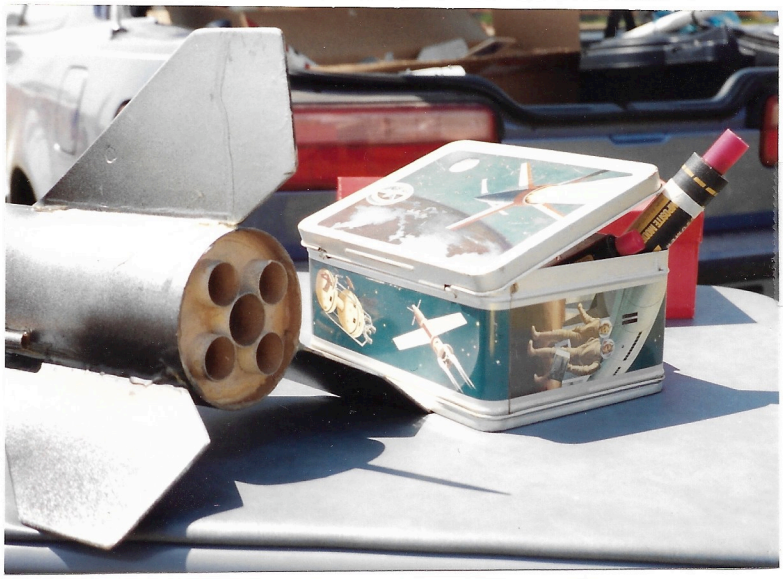
MAX-Q HARA

Newsletter of the Huntsville Area Rocketry Association Volume 8, Number 3, Jun/Jul 1994

Big Launch at New Athens Field



By Greg Warren

To everyone who came to the SEP Program Mission launches, the day started out like any other rocket event. It was late getting started, the wind was stronger than what it was supposed to be, people parking in the wrong place, you know, typical. But the day promised to be full of excitement and surprises, and that turned out to be an understatement.

The first disappointment for the day was a payload that didn' t make it to the launch. For the past few months, several students at UCLA have been developing a micro furnace capable of producing up to 60 microspheres during the flight onboard the SEP II rocket (6 inches in diameter.) The progress had been moving along quite well up until the unit had to be condensed down into the payload size, then complications arose. The students are still working on the experiment and hope to have it ready for launch in thc near future. SEP has promised them a flight upon delivery of the payload.

The hardest task of the day before the flying started was: "getting that stupid tent put up." It took the entire SEP team to wrestle the canvas onto the poles, but the shade all day was worth it.

Matt Sherrill from the Shoals flew several *Big Bertha* size models. Mark Tygielski made a high power qualification flight. Greg fired a *Patriot* and a *Viking.* Joe Robertson served as firing officer.

Vince Huegele flew alot of stuff. He lit a *Strong Arm* on an E15-4, an *Eliminator* on a F50-7 Silver Streak, a scratch built *V-2* on a F25-6, a LOC *Beauty* on an H55-10, then the same model on a G80-7 with four E30 outboards. The clustered motors all lit with a deep satisfying roar, but the ejection charge from the G severed the fabic cable on the piston.

Also on hand was Tim Pickens, who brought his steam powered rocket for display and Dan Coon with his *Tsunami* water rocket. Dan had two successful launches to an altitude of roughly 200 feet, and as usual, was a real crowd pleaser.

In addition to model and high power launches, there were activities for other family members. These activities ranged from playing with styrofoam gliders and frisbees, to flying kites. Some of the local youth set up a snack and refreshment stand which proved to be popular as the temperature began to climb. Total count for the day, with people coming and going, topped out at around 200 with a steady crowd of around 100 throughout most of the day.

Of the eight experiments to be placed on the SEP I flight, the sponsor students were in attendance along with their teachers. After conducting two hours of open range time for students to launch their model and high power rockets, the range was closed to prep the SEP Mission flight. Since this was a new field, the FAA had requested that any flight exceeding 5000 feet AGL be called in within 30 minutes of launch. After the call, the crowd of about 150 waited for the countdown.

As the numbers rolled backward to "Zero . . . Ignition", no one could have anticipated the disaster. The forward bulkhead in the ISP J-800 reload gave way and the motor presented a most impressive volcano

continued inside.....

INSIDE MAX-Q

> Hot Rockets
> Cold Rockets
> Big Rockets
> Old Rockets

From the President's Pad

Glorifying the Past, Neglecting the Future ?

Twenty-five years ago the Earth was united into one world watching the Moon. As we reflect on that accomplishment I think about two things. One, we left the moon and haven't hardly been back to space in all that time, and two, there hasn't been near the hype about this milestone in the space advocacy modeling arena as there should have been.

