Challenger crew plagued by plumbing, other woes

By JOHN KEEFER III
St★r-Advocate Staff Writer

After a near-perfect launch Monday, the Space Shuttle Challenger was plagued with minor problems during its first two days in space.

The launch was delayed for two minutes because of a minor computer problem that was quickly remedied. Challenger roared from Pad 39A at the Kennedy Space Center at 12:02 p.m., rising through a dense haze that made the flame from the orbiter's three engines and the solid rocket boosters barely visible to almost 10,000 visitors watching along the river's edge in Titusville.

Four and a half hours into the mission, Challenger's seven-member crew launched the first of two Getaway Special satellites located in the cargo bay. The NUSAT, an air traffic control radar calibrator designed by Morton Thiokol and a science team at Weber State College in Utah, became the first privately developed spacecraft to be deployed from the shuttle.

The second satellite, a oceanographic sensor locator and message relay system known as GLOMR, was not as cooperative. It never left its specially designed deployment canister.

"No joy on the GLOMR deploy," said mission commander Robert Overmyer.

NASA officials said another attempt at deployment could be made later in the flight.

After the failure of the GLOMR satellite, other problems developed. A urine monitoring device attached to Challenger's lavatory facilities began to malfunction, spewing urine into the cabin whenever the monitoring device was activated.

Since the toilet operated properly when the device was off, the device was shut down.

Another plumbing problem kept the shuttle crew without fresh water for almost six hours when a kitchen faucet malfuctioned. The crew successfully jerry-rigged a hose to bypass the water suppy system.

Communication problems between the Spacelab facility in the orbiter's cargo bay and the command cabin also became evident when mission specialist William Thornton said he could not talk to the cockpit crew.

By Tuesday, rat feces and food (from the life sciences experiment involving 24 rats and two squirrel monkeys) were seen floating inside Spacelab. Other problems included inaccurate readings from certain instruments, a faulty fire alarm system, and unusual computer printouts.

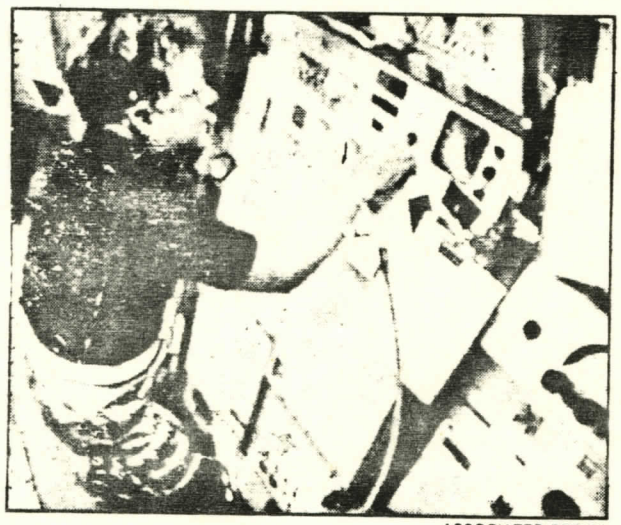
NASA spokesman Mark Hess said, however, most of the problems had been cleared up by Wednesday morning and the astronauts were settling into a normal routine. He said none of the problems Challenger had experienced threatened the safety of the crew or the length of the mission.

One major operation that has functioned properly is Spacelab. Fifteen experiments will be conducted in the laboratory during the seven-day mission.

NASA officials were pleased with the record time between shuttle flights. Challenger lifted off only 17 days after its sister ship, Discovery, began Mission 51-D on April 12.

Landing is scheduled for Edwards Air Force Base, Calif., at 12:05 p.m. EDT on May 6.

Troubles let up in Spacelab while tests excite scientists



ASSOCIATED PRESS

A crystal grower at work
. . . Don Lind fine-tunes controls in Spacelab.

By James Fisher
OF SENTINEL STAFF

CAPE CANAVERAL — With fewer problems hindering work, shuttle astronauts kept busy Wednesday in Spacelab gathering valuable scientific data from 11 of 15 experiments.

