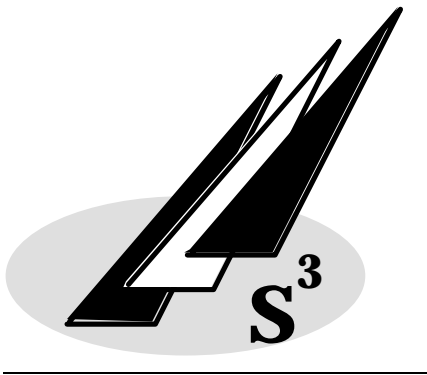


# *Southeastern Space Supporter*

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

Volume 5, Number 6 — November–December 1996



## **FIRST WORD**

### **GOING FOR IT!**

(by Gregory Allison, HAL5 President)

There comes a time in an engineering development project when you have to freeze the design (once you have something that works) and go for it! We have frozen the HALO Space Launch 1 (HALO SL-1) design on the rocket we flew in Manchester in April, but with an upgraded payload canister and nosecone. If the good lord and the FAA are willing — **we are ready to fly the first history breaking amateur space mission by January 25, 1997!**

Getting FAA approval will be our biggest hurdle. We will follow, as first recourse, the trail blazed by the Southeastern Community College of Whiteville, North Carolina. They obtained FAA approval twice for rockoon missions. Due to technical difficulties they failed to launch on each attempt. We at least think we understand how to overcome those technical difficulties. Our biggest challenge is thermal control of our liquid oxidizer. We are studying ways to use passive and active techniques to keep the nitrous oxide warm.

(see First Word on page 6)

### **HAL5 Special Event**

Thursday, December 5, 1996  
6:30 p.m. Social, 7:00 p.m. Dinner at  
the Holiday Inn at Madison Square Mall

### **HAL5 Appreciation Night**

Featuring dinner (\$15), conversation, a possible speaker/program (TBD), and award certificates for active members. Open to members and their guests.

## **PROJECT HALO NEWS**

### **HAL5 Launches 19K Balloon**

(by Ronnie Lajoie and Bill Brown)

On Sunday, September 22, members of HAL5's Project HALO launched their largest high-altitude balloon to date. The clear plastic (polyethylene) balloon (see Figure 1) measured over 60 feet long and had a total volume of 19,000 cubic feet when fully expanded into a sphere with a diameter of 33 feet.

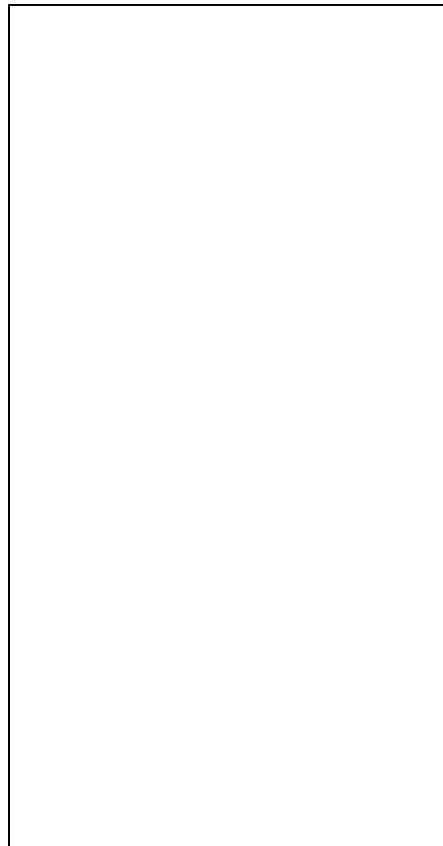


Figure 1. HALO team members prepare to launch the 19K balloon.

The crew started setting up a 8:30 AM, on a chilly and foggy, but calm, day. Launch site was the Old Airport in Huntsville, Alabama. Unlike the latex balloons launched in the past by HALO members, this would be a zero pressure

balloon designed to float at an altitude of 20 miles until commanded down.

Due to high wind gusts that occurred just as we were preparing to launch, two large holes were torn in the balloon envelope. We taped the holes shut as best as we could and pumped some more helium in the envelope. Then we successfully launched the system — Hooray! — only to snag on a loudspeaker wire leftover from the previous week's County Fair — Boo! Bill was able to hook the balloon's radar reflector with an 18-foot pole and pull the payload away from the line and let it go on its journey (see Figure 2) — Hooray! Launch time was at 11:24 am.