It's good and appropriate to have NARAM in Houston this year, but if not NAR, then Estes at least I thought would have some kind of commemorative launch program for clubs nation wide to support. Since the current space program doesn't give anyone much to get excited about, the Apollo anniversary would be a chance glamorize rocketry and modeling again.

There's more than just missed opportunities for launches that's depressed me since the fourth of July, and as the twentieth approaches. Instead of trying to surpass previous accomplishments, America is content to watch replays of moon landings and just say "been there, done that." We aren't still on the moon now because the United States doesn't care. NASA is the symbol of greatness in this country, but our rocket's red glare has lost its glimmer because it represents the country and the whole country is in decline. We've gone from national symbol to national symptom, where it seems no one knows anymore how to get anything done. That's my reaction; well, this is an editorial page.

There are Apollo observances in NASA towns. Huntsville has several events this month, and the Rocket Center has had a special exhibit all year. I want all HARA members and friends to come out to the Athens field for the festivities planned there so come to fly or watch, (see back cover for details and map.) By the way, this is also the new high power field, so keep the directions. See you there!

MAX-Q

VOL 8. NO 3 . Jun/Jul 1994

Editor: *Vince Huegele*

Contributors: *Greg Warren, Dan Coon, Tim Pickens*

Max-Q is the official newsletter of the Huntsville Area Rocketry Association (HARA), NAR Section 403. Subscriptions are included as part of membership dues, or available to non- members for $10.00 per year (six issues.) The editor welcomes any material submitted for publication. Send all items or payments to 11108 Argent Dr., Huntsville, Al, 35803.

HARA officers

President: Vince Huegele
Vice President: Joe Robertson
Secretary: Greg Warren
Treasurer: Sharal Huegele

NAR address: 1311 Edgewood Dr., Altoona, WI 54720.

COUNTDOWN '94

HARA meetings are second Thursdays (except December) at the Huntsville Association of Technical Societies (HATS) office, Suite 29, Building 4900, University Square, (off the Boardwalk.)
Launches are 9:00 am Saturday mornings at the Old Airport, unless announced otherwise. Call Greg Warren for SEP launch site information.

JUL: 14 Thur; HARA Meeting, 7:30pm, HATS
9 Sat; Sport Launch
23 Sat; Apollo 11 Anniversary Launch, Athens Field

AUG: 11 Thur; HARA Meeting, 7:30pm, HATS
13 Sat; Sport Launch

SEP: 8 Thur; HARA Meeting, 7:30pm, HATS
17 Sat; Sport Launch, Classic Prep,
17 Sat; Model Contest at Hobbytown

OCT: 1 Sat; **Rocket City Classic XIII**, 9-12
13 Thur; HARA Meeting, 7:30pm, HATS

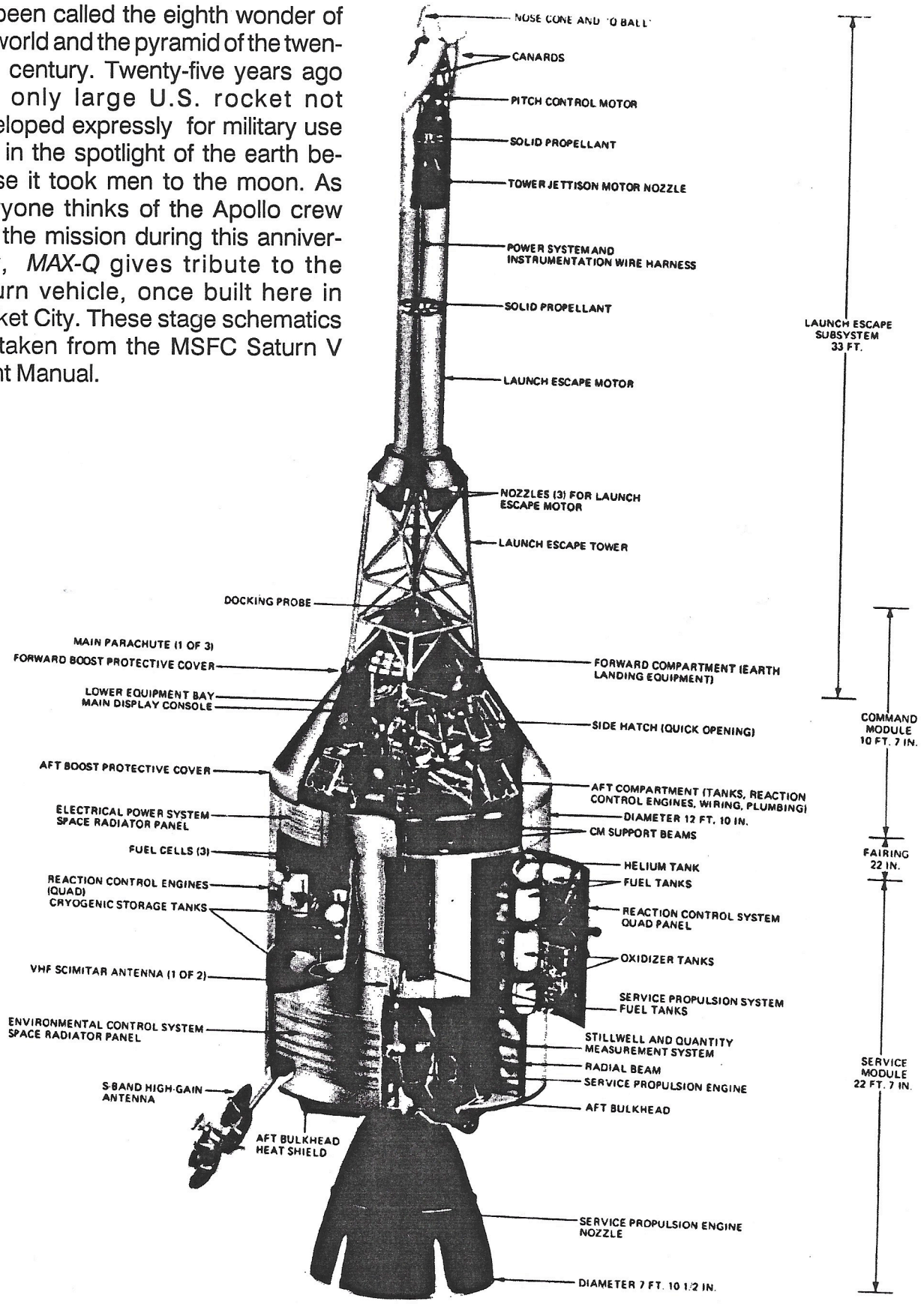
NOV: 5 Sat; Sport Launch
10 Thur; HARA Meeting, 7:30pm, HATS

