Greg serves as Program Manager of Project HALO and leads its Education Committee, which developed the HALO Achievement program. In 1996, Greg received the NSS Chapters' Assembly Outstanding Chapter Member Award. In 1997, Greg received the NSS Space Pioneer Award for Entrepreneurship for Project HALO. Congratulations Greg! ☆



What's wrong with this picture? Unfortunately -- PLENTY!

Huntsville Alabama L5 Society

President — Greg Allison
Day: 544-4440, Eve: 859-5538
Vice-President — Gladys Young
Day: 852-0561, Eve: 852-0561
Treasurer — Ronnie Lajoie
Day: 971-3055, Eve: 721-1083
Secretary — Clay Sawyer
Day: 971-6408, Eve: 539-3889
Membership — Philomena Grodzka
Day: 536-8638, Eve: 536-8638
Communications — James Hopkins
Day: 971-9362, Eve: 726-0056

Southeastern Space Supporter

Volume 7, Number 3
May / June 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.

1998 HAL5 Election Results

(by Ronnie Lajoie, SSS Editor)

At the June HAL5 Program Night on Wednesday, June 24, the membership of HAL5 (10 were present) held elections for the 1998-1999 HAL5 Executive Committee. Due to HALO SL-2 launch attempt, no time was available to form an Elections Committee to create a slate of candidate officers (as in past years).

Instead, per the HAL5 bylaws, officer and committee chair candidates were nominated from the floor.

Greg Allison, past President, accepted the nomination to continue as President. Ronnie Lajoie was also nominated, but declined because he said he wanted to be reelected as Treasurer. He was then nominated to continue as Treasurer.

Larry Scarborough, past Vice-President, left HAL5 at the start of this year for personal reasons. We appreciate all his many contributions to HAL5 and will sorely miss him. Greg Allison asked Gladys Young to consider becoming the next Vice-President, and she was then nominated. Ron Lajoie nominated Gene Young, but he declined.

Peter Ewing, past Secretary, and David Dean, past Secretary after Peter Ewing's resignation, both were not present to be considered for reelection. Greg Allison asked Clay Sawyer to consider becoming the next Secretary, and he was then nominated.

Prior to committee chair elections, per the HAL5 bylaws, the membership first reviewed the need to continue having its at-large committees. Ron Lajoie made a motion to disband the Special Projects Committee since it had been inactive. The motion passed unanimously.

Bill Brown, past Chair of the Communications Committee, said he was not seeking reelection. He made a motion to disband the Committee, since Ron Lajoie had been handling much of the HAL5 publicity work. Instead, James Hopkins volunteered to be nominated to be the next Chair to keep

this important committee alive. Ronnie said he looks forward to getting help from James in the publicity area.

Wade Dorland, past Chair of the Programming Committee, said he was not seeking reelection. Ron Lajoie also made a motion to disband the Programming Committee, since that function had previously been performed by the Vice-President. Gladys Young, candidate for Vice-President agreed to take back the program-planning function as long as the associated workload was not too great. The motion passed unanimously.

Since only one candidate was nominated for each officer and chair position, all were elected by acclamation (no need for a vote). The following HAL5 officers and committee chairs were elected and will serve from July 1, 1998 to June 30, 1999:

President..... Greg Allison
Vice-President Gladys Young
TreasurerRonnie Lajoie
Secretary..... Clay Sawyer
Membership.....Philomena Grodzka
Communications..... James Hopkins