Another experiment, a machine that will study ions streaming toward Earth from the sun and other sources, was scheduled to begin collecting data by this morning.

One of two squirrel monkeys along for the ride was reported a bit woozy from spacesickness. Television pictures showed him curled in a corner with his head between his paws. His condition improved later in the day.

The monkeys and 24 rats are aboard to test new space animal cages. NASA officials suggested that the crew put tape around the cages and try to moisten their food to prevent clouds of stinking crumbs from floating through the cabin as happened on Tuesday.

"Everything is settling in. The crew is adjusting well to the experiments," said mission scientist George Fichtl at Johnson Space Center in Houston. Scientists "are extremely excited about the progress of the mission."

But some of the scientists will get little or no information from experiments they had spent years designing.

A wide-field camera got no usable astronomy pictures before NASA decided to stow the equipment because a faulty air lock prevented its use.

A machine that will study the actions of liquid drops in weightlessness was still out of service Wednesday because of electrical problems.

Challenger's astronauts, working around the clock in 12-hour shifts, reported good progress with the growth of crystals, atmospheric studies and aurora photography.

Three experiments involve the growth of clear and ruby-red crystals for electronics use.

Fichtl said one of the monkeys "suffered a bit of adaptation to space problems. He has overcome that and is now taking on food and water. He appears to be doing very well."

Dr. William Thornton called the monkeys "the real prima donnas of this facility," and predicted that astronauts eventually will have pets aboard spaceships.

NASA officials said they haven't decided to extend the mission a day for more science work, but scientists were planning how to use the extra time.

The flight began Monday and is scheduled to end at 12:03 p.m. next Monday at Edwards Air Force Base in California.

ORLANDO SENTINEL
APRIL 29, 1985

Challenger, crew ready for field trip

Research mission set to start at noon today

By James Fisher

OF THE SENTINEL STAFF

CAPE CANAVERAL — Seven astronauts, two "monkeynauts" and 24 rats are scheduled to thunder into space at noon today aboard the shuttle Challenger for a weeklong journey of science and discovery inside the $1 billion European-built Spacelab.

The weather outlook for the launch area is excellent, and the shuttle has a "window" of 2 hours and 39 minutes during which it can be launched, officials said Sunday.

"Everything is looking well. We're showing a thumbs-up sign now," said Jesse Moore, NASA associate administrator for spaceflight.

The shuttle is set to land at 12:03 p.m. May 6 on the dry lake bed at California's Edwards Air Force Base, where there is more margin for landing error than at Kennedy Space Center.

NASA decided on the California landing because the shuttle Discovery blew a tire and had brake problems when it touched down at KSC April 19, Moore said. A committee is studying the problem, and Discovery's flight in mid-June also may land at Edwards, he said.

Moore also announced that NASA officials were reconsidering their decision to cancel the

Please see **SHUTTLE, A-4**

SHUTTLE

From A-1

launch of two small satellites during this week's flight. Technicians were worried that the space environment could cause a failure in transistor radio batteries used in the release.

Officials Sunday were evaluating the chances of battery failure if the satellites were released the first day in space instead of near the end of the mission. But by Sunday evening there had been no decision to launch the two spacecraft.

The satellites, which are not considered part of the Spacelab payload, are contained in Getaway Special canisters about the size of a garbage can, which are mounted in the payload bay.

The 115-pound NUSAT, built by Morton Thiokol for a university team in Utah, would calibrate air traffic control radar. A 152-pound Global Low Orbiting Message Relay Satellite would relay to customers various information gathered by oceanographic and ground sensors.

NASA is flying the monkeys and rats to test new animal cages for future use.

All the animals have adapted well during training for the launch and mission, and this spaceflight will be their trip of a lifetime. For the rats, however, it will be their last trip anywhere.

They will be decapitated and their tissues given to 20 scientists nationwide for studies of the effects of spaceflight.