DEC: No HARA activities.

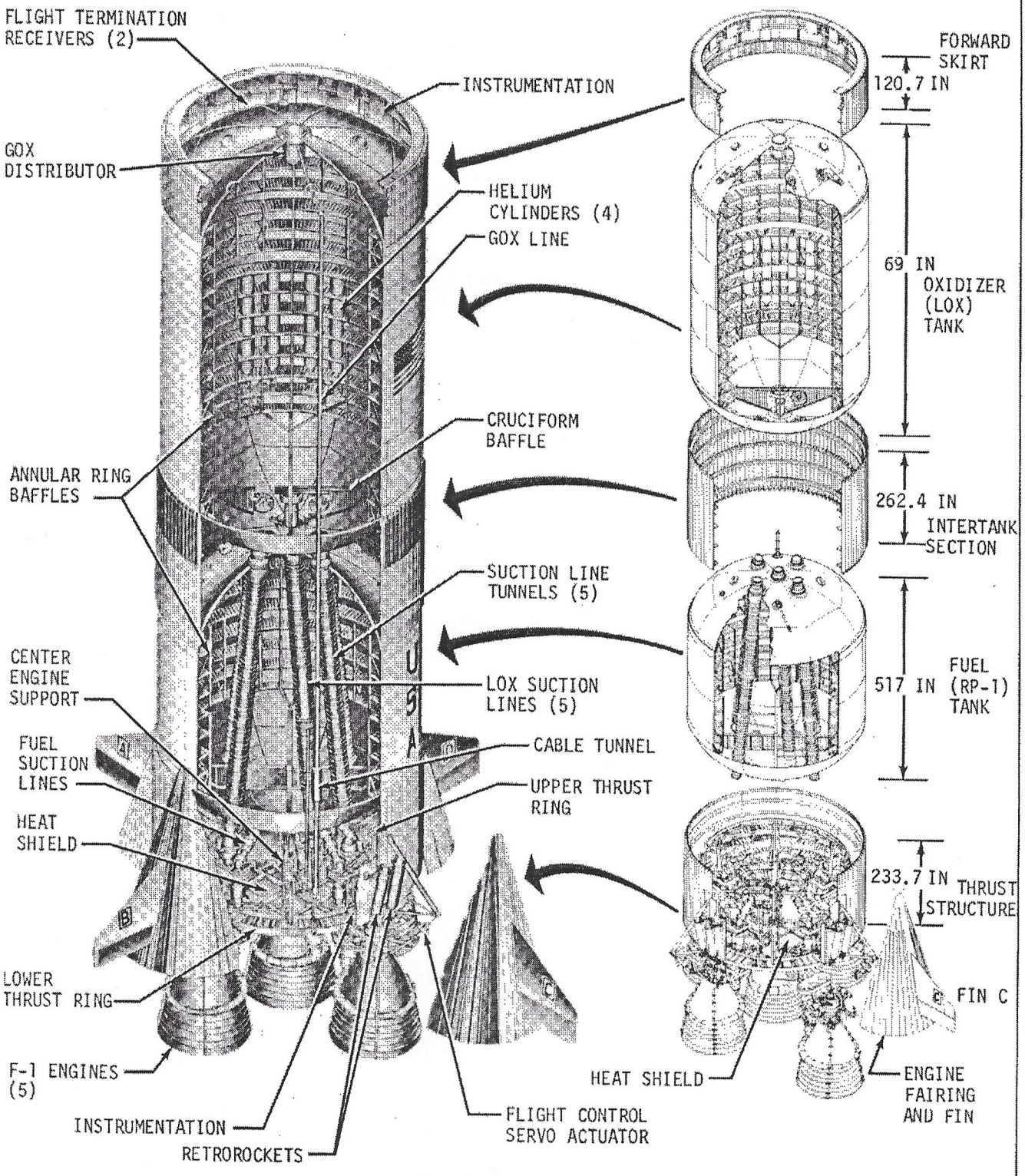
For more details call Vince at 881-2904 or Joe at 721-1338.