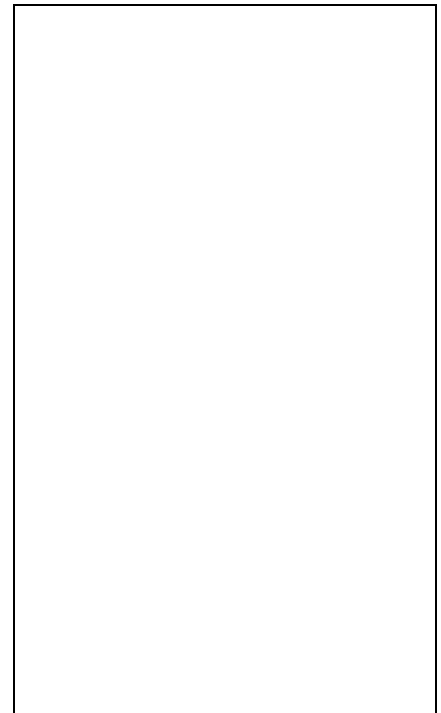


Figure 2. Balloon carries gondola electronics and nitrous-oxide tank.

The balloon was easy to spot and appeared as a bright, shimmering spot in the sky for quite some time.

(see Balloon on page 3)

**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 — James Hopkins  
 Day: 461-1787, Eve: 461-1787  
 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 6  
 November / December 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.

**Farewell Ron,  
 Welcome James**

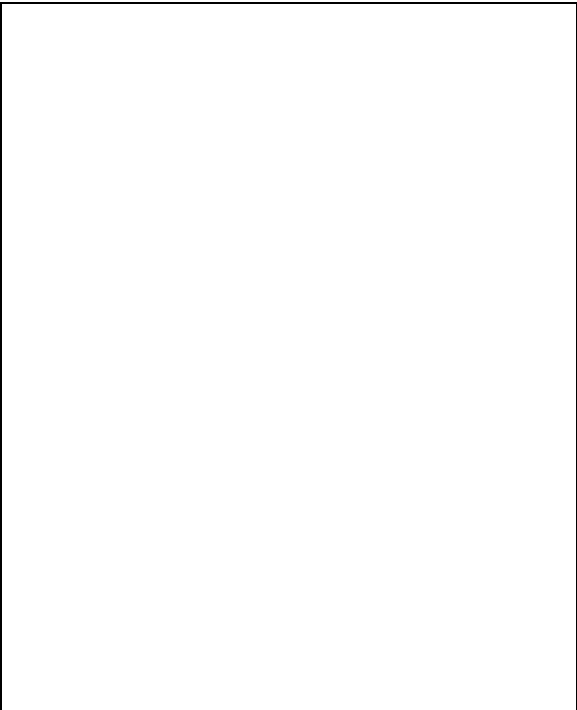
(by Ronnie Lajoie, SSS Editor)

Ronald Creel, HAL5's Secretary, has accepted a job in southern Florida, and has reluctantly resigned from his post. Ron joined HAL5 in 1994 and quickly became involved in all aspects of our society, especially Project HALO. In 1995, he was elected to the post of HAL5 Communications Chairman, followed by Secretary in 1996.

Ron has been a steadfast supporter, greatly aiding in the analysis, manufacturing, and testing of HALO rockets. He also has supported all HALO balloon launches, HAL5 educational events (Program Nights, TOPE/HOPE, HALO Balloon Days, and HAL5 Race for Space), and HALO exhibits (STEDTRAIN, TABES, 1996 ISDC, and Star Trek 30). All this effort in between looking for a job — Way to go, Ron!

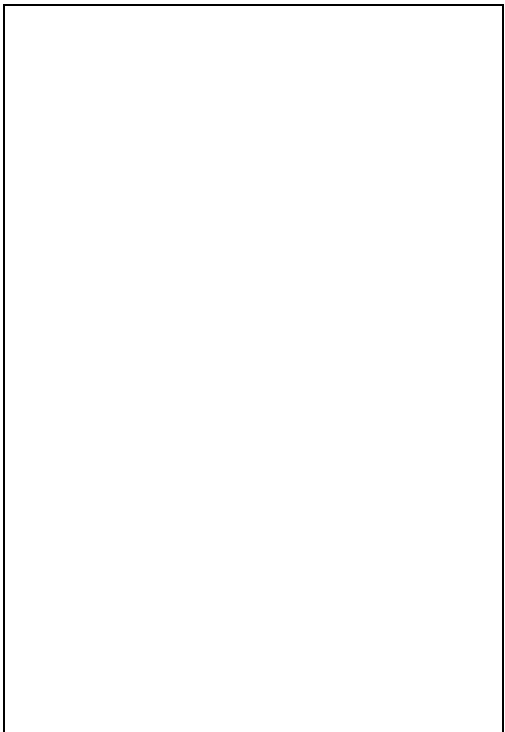
Ron's dedication, hard work, and good humor was very much appreciated and will be sorely missed by all. Ron has expressed a desire to remain a HAL5 member and to continue supporting Project HALO remotely, possibly as our liaison to the Florida Spaceport Authority. Please join me in wishing Ron the best of luck in Florida — and better luck in finding a job back here in Huntsville (where his family will remain for now). Good Luck, Ron, and Thanks Again!