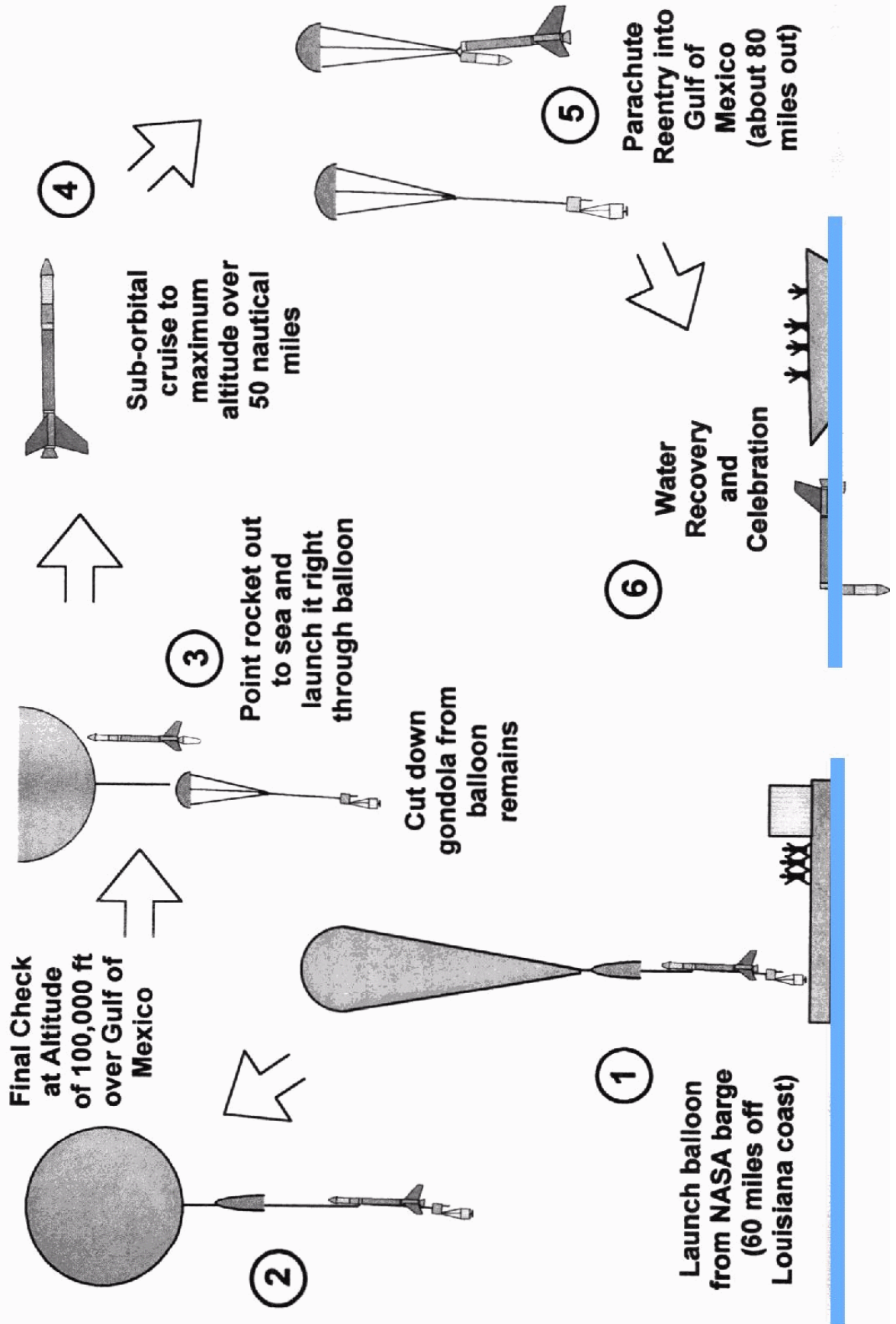
All HAL5 members should feel free to contact any of your elected officials (see sidebar at left for their phone numbers), as they are here to service you. ☆

HAL5 Bylaws Electronic Again

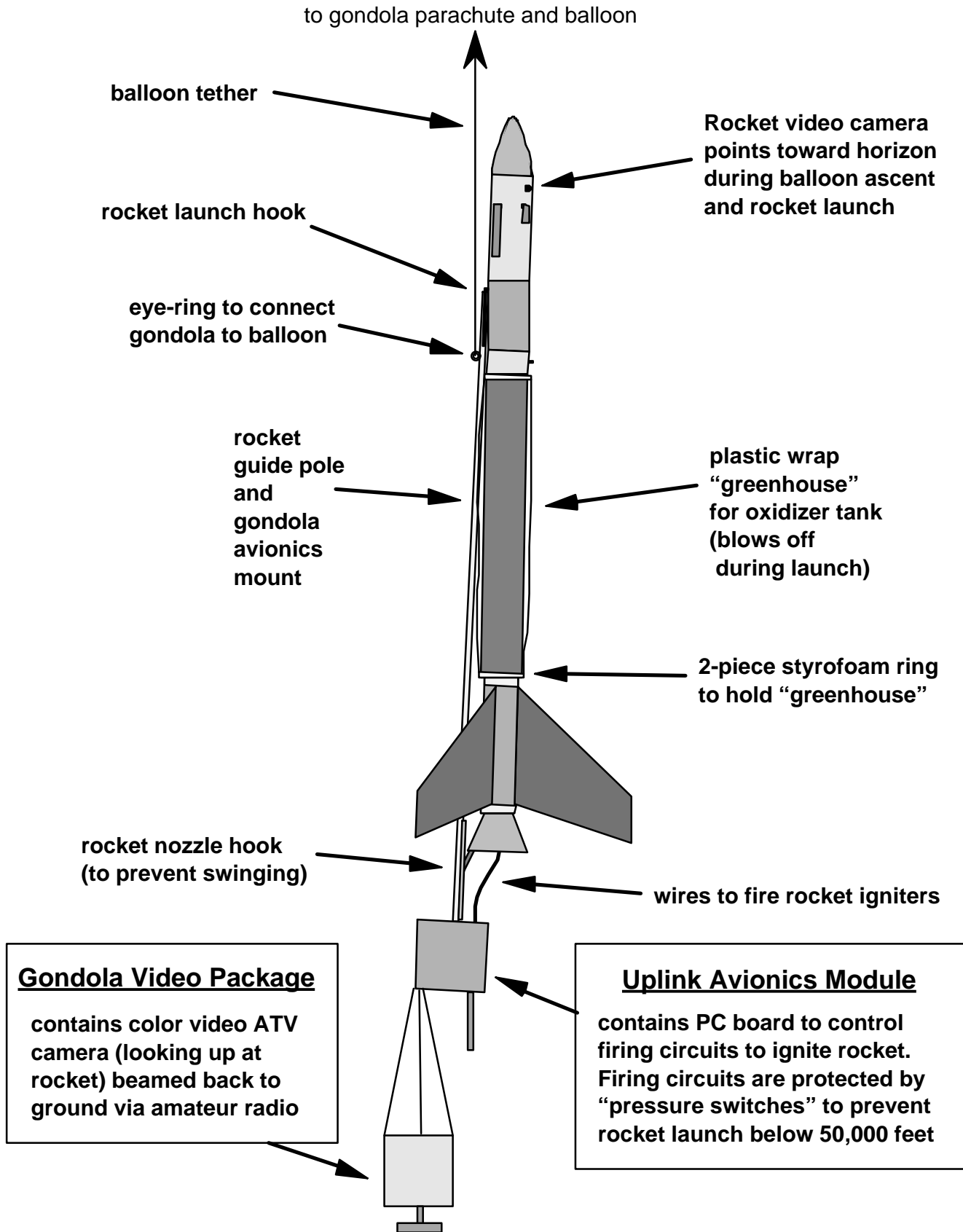
It has been a long time since HAL5 had an electronic version of its bylaws. The last time they were updated was in 1991. Prior to the 1993 ISDC, a change was needed to be made to the bylaws. Since it involved the deletion of only one paragraph, it was done via white tape.