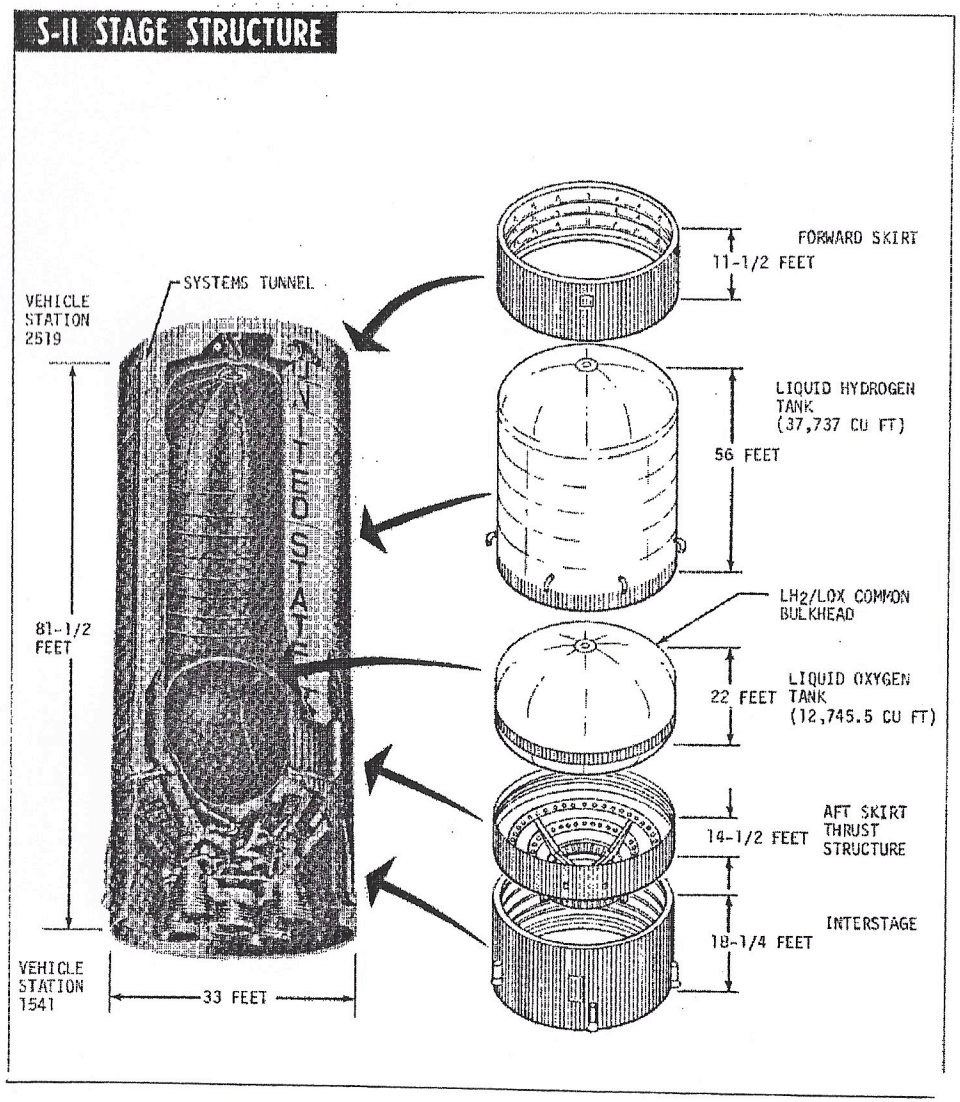
SATURN FIVE

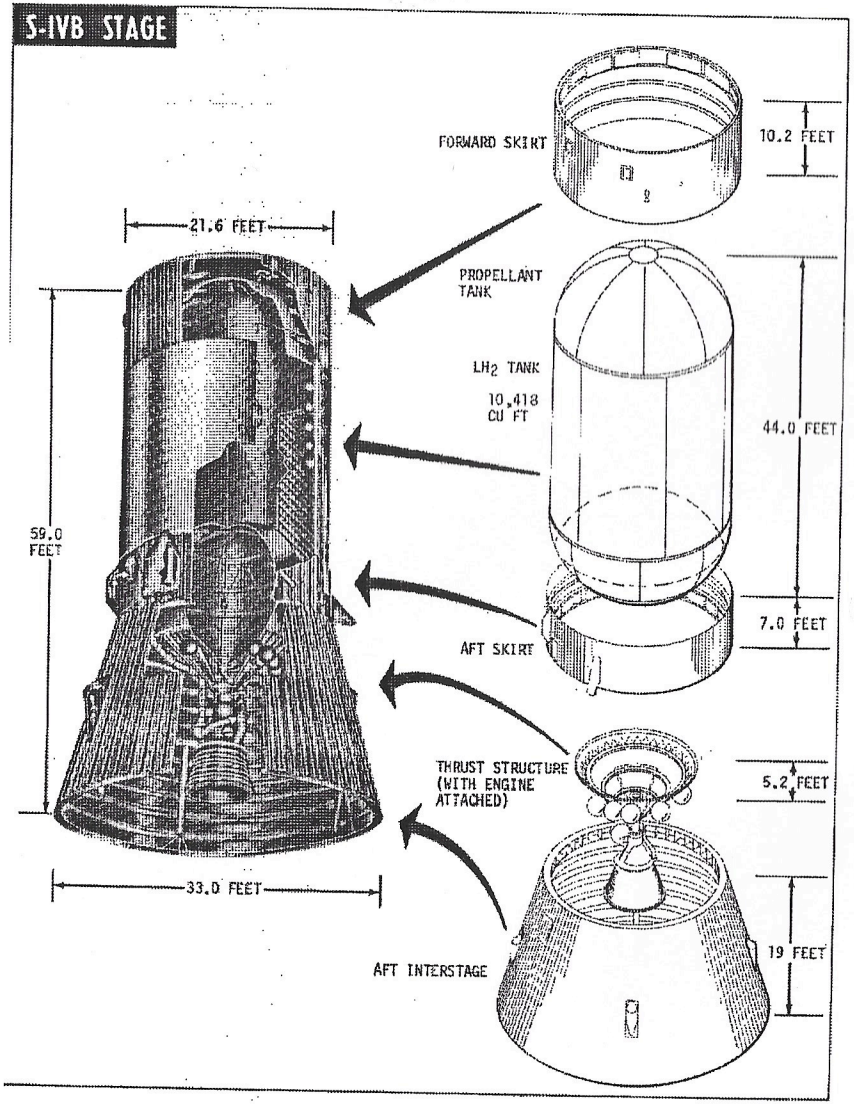
It's been called the eighth wonder of the world and the pyramid of the twentieth century. Twenty-five years ago this only large U.S. rocket not developed expressly for military use was in the spotlight of the earth because it took men to the moon. As everyone thinks of the Apollo crew and the mission during this anniversary, *MAX-Q* gives tribute to the Saturn vehicle, once built here in Rocket City. These stage schematics are taken from the MSFC Saturn V Flight Manual.



S-IC STAGE


FLIGHT TERMINATION RECEIVERS (2)
INSTRUMENTATION
GOX DISTRIBUTOR
HELIUM CYLINDERS (4)
GOX LINE
CRUCIFORM BAFFLE
ANNULAR RING BAFFLES
SUCTION LINE TUNNELS (5)
CENTER ENGINE SUPPORT
LOX SUCTION LINES (5)
FUEL SUCTION LINES
CABLE TUNNEL
HEAT SHIELD
UPPER THRUST RING
LOWER THRUST RING
F-1 ENGINES (5)
INSTRUMENTATION
RETROROCKETS
FLIGHT CONTROL SERVO ACTUATOR
HEAT SHIELD
ENGINE FAIRING AND FIN
FIN C
FORWARD SKIRT
120.7 IN
69 IN OXIDIZER (LOX) TANK
262.4 IN INTERTANK SECTION
517 IN FUEL (RP-1) TANK
233.7 IN THRUST STRUCTURE