James Hopkins, one of our newest members, accepted Ron's nomination for his replacement. During a meeting on Thursday, October 31, the HAL5 Executive Committee voted unanimously to elect James Hopkins to the post of HAL5



Ron Creel, Larry Scarborough, and Ronnie Lajoie at HALO Balloon Day 2 at Mt. Gap.

Secretary. (In the event of a resignation, the HAL5 bylaws require only a vote of the Executive Committee, rather than a full election by the entire membership.) Welcome aboard, James! ☆



James Hopkins already at work in the Tim Pickens Project HALO workshop.

(Balloon, continued from page 1)

**Preparing to Launch the Balloon**

The balloon material resembled very much Paul Bunyan’s sandwich bag — a 60-foot long pile of thin plastic (polyethylene). To protect it from the dangerous rigors of the old airport runway (or even grass), Ron Lajoie had purchased a plastic painter’s tarp 8 feet wide and 100 feet long. The team laid out the tarp on the runway along the wind vector, such that any breeze would carry the balloon along the tarp first.

Once the balloon payloads were ready (see page 4), the team was ready to begin inflating the balloon. Lack of time prevented the group from making a Kjome (pronounced “cho-mie”) Launcher for this event. It is named after Norm Kjome who invented an easy-to-operate mechanical device for safely launching these and larger delicate high altitude weather balloons. (HAL5 is currently preparing to build a Kjome Launcher for use on our space launch attempt, under the leadership of Greg Allison and Larry Scarborough.)

The calm of Sunday morning allowed the group to handle the balloon with hands (in soft gloves however), rather than even using a device known as a Hutch Clutch, as shown in Figure 4.

Calm you say, then how did the balloon rip? Well, on the first launch attempt, the group underestimated the flexibility of the balloon tether. As the filled balloon lifted into the air, the tether stretched just enough such that wires running along the tether to a cut-down device pulled loose, damaging a squib.

While waiting for Tim to fetch a replacement squib, the wind picked up. The HALO team valiantly fought to keep the balloon aloft as the wind increased from a zephyr to a stiff and unpredictable breeze.

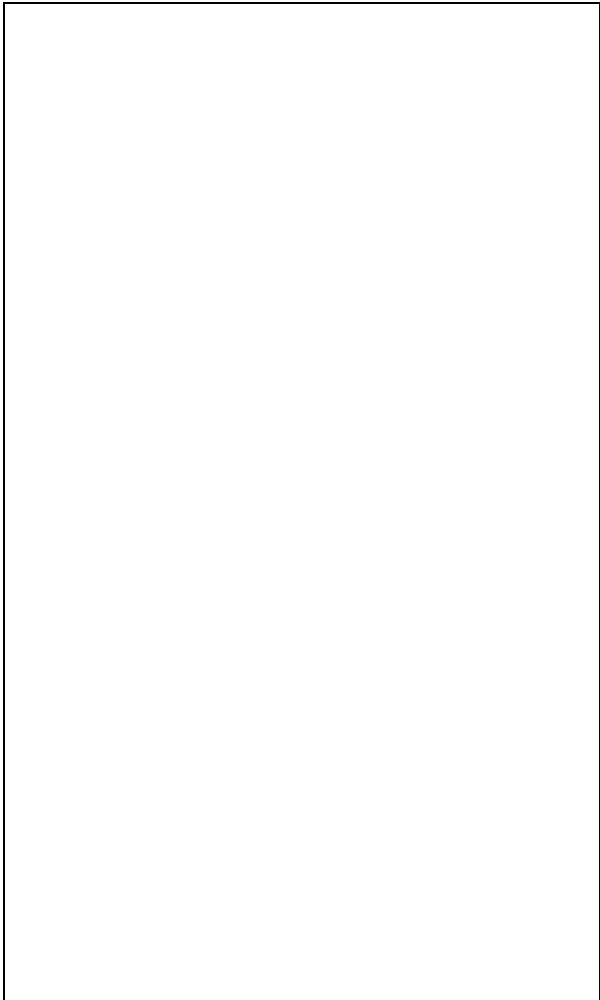


Figure 4. James and Clay are helped by Stacy Scarborough (daughter of Larry) and another.