Today, thanks to Wade Dorland, we now have an electronic copy of our bylaws again. Fresh copies of our "new" bylaws will be distributed at the HAL5 program on Wednesday. Some minor revisions will be proposed in the coming year, to finally bring our bylaws back up to date. ☆

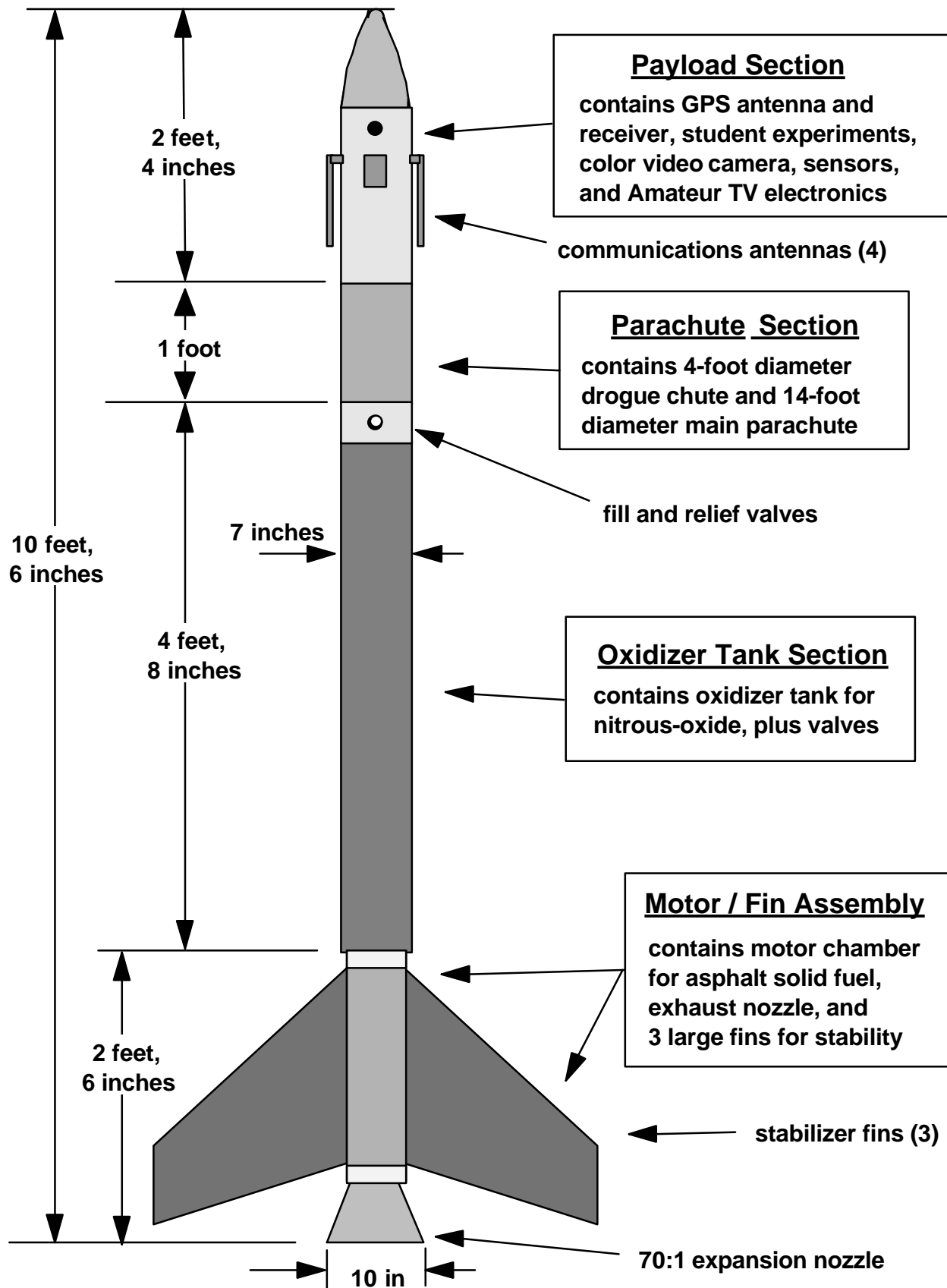
Sketch of Project HALO Sky Launch 2 Mission