Animal rights activists have criticized such research on animals and threatened to protest today outside Kennedy Space Center.

While the animals are the mission's popular focus, the main emphasis is on materials processing and the study of fluid movements in weightlessness. Other areas include life sciences, atmospheric observations and astronomy.

These experiments could result in the growth of exceedingly pure crystals for advances in electronics, development of a process to mix materials without using containers, and a better understanding of Jupiter's atmosphere.

"There's very significant research that will be performed, and [there will be] full use of Spacelab's capabilities," said George Fichtl, mission scientist.

The 23-foot Spacelab module is connected to Challenger's cabin by a 19-foot tunnel and provides a shirtsleeve environment for science work. A pallet with remote-controlled equipment is attached to the cargo bay behind the lab module.

Designed and built by the European Space Agency, Spacelab was first flown on the shuttle in November 1983. It is designed to be changed according to the needs of each mission.

Because the crystal growth and fluid experiments are sensitive to movement or gravity, NASA has taken special pains to jostle Challenger as little as possible during the mission.

The shuttle will orbit 219 miles high with the tail pointed toward the center of Earth and the right wing in the direction of travel. The shuttle will fire its thrusters quickly and softly to maintain that position and orbit, considered the most stable flight pattern.

The crystal growth and fluid experiments are positioned in Spacelab close to the shuttle's center of gravity for even more stability.

Crew members split into two teams will work 12-hour shifts to perform science work around the clock.

The crew consists of commander Robert Overmyer, pilot Frederick Gregory, physicians Norman Thagard and William Thornton, fluids expert Taylor Wang, materials science expert Lodewijk van den Berg, and Don Lind, who will do astronomy work.

TODAY
MAY 2, 1985

Space plumbers fix leaks

● New Shuttle plant a feather for Brevard, Editorial, 14A

By MICHAEL LAFFERTY
TODAY Staff Writer

The Shuttle Challenger's crew Wednesday fixed some but not all of the problems pestering the mission as Spacelab 3 entered its third day of experimentation.

One of the two squirrel monkeys aboard continued to seem "queasy" Wednesday, apparently experiencing the symptoms of "space adaptation syndrome," said Dr. Paul Callahan, project manager of NASA's Ames Research Center Life Sciences payload.

The monkey's balled-up position in his cage seemed to say "I'm a little bit drowsy. I don't feel too bad, but I don't feel to great," Callahan said.

Later, however, the primate began eating and drinking, indicating it's adjusting to the lack of gravity, he said. One official said the monkey seemed to be recovering from the sickness — which includes symptoms of nausea and headache — faster than most human space travelers who've been affected by it.

The seven-member crew also continued to experience problems with rat feces and tiny bits of food that escaped into Spacelab while feeding trays were being changed.

Bill Bock, a NASA spokesman at Johnson Space Center in Houston, said the crew tried several methods to alleviate the problem, but feces and food particles again escaped during a Wednesday night attempt at changing the trays. Other methods will be tried today.

Officials don't consider the floating material a health hazard.

The monkeys and 24 rats were shot into space to test animal cages for use during spaceflight in addition to the animals' reactions to weightlessness.

During a "parade of animals"

See PLUMBERS,
Back Page This Section

Wednesday afternoon, mission specialist Dr. William Thornton was televised in Spacelab's work area explaining the animal experiments. He predicted that one day there could be "pets in space."

The rats were "very friendly," he said, remarking about the first time a large number of animals and humans have been housed together in space.

The rats will be killed and autopsies will be performed on them at the end of the mission.

On the brighter side, a periodic problem with Challenger's fresh-water system was fixed when crew members "smacked the galley on the right-hand side" and then "smacked it a little harder on the left-hand side" when it failed again, said Flight Director Gary Cohen.

Most of the Spacelab's other experiments performed well, though several either malfunctioned or were abandoned.

A "very wide field camera" to study the heavens was stowed after crew members were unable to open an outer hatch so the camera could be used.