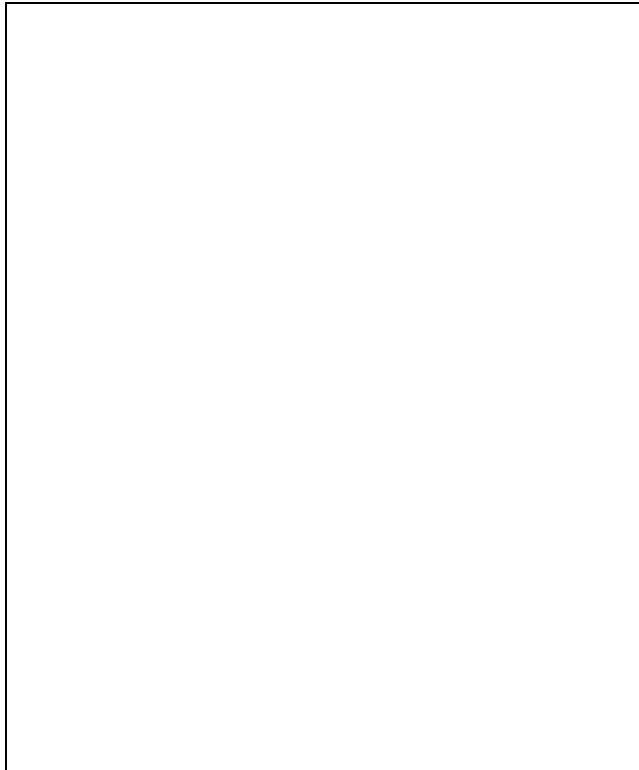


Figure 3. Tim Pickens, James Hopkins, and Clay Sawyer hold the balloon steady during inflation.

Greg Allison quickly assembled a subgroup of members to use the plastic tarp as a shield to deflect the balloon upwards any time the wind forced it down. Meanwhile, Tim, Bill, and others attached the new squib and left slack in the wire to prevent another pullout.

Just as we were preparing for the next launch attempt, a downdraft slammed the balloon to the ground faster than the “tarp team” could react. The balloon barely grazed the surface, but it was

enough. The balloon now had two huge tears in its delicate fabric. Her damage done, Mother Nature took a break and calmed the winds.

Several people exclaimed remorse and regret. Ron Lajoie ran to his car and grabbed a role of clear plastic tape. Bill Brown, Al Wright, and others taped up the holes as best as they could. The leftover helium was pumped into the last hole (faster than untying the main knot), then that hole was resealed.

The entire group of about 15 people now formed a train of balloon and payload handlers, as we guided the balloon upwards and along with the now regrowing wind. With a cheer the package was released. The balloon lifted slowly and sailed across the runway, over the grassy field.

Below the balloon proper was a parachute, followed by the electronics package (see Figure 7), followed by the nitrous tank test package (see Figure 5), followed by a radar reflector. A long string of items to be sure (see Figure 2).

Within five seconds of balloon release, an antenna attached to the tank test package snagged that speaker line. As mentioned on page 1, Bill freed the package and the balloon sailed on.

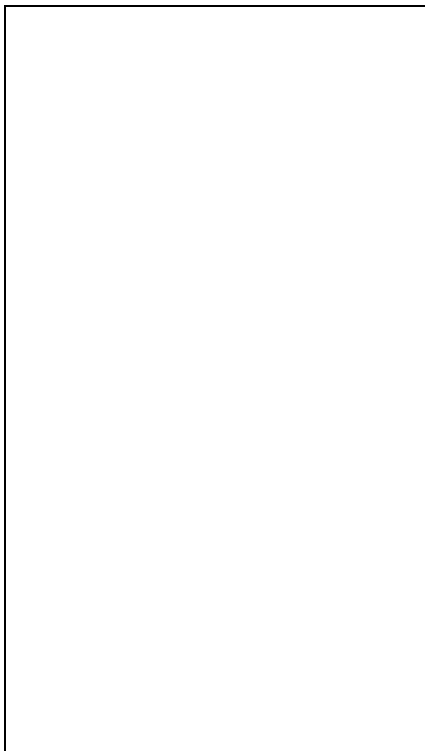


Figure 5. Insulated test launch tube for heated nitrous-oxide tank.

The downlinked ATV signal was fantastic with absolutely NO spinning whatsoever. It looked like an elevator ride. Great views of Huntsville and surrounding suburbs could be seen during the early part of the flight. The ascent rate was a very slow 620 ft/min. At 38,300 feet, the balloon system started to descent slowly (around 500 ft/min). We think that the tape that was covering over the holes in the balloon let loose and let the helium leak out.

The balloon ended up traveling 108 miles downrange at a heading of 122 degrees from the launchsite. It landed around 2:00 pm CDT. The balloon

landed behind a house north of Villa Rica, GA (40 mi west of Atlanta).

The woman who lived in the house was washing dishes and saw the balloon descend into her field behind her backyard. She thought it was a UFO and excitedly called the TV and radio stations. She turned on her scanner and actually heard the chase team chatter as they closed in on the signals.

Foxhunters from the Atlanta area tracked APRS packet signals and low power telemetry beacons and quickly located the payload. It was lying in a bed of Kudzu behind the woman's house.

All payloads survived the flight and landing in good shape. Even with the low altitude we attained, we consider the flight to be a success one, considering this is the first zero pressure balloon that we have flown. We beat the odds and actually launched the balloon in a high wind!

**Nitrous Tank Takes a Ride**

On board the balloon was one of our flight-ready oxidizer tanks, filled with nitrous-oxide. This was a test to see whether or not we can keep liquid nitrous-oxide warm at about 75°F using only a 25W band heater and an insulated tube (see Figure 5).