HALO SL-2 Gondola Description



HALO SL-2 Rocket Description



Huntsville Alabama L5 Society (HAL5)

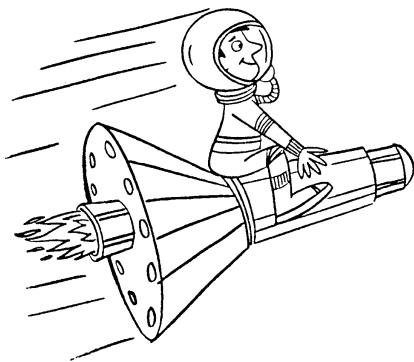
your local chapter of the

National Space Society

presents



Affordable In-Space Transportation



Space Travel on a Tight Budget

a free public presentation by

Mr. Ronnie M. Lajoie

Space Systems Engineer, The Boeing Company

Wednesday, July 22, 1998

7:00 pm to 8:30 pm at the

Huntsville/Madison County Public Library

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

For more information: call Ronnie Lajoie at 971-3055 (day) or 721-1083 (evenings).

HAL5 CALENDAR OF MEETINGS AND EVENTS

June 1998

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
14 Flag Day	15 HALO Rocket Work Party 6 pm at Tim's	16 Project HALO Tech. Meeting Noon at Ponds	17	18 HAL5 Executive Comm. Meeting Noon at Ponds	19	20 HALO SL-2 Launch Attempt Dawn on barge
21 Father's Day	22 HALO Rocket Work Party 6 pm at Tim's	23 Project HALO Tech. Meeting Noon at Ponds	24 HAL5 Elections "HALO SL-2" 7 pm at Library	25 HAL5 Executive Comm. Meeting Noon at Ponds	26	27
28	29	30 Project HALO Tech. Meeting Noon at Ponds	HAL5 June Elections and Program Night "Project HALO Sky Launch 2" by Greg Allison, Program Manager 6:30 - 9:00 PM, Wednesday, June 24, at Huntsville Public Library (apologizes to those of you who missed the Program for lack of info)			

July 1998

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
HAL5 July Program Night "Affordable In-Space Transportation" by Ronnie Lajoie, Boeing Aerospace Engineer 7-9 PM, Wed., July 22, at Huntsville Public Library			1 Canada Day	2 HAL5 Executive Comm. Meeting Noon at Ponds	3	4 Independence Day
5	6	7 Project HALO Tech. Meeting Noon at Ponds	8	9 HAL5 Executive Comm. Meeting Noon at Ponds	10	11
12	13	14 Project HALO Tech. Meeting Noon at Ponds	15	16 HAL5 Executive Comm. Meeting Noon at Ponds	17 Apollo-Soyuz Docking 1975	18
19	20 Apollo 11 Lands on Moon 1969	21 Project HALO Tech. Meeting Noon at Ponds	22 HAL5 Program "Afford. Space" 7 pm at Library	23 HAL5 Executive Comm. Meeting Noon at Ponds	24	25
26	27	28 Project HALO Tech. Meeting Noon at Ponds	29 Delta-Aquarid meteors	30 HAL5 Executive Comm. Meeting Noon at Ponds	July 31	August 1

August 1998

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
2	3	4 Project HALO Tech. Meeting Noon at Ponds	5	6 HAL5 Executive Comm. Meeting Noon at Ponds	7 Lunar eclipse 9:10 PM	8
9	10	11 Project HALO Tech. Meeting Noon at Ponds	12 Perseid meteors	13 HAL5 Executive Comm. Meeting Noon at Ponds	14 Perseid meteors	15
16	17 Phobos discovered 1877	18 Project HALO Tech. Meeting Noon at Ponds	19	20 HAL5 Executive Comm. Meeting Noon at Ponds	21 Solar eclipse 9:03 PM	22

EDITORIAL**The Millennium Foundation
Project: Planetary Collision
Defense, Energy from Space,
and Solar System Settlement**

(by Greg Allison)

**First The Good News!
Federal Budget Surpluses?**

As we prepare to close out this second millennium wondrous turns of fortune beacon us. Not only have we closed the recent Cold War, but suddenly the federal budget deficit is gone! The Congressional Budget Office (CBO) now projects that the federal budget deficit for 1998 will be only about 5 billion dollars. For 2008, ten years from — providing that Congress does nothing at all, the budget surplus will soar to 138 billion dollars!

How can this happen? Congressional “belt tightening” has only had a modest impact on federal coffers. Since 1992 economic growth has steadily increased federal revenues. This growth is the source of the apparent windfall which could come. Granted with politicians at the helm and the cyclic nature of economies these projections are indeed highly suspicious!

**Doomsday Has Been Postponed!
The Environment Improves
while New Resources are Discovered!**

This news will greatly upset the alarmist! After-all, many are teaching our school kids that an environmental doomsday is less than 20 years away. That’s what they taught me 20 years ago. The same thing! Now one of the leading alarmist has broken rank and expressed enthusiasm over advances in renewable energy and corporate moves to focus more on the environment.