S-II STAGE STRUCTURE
SYSTEMS TUNNEL
VEHICLE STATION 2519
81-1/2 FEET
VEHICLE STATION 1541
33 FEET
FORWARD SKIRT
11-1/2 FEET
LIQUID HYDROGEN TANK (37,737 CU FT)
56 FEET
LH2/LOX COMMON BULKHEAD
LIQUID OXYGEN TANK (12,745.5 CU FT)
22 FEET
AFT SKIRT THRUST STRUCTURE
14-1/2 FEET
INTERSTAGE
18-1/4 FEET


S-IVB STAGE
FORWARD SKIRT
10.2 FEET
21.6 FEET
PROPELLANT TANK
LH2 TANK
10,418 CU FT
44.0 FEET
59.0 FEET
AFT SKIRT
7.0 FEET
THRUST STRUCTURE (WITH ENGINE ATTACHED)
5.2 FEET
33.0 FEET
AFT INTERSTAGE
19 FEET

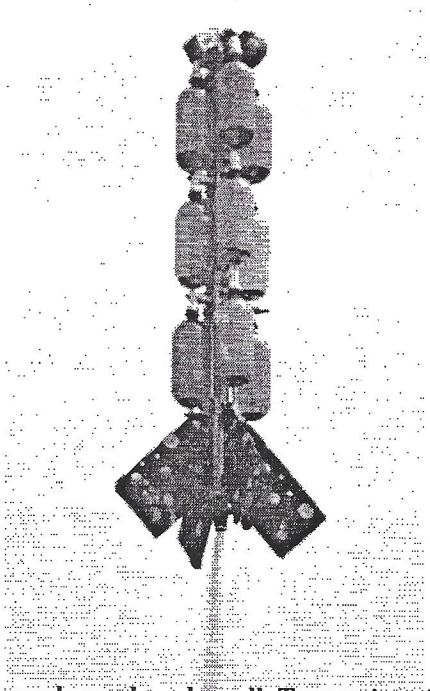
H_2O Power!

While many rocketeers are sweating the possible BATF involvement in motor restrictions, Dan Coon and Tim Pickens are cool. When other modelers are hording their dimes to pay for propellant reloads, Dan and Tim have their fuel on tap. Although some guys in the desert are wearing gloves and breathing filters to protect them from their advanced propulsion systems liquids, Dan and Tim drink and bathe in theirs. (No, it's not Alabama moonshine.) The two stories continue, of amatuer rocketry's most unlikely and successful new dual application propellant: *water.*

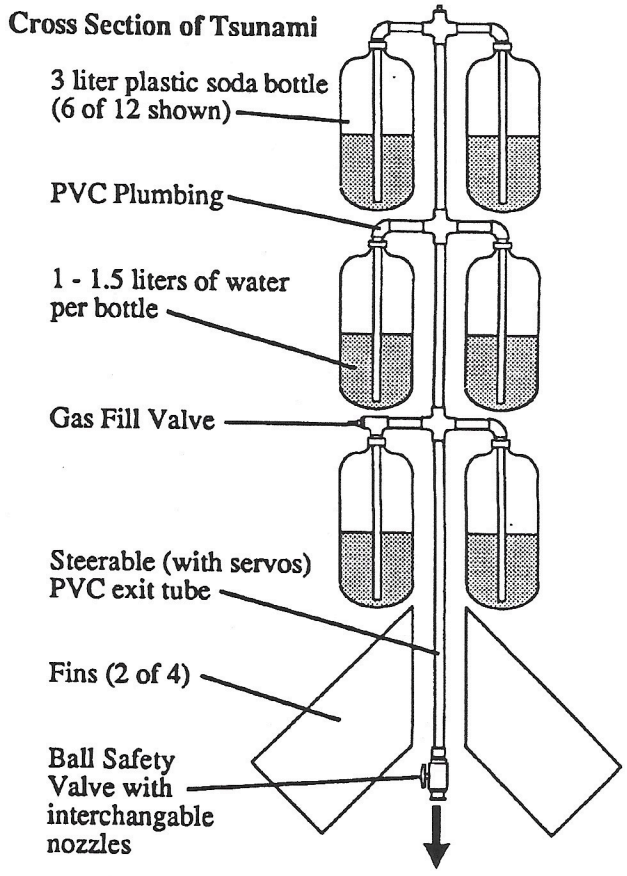
Cold Water

It hasn' t been easy and it hasn' t been an overnight project, but HARA member Dan Coon has come close to perfecting his water rocket. Named *'Tsunami*" by its creator, the water rocket is unlike any flying machine that most specators have ever-seen.