The tube was a short piece of phenolic wrapped on the outside with R-25 insulation. Thick Styrofoam cylinders, served as endcaps. The bottom one was taped shut, but not the top, to provide access to the inside to the tank, safing equipment, and detailed instructions for safing the nitrous tank (see Figure 6).

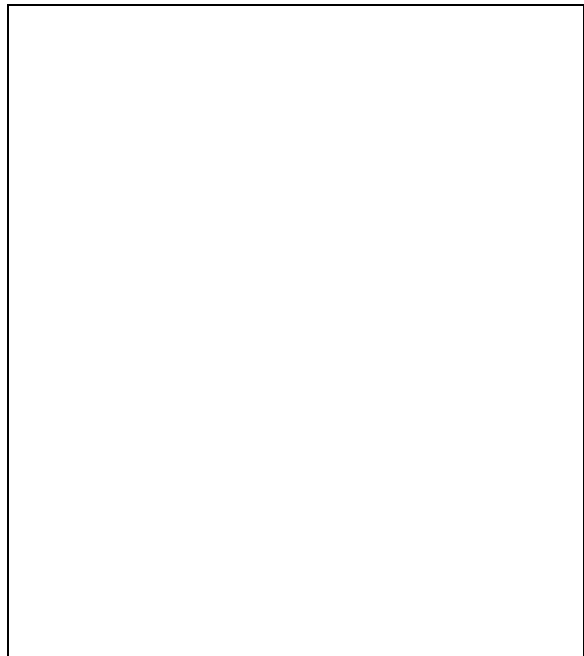


Figure 6. Inside tube were instructions and equipment for safely purging the nitrous tank.

Although the test was short, data indicated that the insulated tube kept the heat in and the cold out. ☆

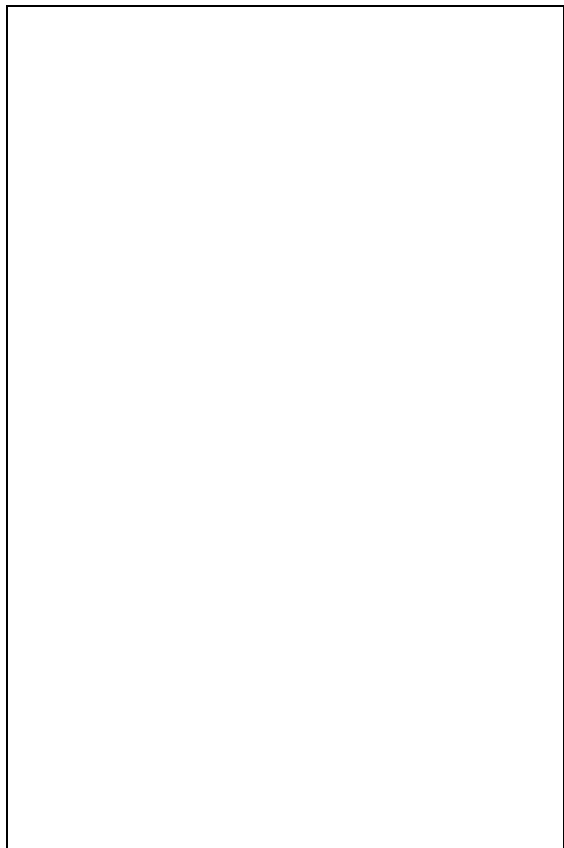


Figure 7. The electronics package carried GPS, sensors, video, and radio equipment.

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
17	18 <b>Education Team Meeting</b> 6 pm at HATS	19 <b>Project HALO Tech. Meeting</b> Noon at Ponds	20 <b>HALO Rocket Work Party</b> 6 pm at Tim's	21 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	22	23
24	25 <b>Education Team Meeting</b> 6 pm at HATS	26 <b>Project HALO Tech. Meeting</b> Noon at Ponds	27 No HAL5 Program	28 Thanksgiving Day	29	30

**December 1996**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2 <b>Education Team Meeting</b> 6 pm at HATS	3 <b>Project HALO Tech. Meeting</b> Noon at Ponds	4 <b>HALO Rocket Work Party</b> 6 pm at Tim's	5 <b>HAL5 Member Awards Dinner</b> 7 pm at Ponds	6	7
8	9 <b>Education Team Meeting</b> 6 pm at HATS	10 <b>Project HALO Tech. Meeting</b> Noon at Ponds	11 <b>HALO Rocket Work Party</b> 6 pm at Tim's	12 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	13	14 <b>Project HALO Balloon Launch</b> 9a at Old Airport
15	16 <b>Education Team Meeting</b> 6 pm at HATS	17 <b>Project HALO Tech. Meeting</b> Noon at Ponds	18 <b>HALO Rocket Work Party</b> 6 pm at Tim's	19 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	20	21 Winter Solstice
22	23	24	25 Christmas Day	26	27	28
29	30	31 New Year's Eve	HAL5 All-Membership Event <b>HAL5 Membership Appreciation Night and Dinner (\$15 or \$16)</b> 7 p.m., Thurs., Dec. 5 at Holiday Inn		Project HALO Main Event <b>Rocket Payload Test aboard High Altitude Balloon</b> 9 a.m., Sat., Dec. 14 at Old Airport	