Lester R. Brown has for the last 15 years announced that this planet is near the end of its resources. According to Brown, “We may now be on the threshold of change.” But so as not to disappoint us he does continue to reserve

plenty of gloom and doom for the decades down the road, “As the economy grows, pressures on the Earth’s natural systems and resources intensify.”

In truth, as the economy grows we continue to find new resources, and better ways to reach and manage the old ones. Processes have been put in place to scrub the waste from many industrial outputs. While indeed there must be limits, one can easily paint a rosy future for the next couple of decades. Ironically it may be that the greatest environmental threat could result from reckless practices which business may adopt as a result of an economic downturn stemming from governmental efforts to limit carbon dioxide emissions.

So What Does It All Mean?

In short — it just don’t get any better than this! These are the best times! We must make the most of them — before it is too late.

**Now For The Bad News!
High Probability of Global Damage
From Small Asteroid Strike**

During any single 100 year period there is a 2 to 3 percent chance that a “small” (not a dinosaur killer) asteroid will impact either in the Atlantic or Pacific Ocean generating tidal waves that could kill hundreds of millions of people according to Los Alamos National Laboratory astrophysicist Jack Hills.

A three mile rock splashing into the North Atlantic Ocean would drown most of the upper East Coast and much of the European coastal regions. All of Delaware, Virginia, and Maryland would be laid waste. Long Island and Manhattan would be stripped to the ground. (Wall Street would really crash.) If it hit in the Pacific the resulting tsunamis would plow over Honolulu and flood the Los Angeles basin. Japan would be devastated. Imagine a 300 foot tall wall of water racing near the speed of sound. It would be blast buildings away, scour the land, leaving vast areas in waste. According

to Hill, “The damage would be unprecedented in human history.”¹

Sound nuts? This has happened before, many times. 90,000 years ago a tsunami deposited coral 1,000 feet high around the Hawaiian Islands. Obviously that was a particularly bad strike.

Hills studies indicate that a minor asteroid at least 600 feet in diameter strikes the oceans of Earth every at least once every 3,000 to 5,000 years. According to Mr. Hills a person living to be 100 years old has a one in 50 chance of being alive when an asteroid impact generates deadly tsunamis.²

Such an impact could cause more devastation than a global nuclear war. For those not drowned materials sprayed into the upper atmosphere could block enough sunlight to cause global crop damage. Famine would plague the planet. Today we are dependent on global commerce. Imagine the shortages that would occur given the devastation to international shipping. Petroleum, parts, and raw materials would not be available. Utilities would be disrupted leaving cities to go mad. Crime and warfare would escalate! People would turn to the woods and slash and burn the forest for food and fuel. The environment would be devastated.

**So What? Who Cares? Even 100
Years is Too Long to Worry About!
Three Nuclear Sized Strikes per
Century Average Three in the Last
Twenty Years?**

In 1908 a blast in the Tunguska region of Siberia devastated 800 square miles. The event was noticed as far away as England. It has been estimated that such events occur three times every hundred years. However this may have happened at least three times in the past twenty years. In 1978 a Department of Defense (DOD) Vela satellite picked up an

¹ Martin Burkey, Who Will Save The World, The Huntsville Times, Thursday, October 2, 1997, pp. A1 & A9.

² Martin Burkey, Who Will Save The World, The Huntsville Times, Thursday, October 2, 1997, pp. A1 & A9.

enormous flash off the coast of South Africa. This may have been a test of a South African nuclear weapons program designed to prevent Mandella from becoming the President of South Africa.

In 1983, a mushroom cloud was spotted over the Sea of Japan by three different airliners. Afterwards, military units swept the area and detected no radiation. The largest airburst recorded by the DOD occurred in February 1994 when a meteor burst over Micronesia with from 50 to 70 kilotons of energy. It was four times more powerful than the atomic bomb the U.S. dropped on Hiroshima.³

Imagine what would happen if such a random impact were to occur in a moment of global tension, like in 1990 over Tel Aviv or Bagdad. Imagine explaining that. What if one hits over North Korea? Would they believe us? Go figure! Now just a few months ago, a huge meteorite struck northern Greenland. The flash was seen on both sides of this great island. No one is likely to visit this site until this summer.

How many ocean, tundra, and desert strikes did we miss early this century before we put up all these satellites, launched global air routes, and deployed the military to the four corners of the Earth? Was the three strikes per century wrong, or are we just above average? Could the flux rate of bodies which might hit us be on the increase? In short, no one really knows!

Now that mankind has developed a global network of cities, ports, and bread baskets the likelihood of a strike of one of the much smaller bodies to a critical area is quite high indeed. What happens if a major city takes a hit? What happens if one of these hits the wheat fields of Kansas? What if one hits a major ecological center such as the Everglades? Frankly, I don't want to find out.

Planet Busters!

³ Martin Burkey, Meteors strike the Earth regularly, The Huntsville Times, Thursday, October 2, 1997, p. A9.

We have all heard of the asteroid which destroyed the dinosaurs. You may not know it but an asteroid large enough to kill most large critters scurrying around on the surface of this pretty blue ball hits about every 30-35 million years. Quite notable among the lineup of these nasty visitors was the one six mile wide asteroid which completely exterminated all species of that highly successful rock group known as the dinosaurs.