The internal structure is composed of thin wood framing outfitted with a matrix of PVC plumbing and fittings. These intricate patterns terminate in 12 sockets into which 3 litre soda bottles are first filled with a predetermined amount of water, then attached to the fittings. An air valve located near the center of the rather bulky looking vehicle allows for pressurized carbon dioxide to be forced into the structure, pressurizing the tanks to 90 PSI. A ball valve at the bottom of the exhaust tube sends the pressurized water into the nozzle. Action forces reaction and up the rocket goes.



It really works, and works well. Tsunami squirts off above tree top level to aptly demonstrate Newton's 3.



Reading about the *Tsunami* is one thing but to really appreciate this unique vehicle there is no substitute for seeing it launched. Despite the fact that water is dumped from the nozzle in less than three seconds, the liftoff is amazingly slow and majestic. Utilizing a 1 /2" launch rod, the *Tsunami* rises straight up with a rather impresive roar with little or no rolling on the way up. A slow and gentle flight to around 200 feet (average) allows the nearly six foot tall rocket to remain inclear sight to all spectators. At or near apogee, depending on the general feelings of the person tending to the radio control unit, a signal from the transmitter releases a 6 foot parachute for a slow and steady descent. Dan has also added a panoramic camera (also radio operated) and has managed to capture several very impressivephotographs of crowds, terrain and of course - sky.

What's in store for the *Tsunami*? At present, Dan is working on a new fin system for the rocket to overcome the frequent breakage that occurs from landing. Also in the works is an attempt to place gyros onboard the vehide, completely eliminating the need for a launch rod. Dan has also talked about working up plans or possibly a kit for a similar version of his rocket, designed for student construction.

Hot Water

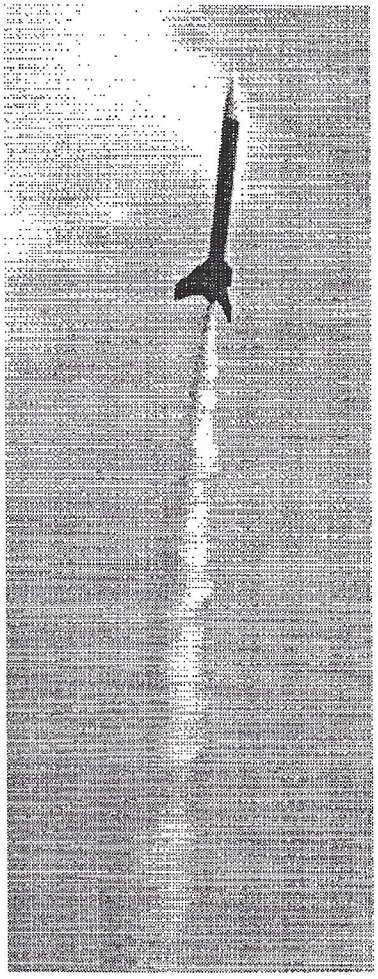
After months of meticulous building and testing, Tim Pickens pulled the plug on his steam rocket sending it skyward (shown at right) on as nominal a flight as any rocketeer could want. The lift-off, ascent and recovery were excellent on May 21 even thought the whole operation was just a test to see if anything would work.

It was not merely luck that the flight was so good. Tim has spent countless hours on this project. He built a test stand to study his nozzle designs and heating techniques. But he needed a better stand, and made another one to more accurately measure the thrust. The motor "fires" when the plug is released from the nozzle and the steam blows out.

Reading his strip charts, Tim made careful refinements of thrust, pressure and temperature to optimize performance. He made regular reports at HARA meetings from his notebook and showed videos of his test progress. What had started as a fire extinquisher can over a propane heater had become a sophisticated pressure vessel. At 250 psi, Tim's tank was now able to give 275 pounds thrust for about two seconds. The two thousand newton-seconds of impulse make this about a 'K' motor.

Putting the steam engine in an airframe was another project. The bird has to fly stable and kick out a parachute somehow. Greg Warren and Jeff Frohwein contributed to the recovery system design and instalation. The 8 inch diameter, 12 foot long vehicle weighs 50 pounds with 18 pounds of water.

A large entourage of interested parties gathered at the Athens field for the launch test. While Tim and company sorted out the final preparations and heated the water, others flew a few models nearby.



At the moment of truth, a hundred foot cable manually pulled the release pin that held the pressure plug and locked the tank to the stand. The steam roared out as the rocket went straight up on a vapor trail and stopped as soon as the gas was gone. At six hundred something feet, a large parachute emerged and settled the rocket quietly back down in the grass.

What was just a test flight, where anything could have happened and been acceptable for learning a new technology, turned into one of the most impressive and satisfying performances of the year. We all know now the thing works, and works well. But Tim's at the drawing board with another idea for a new nozzle to get just a *little* more thrust.