**January 1997**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Project HALO Phase I Main Event <b>Launch of HALO Rocket from High Altitude Balloon to &amp; beyond the Edge of Space (50 nmi)</b> Saturday, January 25 from coast of North Carolina			1 New Year's Day	2 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	3	4
5	6 <b>Education Team Meeting</b> 6 pm at HATS	7 <b>Project HALO Tech. Meeting</b> Noon at Ponds	8 <b>HALO Rocket Work Party</b> 6 pm at Tim's	9 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	10 Inputs to HAL5 newsletter due	11
12	13 <b>Education Team Meeting</b> 6 pm at HATS	14 <b>Project HALO Tech. Meeting</b> Noon at Ponds	15 <b>HALO Rocket Work Party</b> 6 pm at Tim's	16 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	17	18
19	20 <b>Education Team Meeting</b> 6 pm at HATS	21 <b>Project HALO Tech. Meeting</b> Noon at Ponds	22 <b>HAL5 Program Night</b> 7 pm at Library	23 <b>HAL5 Executive Comm. Meeting</b> Noon at Ponds	24	25 <b>Project HALO Space Launch</b> North Carolina

(First Word, continued from page 1)

**More Rockoon Missions in the Works**

HAL5 has won its unsolicited bid with NASA to conduct two more rockoon missions next year. These missions will be launched from a NASA barge in the middle of the Gulf of Mexico! Preliminary details of these missions are as follows:

**HALO SL-2**

This mission will be co-sponsored by the National Space Society (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 (ISDC), the annual meeting of the NSS.

This mission will consist of a single stage 350 pound thrust 30 second burn enriched Hydroxyl-Terminated Poly-Butadiene (HTPB)/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 pounds. Of this the fuel weight

is to be 56.66 pounds yielding a dry or post mission weight of about 38 pounds.

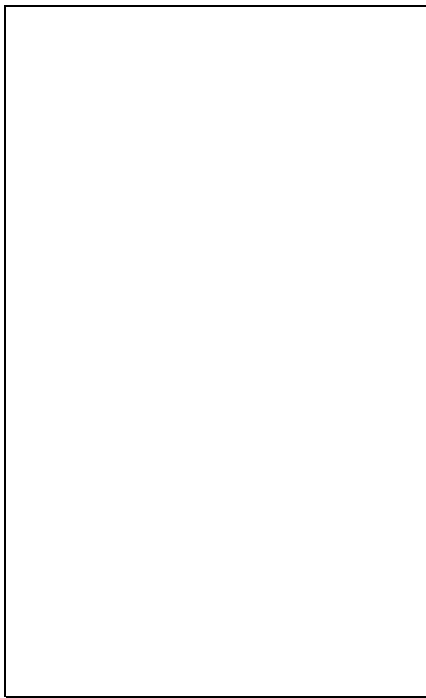
The launch tube and gondola firing electronics will weigh less than 20 pounds. This mission will have active guidance provided and providing microgravity for a five pound payload. The apogee is expected to be about 70 statute miles. Planned launch date is during Memorial Day weekend 1997 to tie it with the 1997 ISDC in Orlando.

**HALO 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/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 is 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.



Philomena Grodzka holds up her Volunteer of the Century Award.

**Philomena Grodzka Awarded**

At the last HATS General Membership Meeting, HAL5 member and longtime, and now retiring, HATS volunteer Philomena Grodzka was awarded a "Volunteer of the Century" certificate for her long involvement with the HATS organization, including serving the past five years as Executive Coordinator. She was also recognized during the Von Braun Exploration Forum. Congratulations, Philomena! ☆

\*\*\*\*\*

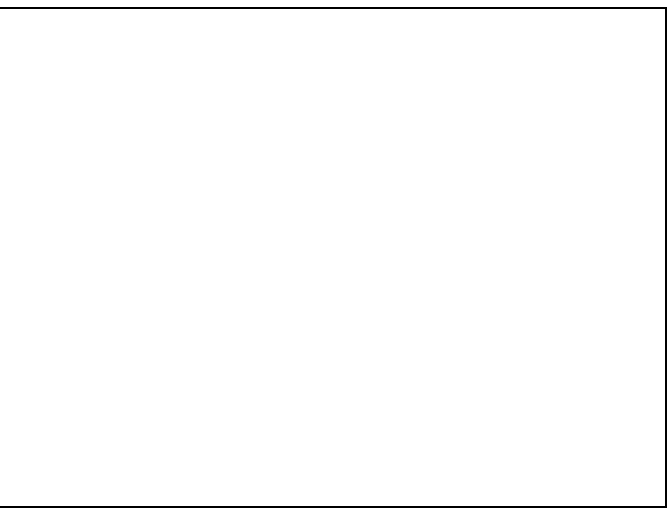
**HAL5 Receives HATS Grant**

At the last HATS General Membership Meeting, HAL5 was awarded a \$1,000 grant. The grant is to be used to help offset the cost of insurance, currently required by the NSS Board of Directors for the second HALO space flight. HAL5 would like to thank HATS for this very generous donation, and thank HATS President Amy Herring and Philomena for their assistance. ☆