It has been calculated that the average person has a higher probability of dying from one of these planet buster than from lightening or a snake bite. Now how can that be? We have all heard of someone who has died from one of these. What throws the probability off in this case, even though the odds of Earth being hit by anything that big may be lower than

Many astronomers link [major asteroid impact cycles] to the frequency at which the Sun crosses the galactic ecliptic plane . . . It was recently announced that the Sun has just completed a crossing of the galactic ecliptic plane!

one in 30 million in any given year, is that an asteroid this big doesn't settle for just killing the coastal flat-landers, it kills everyone!

Now for the Really Bad News!

The probabilities mentioned above are based on a random distribution in which any given year the likelihood of an impact is equal to that of any other year. Unfortunately the fossil record paints a picture of periodacy. It seems that major die-offs occur about every 30-35 million years on this planet. Just like some great seasonal cycle. This has puzzled geologist and astronomers alike.

What event could occur on such long cycles which would increase the flux density of objects in the inner solar system which could collide with Earth

and devastate the planet. Some looked to no avail for a brown dwarf "death star" orbiting the sun which might disturb the Oort Cloud.

Many astronomers link it to the frequency at which the Sun crosses the galactic ecliptic plane, the orbital mean of the Milky Way Galaxy where galactic gravitational influences could perturb the Oort Cloud and send comments astray. It was recently announced that the Sun has just completed a crossing of the galactic ecliptic plane!

So what has the galaxy done for us lately? On the 11th of September 1995, a scientific team lead by C. Wylie Poag of the U.S. Geological Survey said they found a 55 mile wide meteor crater underlying the lower Chesapeake Bay, nearby to the sea floor. This meteorite, at least a mile in diameter vaporized on impact, melting the local part of the Earth's crust, shooting jets of molten rock and hot jets of gas way above the stratosphere. Debris rained down as far away as Texas. This event played a significant role in creating subterranean structures associated with the Chesapeake Bay.

One wonders how Washington D.C. would react today? Answer: federal expenditures would be totally eliminated! Why? The federal government would be no more. And now for the bonus question. When did this impact take place? Answer: 35 million years ago!

Oh My Gawd! Asteroids are Everywhere!

More than 2,000 objects more than a half mile in diameter are in orbits that cross that of Planet Earth according to Dr. Ed Tagliaferri, a contractor who coordinates DoD asteroid studies. Dr. Tagliaferri maintains that an object as big as a half mile to two miles in diameter could set off fires and earthquakes around the entire planet. The soot from the impact could trigger another ice age. In fact, a meteor just 110 yards in diameter could wipe out Los Angeles. According to Dr.

Ed Tagliaferri a meteor with the power of a Hiroshima bomb explodes at least once a year somewhere in the upper atmosphere. (A map of these explosions is available on page 1 of the Huntsville Times dated 3 October 1997.)

Stars Fall Over Alabama!

As usual when it comes to negative things Alabama manages to rise to the top of the list! (It's great to be first at something!) The only person in recorded history to be struck by a verified meteorite was of course in Alabama! On the 30th of November 1954 an eight pound meteorite crashed through the ceiling of Ann Hodges of Sylacauga, glanced off a cabinet radio and bruised her leg. Today, that meteorite is preserved in the Alabama Museum of Natural History.

But wait — man you ain't (proper Southern English) heard nutin' yet! 65 million years ago (where have we heard this number before?), a very large meteorite struck near Wetumpka, Alabama. (Well, it likely kilt wun uf them thar field lizards - Like wun uf them tricycleorus rexters!)

Let's All Procrastinate!

Despite the fact that we as a species should now damned well be already mining the asteroids, maybe we should really just sit back on this planet and do nothing at all until global poverty overtakes us and ensures that we indeed cannot do anything at all but decay into a global state resembling Haiti and welcome the next asteroid which would put us out of our misery and grant this miserable planet to its rightful owner, the cockroach!

This is the answer of the "environmentalist" (who wants to preserve nature — HA HA! LOL! for those conversant in email speak) and our leftist buddies who think the sole role of the government is to provide welfare to those who had not rather get off their lazy posteriors and earn an honest day's wages. Please forgive me for repeating myself — yes I already mentioned cockroaches!

Well Forget the Cockroaches!

Even the cockroaches cannot ultimately save themselves! The largest asteroid known to cross Earth's orbit is at least 20 miles in diameter! But that ain't nothing! There are at least three comets about 200 kilometers in diameter traveling at 70 kilometers per second. Comets of this size are thought to be rather typical of the Kuiper Belt and the Oort Cloud. If one of these puppies hits Earth just forget it. Anthropologist from other worlds might simply wonder why life never took hold on this rock! So how many times will life on Earth be obliterated before the Sun expands into a red giant to totally consume this planet? If the sun waits 4 billion years before it eats this planet, doomsday will visit 114 times if spaced out 35 million years between each impact.

I only have this to say to mother Earth, "Mommy, I want outta here!"

Sports

Ever been to a duck shoot at a carnival where you popped the ducks as they passed you by on the conveyer? Welcome to the duck shoot — and YOU are the duck!