Athens Launch *continued from page 1*

cano of smoke and fire out the nose while it sat on the pad roasting. The closure had stripped the threads allowing the burning propellant to exhaust out the front. The good news was that the payload bay and the experiments were ejected right as the motor failed and descended safely to the ground on a parachute while the booster burned. All spectators were behind the firing line and safe at that distance during the event.

As if on cue, Neal Redmond arrived with his Mad Dawg (it's a rocket manufactured by Dangerous Dave) which just happened to have an exact size payload bay and the same diameter airframe as the now creamated SEP I. So after a few tradeoffs and transfers, the experiments were loaded and ready to go. This time the flight on a new motor was picture perfect with a beautiful recovery. For those who stayed to see the additional flight, they were not disappointed. Activities wrapped up around 5:00 p.m.

Over the next two days, the SEP Team (with the help of some students from Athens High School), launched and recovered the remaining payload experiments on the SEP I-A and SEP II rockets. The flights culminated in a total of 32 experiments being launched with an average flight altitude of 7,240 feet AGL. Payloads ranged from tadpoles from Highlands Elementary in Huntsville, to accelerometers and air sampling devices from Tennessee and California. The SEP Team is still anticipating the arrival of the UCLA micro furnace experiment.

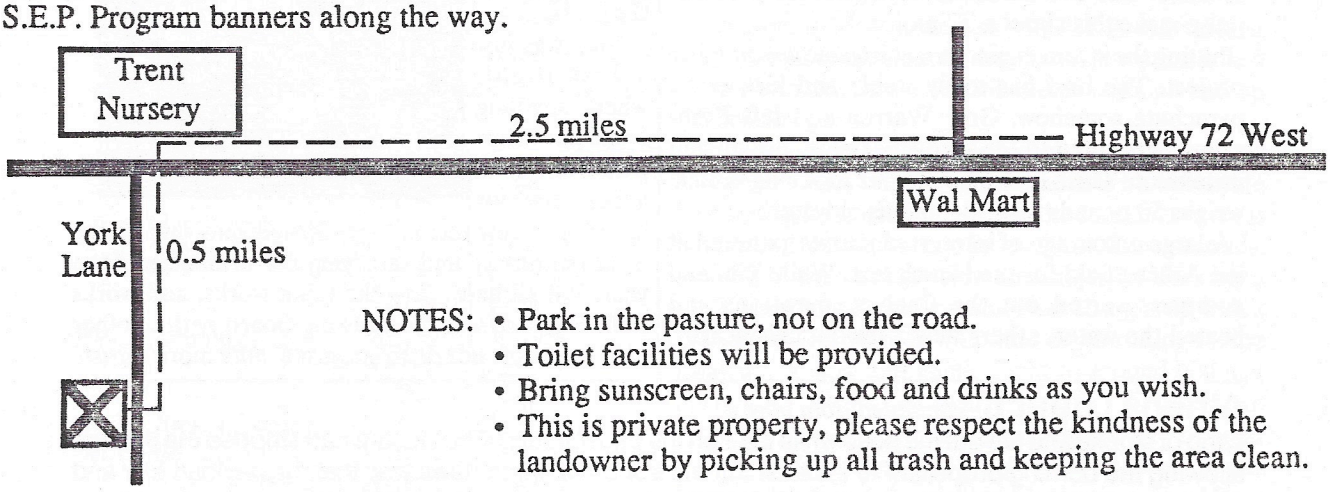
M A X - Q

25th Anniversary Tribute to the First Moon Landing Saturday 23 July 1994 - Athens, AL

- Model rocket and high power rocket launches - 2:00 p.m.
- Video presentation of the first moon landing - 7:30 p.m.
- Spectacular night launch with lunar landing dedication
- Recognition ceremony for astronauts past and present

Admission is free and the public is invited.
Food and refreshments available courtesy of
Athens Optimists Club and S.E.P. Program.

Directions: Travel **WEST** on **Highway 72** to Athens. Once entering Athens, continue on Highway 72 West until you reach **Wal Mart** on the left. Continue on Highway 72 for **2.5 miles** past the traffic light at Wal Mart. Turn **LEFT** onto **York Lane** (Trent Nursery on Hwy 72 will be on your right), and travel **0.5 miles**. The launch will take place in the large pasture to your right. Look for S.E.P. Program banners along the way.



NOTES:
- Park in the pasture, not on the road.
- Toilet facilities will be provided.
- Bring sunscreen, chairs, food and drinks as you wish.
- This is private property, please respect the kindness of the landowner by picking up all trash and keeping the area clean.

The Student Experimental Payload Program is a non-profit organization dedicated to hands-on aerospace education. For more information call (205) 230-0353.

Huntsville Area Rocketry Association
11108 Argent Drive
Huntsville, Alabama 35803

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