**In Closing**

As you can see this is a very exciting time to be in HAL5. We are going to space! We will go again and again! You too can be a part of these history breaking missions. Just contact us and we will find a place for you! Call me at 859-5538 for more details. Ad Astra per HALO! ☆

**Check out the HAL5 Web Page**  
<http://iquest.com/~hal5/>

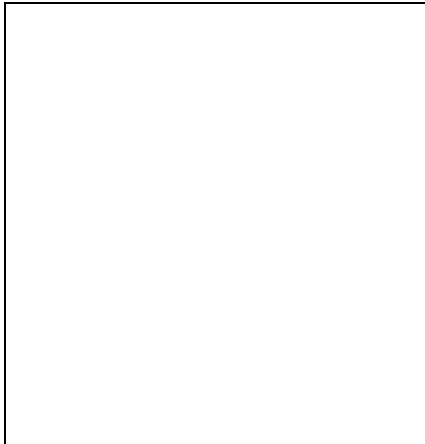


Greg, with Rascal, receives a donation of \$1,000 from HATS towards the second Project HALO space flight.

**Project HALO Rocket Status**

(by Ronnie Lajoie, HALO Member)

During the summer months following the successful ground launch of the HALO rocket, team members sought a way to make the space rocket lighter. By removing the fins, the rocket would be just a cylinder with a pointy nose, allowing us to move the insulation from the tanks themselves to the outer walls of a smaller and lighter launch tube (see article on page 4).



Angled vanes placed inside the nozzle extension to divert thrust.

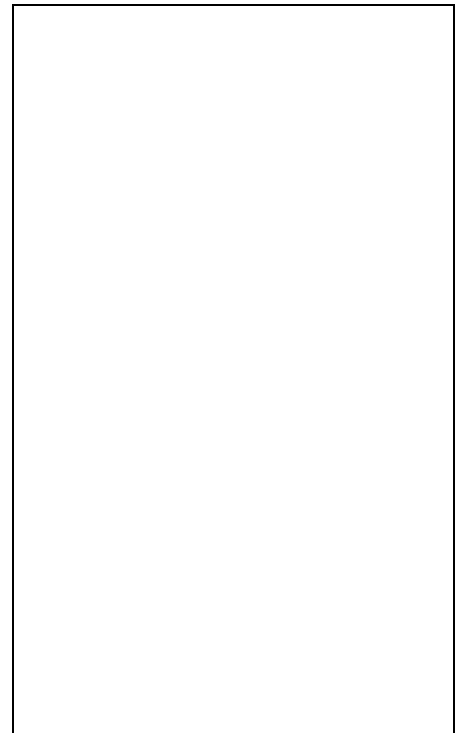
**How Do You Keep a Finless Rocket Stable — You Spin It — But How?**

Many members of the HALO team wrestled with that question all summer long. Suggested ideas included a tube with a large helicopter-like blade. Once dropped from the balloon, the tube would spin up, thereby spinning up the rocket inside. Analysis showed, however, that if ignition did not occur within 5 seconds, the falling tube would gain too much downward velocity for the rocket to overcome.

Larry Scarborough proposed to spin up the tube mechanically and made several successful demonstrators. The system of weights and pulleys requires only an understanding of high school physics and is still considered a viable option.

Back in the 1800's, the first advance in rocketry was made when some bright person thought of deflecting the thrust by placing vanes in the exhaust nozzle. Properly angled, the diverted thrust would generate a moment which would spin up the rocket.

This approach, while not at the high school physics level, seemed doable by the HALO team. Ron Lajoie cut and shaped the aluminum vanes and placed them in the rocket nozzle



HALO motor fires, but does not spin.

extension (see left). When the rocket motor fired at 11th Test Day on October 12 (see below), the motor performed flawlessly, but did not spin. A jammed mechanism was to blame. This was corrected before the 12th Test Day on November 9; however a mechanical flaw broke the nozzle. Oh, well.

For the first launch, we will use fins. ☆

**HAL5 STILL 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 837-7738.
- To help on HALO gondolas, please call lead Larry Scarborough at 881-4363.
- To help on rocket/gondola electronics, please call Clay Sawyer at 539-3889.
- 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.



In between firing rocket motors, HALO team members fire up the barby, and enjoy good food and conversation, courtesy Chris Pickens.