Let the Cosmic Games Begin!

(RE-UP for the next edition of the *Southeastern Space Supporter* and see how we can turn doomsday into utopia!)

The Future is Only Now Beginning to Get Interesting!

(To Be Continued)

The high-points of this and the article to come will be presented to HAL5 on August 26th at the Huntsville-Madison County Library at 7 PM in a joint meeting of the World Future Society and HAL5. The speakers will be NASA's Les Johnson and Greg Allison. ☆

SPACE NEWS

Study: Commercial Space Goes Mainstream

(by Frank Sietzen, UPI, June 25, 1998)

A U.S. Commerce Department report says the commercialization of outer space, once the idea of science fiction writers, "has gone mainstream." The report says e-mail, paging, and other forms of mobile communications used every days by millions are routinely routed through space.

As a result, space is now a critical part of the U.S. economy, according to the analysis of recent trends in the space business field. Keith Calhoun-Senghor, director of the Office of Air and Space Commercialization at the Commerce Department said, "Commercial space will be one of the dozen major industries of the 21st century."

Calhoun-Senghor added, "If the early days of commercial space can be considered its adolescent phase, its more romantic origins, then today we're seeing its move to more maturity." He said, "We're starting to reap the economic benefits."

Calhoun-Senghor said the public and the news media should have a larger role in evolving the space program from one rooted in U.S. federal programs to a one that comprises commercial satellites, commercially operated space stations and facilities, and privately owned launching systems that will likely replace the NASA space shuttle and military rockets.

The key, he said, was to make policy that opens space activities to the widest possible mix of participants and markets in what he called "the democratization of space." Calhoun-Senghor said, "That will allow ordinary citizens to fly in space that have never had the chance before."

He predicted future space businesses would be more focused on information services than on where the information came from to reach their customers. ☆

Evidence of Abundant Water, Thermal Activity In Mars' Past

(from NASA Press Release, May 27, 1998)

New mineralogical and topographic evidence suggesting that Mars had abundant water and thermal activity in its early history is emerging from data gleaned by NASA's Mars Global Surveyor spacecraft.

Scientists are getting more glimpses of this warmer, wetter past on Mars while Global Surveyor circles the planet in a temporary 11.6-hour elliptical orbit.

The Thermal Emission Spectrometer instrument team has discovered the first clear evidence of an ancient hydro-thermal system. This finding implies that water was stable at or near the surface and that a thicker atmosphere existed in Mars' early history.

Measurements from the spectrometer show a remarkable accumulation of the mineral hematite, well-crystallized grains of ferric (iron) oxide that typically originate from thermal activity and standing bodies of water. This deposit is localized near the Martian equator, in an area approximately 300 miles (500 kilometers) in diameter.

Fine-grained hematite, with particles no larger than specks of dust, generally forms by the weathering of iron-bearing minerals during oxidation, or rusting, which can occur in an atmosphere at low temperatures. The material has been previously detected on Mars in more dispersed concentrations and is widely thought to be an important component of the materials that give Mars its red color. The presence of a singular deposit of hematite on Mars is intriguing, however, because it typically forms by crystal growth from hot, iron-rich fluids.

Meanwhile, the Mars Orbiter Laser Altimeter instrument is giving mission scientists their first three-dimensional views of the planet's north polar ice cap. The Laser team have been using the laser altimeter to obtain more than 50,000 measurements of the topography of the polar cap in order to calculate its

thickness, and learn more about related seasonal and climatic changes.

These initial profiles have revealed an often striking surface topology of canyons and spiral troughs in the water and carbon dioxide ice that can reach depths as great as 3,600 feet below the surface. Many of the larger and deeper troughs display a staircase structure.

The laser data also have shown that large areas of the ice cap are extremely smooth, with elevations that vary only a few feet over many miles. At 86.3 degrees north, the highest latitude yet sampled, the cap achieves an elevation of 6,600 to 7,900 feet over the terrain.

In June, the ice cap's thickness will reach a maximum during the peak of the northern winter season. Thickness measurements from April will be compared to those that will be taken in June, contributing to a greater understanding of the Martian polar cap's formation and evolution.

The Global Surveyor accelerometer team has discovered two enormous bulges in the upper atmosphere of Mars in the northern hemisphere, on opposite sides of the planet near 90 degrees east longitude and 90 degrees west longitude. These bulges rotate with the planet, causing variations of a factor of two in atmospheric pressure, and systematic variations in the altitude of a given constant pressure of about 12,000 feet.

Additional information about these findings and other exciting new results from the Mars Global Surveyor mission is available at the following Web sites:

<http://mars.jpl.nasa.gov/mgs/>
<http://emma.la.asu.edu/>

In September, the spacecraft will once again begin dipping into the upper atmosphere of Mars each orbit in a process called aerobraking. The drag will allow the spacecraft to reach a low circular orbit and begin its primary two-year global mapping mission starting in March 1999. ☆

Latest Findings a Year After Mars Pathfinder

(from NASA Press Release, June 29, 1998)

A year after the landing of Mars Pathfinder, mission scientists say that data from the spacecraft paint two strikingly different pictures of the role of water on the red planet, and yield surprising conclusions about the composition of rocks at the landing site.

"Many of the things that we said last summer during the excitement after the landing have held up well," said Dr. Matthew Golombek, Pathfinder project scientist at NASA's Jet Propulsion Laboratory. "But we have now had more time to study the data and are coming up with some new conclusions."

Pathfinder data suggest that the planet may have been awash in water three billion to 4.5 billion years ago. The immediate vicinity of the Pathfinder landing site, however, appears to have been dry and unchanged for the past two billion years.

Several clues from Pathfinder data point to a wet and warm early history on Mars. Magnetized dust particles and the possible presence of rocks that are conglomerates of smaller rocks, pebbles and soil suggest copious water in the distant past. In addition, the bulk of the landing site appears to have been deposited by large volumes of water, and the hills on the horizon known as Twin Peaks appear to be streamlined islands shaped by water. But Pathfinder images also suggest that the landing site is unchanged since catastrophic flooding sent rocks tumbling across the plain two billion years ago. "Since then this locale has been dry and static," he said.

Chemical analysis of a number of rocks by the Sojourner rover, meanwhile, reveals an unexpected composition. The data suggests that all the rocks studied by the rover resemble a type of volcanic rock with a high silicon content known on Earth as andesite. The rocks appear to be chemically far different from meteorites discovered on Earth that are believed to have come from Mars. ☆

HAL5 Membership Report

The following is a list of additions to the current paid membership of HAL5, which includes 35 renewals and 12 new members, for a total of 47. Last year's membership peaked at 82, which was a new record for the society. Since all memberships expired at the end of last year, more renewals are expected to come in. Welcome to all our new and renewed members!

Bill	Brown	(R)
David	Cawood	(N)
Ron	Creel	(R)
Melanie	Hazelrig	(R,D)
David	Hewitt	(R)
Bryan	Jones	(R)
John	Jones	(R)
Linda	Kenny-Sloan	(R,D)
Taras	Kovaliv	(N)
Donnie	Lowther	(N)
Ilmar	Luik	(N)
Steve	Mustaikis	(R)
John	Pavlick	(P)
Bennett	Rutledge	(N)
Pricilla	Rutledge	(N)
Felix	Vikhman	(N)
Gene	Young	(R)
Gladys	Young	(VP)

- (N) - New Member
- (R) - Renewed Member
- (P) - Past Member
- (D) - Included a Donation

HAL5 welcomes back its previous members and also past member John Pavlick. John is owner and President of Advanced Composite Technologies, Inc. and has supplied Project HALO with quality motor parts and service for the SL-2 rocket at very reasonable prices.

Upcoming Events of Interest to HAL5 Members

- Wed., Jul. 22 — **HAL5 Program on “Affordable In-Space Transportation”**
7:00 - 8:30 PM by Ronnie Lajoie, Engineer for Boeing Company at Huntsville Public Library, 915 Monroe Ave.; free; questions: 971-3055
- Wed., Aug. 26 — **HAL5 Program on “Asteroids — Friends or Foes?”** by Les Johnson (of NASA) and Greg Allison (of HAL5), at Huntsville Public Library, 915 Monroe Ave.; free; questions: 971-3055
- September 17-18 **STEDTRAIN**, at Calhoun College; free; questions: 837-4287
- Wed., Sep. 23 — **HAL5 Program on “TBD”** by TBD, at Huntsville Public Library, 915 Monroe Ave.; free; questions: 971-3055
- Tue., Sep. 29 — **ASA Program on “Solar Rockets”** by TBD, at Huntsville Public Library, 915 Monroe Ave.; free; questions: 971-3055

HAL5 also welcomes its new members, including David Cawood, Taras Kovaliv, Donnie Lowther, Ilmar Luik, Bennett and Pricilla Rutledge, and Felix Vikhman. David, Donnie, and the Rutledges joined HAL5 during the 1998 ISDC when they heard that there membership cards would be flying into space aboard the SL-2 rocket. Donnie is President of the DC L5 NSS chapter. Bennett is the NSS U.S. Chapters Coordinator. We are honored to have you on board!

Ilmar Luik is a metal-work specialist and a new local recruit to Project HALO. Felix and Taras are reporter and photographer, respectively, for *Shift*, a Canadian magazine akin to *Wired* in the United States. Felix and Taras joined the HALO team on the NASA barge during the first SL-2 mission attempt.

HAL5 gratefully thanks the members

who included a donation with their membership. Melanie Hazelrig and Linda Kenny-Sloan gave generously to Project HALO. Thank you all very much! Ad Astra! ☆

Donations to HALO Needed!

Project HALO needs **YOUR** financial support now more than ever. Expenses associated with preparing the HALO SL-2 rocket and gondola, purchasing the balloon, and executing the first attempt to launch the HALO SL-2 rockoon has drained both of our Project HALO bank accounts — and we still have some unpaid expenses (about \$500).

We need **YOUR** financial support to help us with these expenses, and to allow us to make high quality brochures. We will use these to ask corporations for the “big” money needed to make another launch attempt of the SL-2 rockoon. ☆

Special Announcement
HAL5 July Program Night on
“Affordable In-Space Transportation”
Wednesday, July 22, 7–9 pm

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