**1996 Was a Fantastic Year for HAL5 Membership**

(by Ronnie Lajoie, SSS Editor)

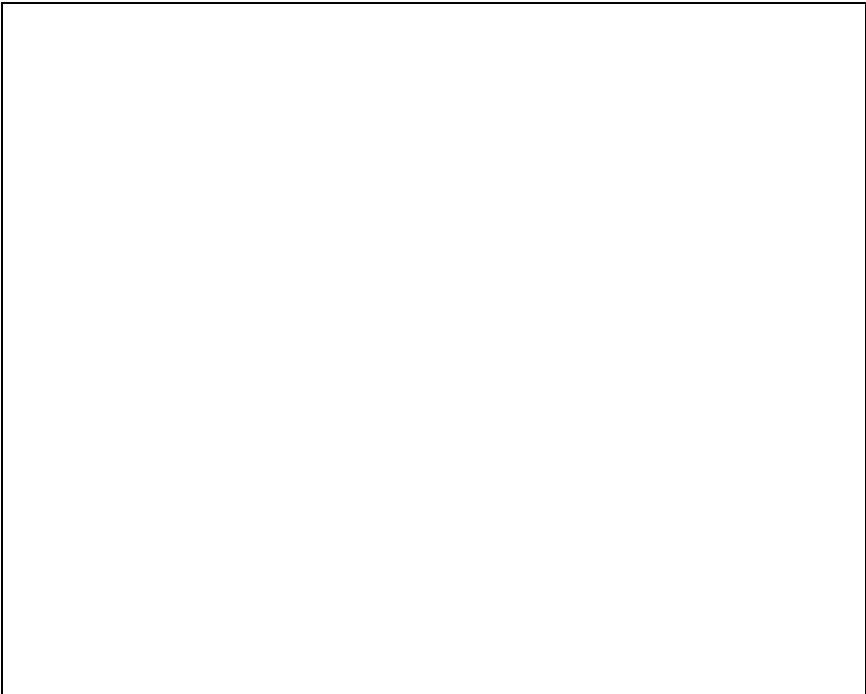
As of November 26, HAL5 membership now stands at 65, plus 4 newsletter subscriptions. This is fantastic — over a 50 percent increase from last year’s membership, which also was a record!

The following is a complete list of the current paid membership of HAL5, which includes 34 renewals and 31 new members, for a total of 65. Thank you to all our new and renewed members and subscribers!

William T. Adams  
 Henry E. Ahler  
 Gregory H. Allison  
 Steve Arnold  
 William H. Axenroth  
 Mary Bare  
 John & Lorraine Barnum  
 Matt Beland  
 Jan A. Bijvoet  
 Bill Brown  
 Gary Buck  
 Johnny C. Campbell (N)  
 Julian V. Campbell  
 Douglas A. Childs  
 Thomas F. Craig  
 Ronald A. Creel  
 David L. Dean  
 Gary Dion  
 Robert L. Ehresman, Jr.  
 Peter D. Ewing  
 Martha H. Feld  
 Beth Furgerson (N)  
 Ernest V. Gilmer, Jr.  
 Franz Gisin  
 Philomena G. Grodzka  
 Jones S. Hamilton, Jr.  
 Melanie Hazelrig  
 David Hewitt

James R. Hopkins  
 William (Gene) Hornbuckle  
 Lee Anne Jernigan  
 Bryan Jones  
 J. Rick Kauffman  
 Edward Kenny  
 Alexander Khalyarkin  
 Peder L. Kilness  
 Nancy A. Lajoie  
 Ronnie M. Lajoie  
 Dennis LaMothe  
 Larry D. Larsen (R)  
 Phillip May  
 Randall G. McCollum  
 Timothy N. McKechnie  
 Ray Moses  
 Keith Murdock  
 Omran A. Musbah (N)  
 Steve Mustaikis  
 Dr. Charles T. Paludan

John A. Pavlick  
 Eugene A. Peresich, III  
 Herman & Chris Pickens  
 Timothy L. Pickens  
 James A. Prentice, III  
 David Robinson  
 Clayton Sawyer, Jr.  
 Larry K. Scarborough  
 Ethan A. Scarl, Ph.D.  
 Chuck Schlemm  
 David V. Smitherman  
 Fritz & Tina Staff  
 Dr. Ernst Stuhlinger  
 Mark Wells (N)  
 Richard D. Wilson  
 Alfred Wright  
 David Yeoman  
 (N) - New Member  
 (R) - Renewed Member



Mt. Gap Elementary School students form the initials of their school. Photo was taken by remote camera aboard the red HALO Balloon.

**Special Announcement**  
**HAL5 Member Appreciation Night**  
**Thursday, December 5, 6:30–9 pm**  
**at Holiday Inn at Madison Square**  
**(See Flyer inside for details)**

**Huntsville Alabama L5 Society**  
 1019-A Old Monrovia Rd, Suite 168  
 Huntsville, AL 35806  
 ADDRESS CORRECTION REQUESTED

Place  
 First Class  
 Stamp  
 Here