In addition, an experiment into the behavior of drops malfunctioned and its developer, payload specialist Dr. Taylor Wang, spent most of the day trying to solve that problem.

Water was used instead of urine Wednesday in a urine monitoring device which malfunctioned Monday, spilling the waste in the main cabin.

Several auroras were seen and recorded as part of one experiment, though none of Wednesday's lightshows over the Southern Hemisphere were as spectacular as those the crew viewed Tuesday.

Crew members also continued to successfully grow crystals in an experiment that could benefit the electronics industry and enhance knowledge of radiation measurements.

"We're having a successful mission," Mission Manager Joseph Cremin concluded.

Cohen said the possibility of extending the mission a day to allow more time for experiments was not being seriously considered. He said there was not enough consumables — food, water and power — to extend the mission for more experiments. NASA has a built-in capability to extend a mission two days in case the weather isn't favorable for landing.

Mission Commander Col. Robert Overmyer expressed some concern over a film on Challenger's side windows that could affect his vision during landing. Flight directors, however, said the film had been present on other missions and was not a problem.

Challenger is scheduled to land at Edwards Air Force Base, Calif., on Monday.

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TODAY
APRIL 30, 1985

Problems plague Shuttle

SHUTTLE, From 1A 4-30

other launch attempt might be made during a future Shuttle flight, KSC spokesman Jim Mizell said.

NASA officials had been worried that the Getaway Special's dime-store 9-volt batteries would malfunction as they did on Shuttle Discovery's last flight.

During the weekend, NASA officials decided to cancel the deployment but later went ahead with plans to release the satellites.

The satellite's designers, under contract to the Pentagon, had hoped to prove the viability of low-cost communications relay satellites used to reduce reliance on remote ground stations.

The Shuttle crew also had some internal problems to worry about.

Overmyer told Houston that a large amount of "water" — later identified as urine collected from the astronauts — had floated into the cabin.

NASA officials said they believed that a leak had developed in the urine monitoring device that is attached to Challenger's toilet. The urine samples were to be used to study the effect of space flight on human liquid volumes, which change in weightlessness.

"We have attempted to use the urine monitoring system," said Dr. William Thornton. "On the flush cycles it was blowing water all over the place and after extensive cleanup, I have discontinued use of that."

Thornton said when the device was not activated, the toilet was operating well. The astronauts were advised to shut down the collection system.

In a second plumbing problem, the crew went nearly six hours without fresh water when Challenger's galley faucet refused to produce. Houston devised a makeshift solution, using a piece of hose to bypass the water supply system.

Also, an inspection of the Orbiter showed that its right-hand engine pod — the flared element at the rear of the Shuttle — looked as if it had suffered tile damage during liftoff, Overmyer said. "It really looks kind of beat up," he said.

The left-hand engine pod appeared undamaged.

Other malfunctions also plagued Challenger.

Communications were poor and Thornton complained he could not talk to the cockpit crew while he was in the Spacelab 3 — although the ground crew heard them both.

Internal communications among the crew were broadcast faintly to the ground, including one unmistakable four-letter word.

Other problems included false readings on instruments, wrong computer readouts, fire alarm lights that did not light during a test, and an early shutdown of the hydraulic system that moves the Shuttle's wing surfaces on ascent and for landing.

The system is not used while the Shuttle is in space and Mission Control said it posed no problem.

The problems did little to dull NASA's joy over launching a Shuttle so soon after a previous flight.

"We feel very, very proud," said Thomas Utsman, KSC Shuttle operations director. "We felt that everybody really pitched in and started in that countdown 17 days ago. The facilities fellows at the pad were able to clean it up in near-record time. The vehicle processing troops did an excellent job. It culminated in a very, very nominal launch."

Nominal is NASA's term for "no problems."

The astronauts will spend the next few days working on experiments carried into space aboard Spacelab.

The crew of the Shuttle program's 17th mission includes pilot Fred Gregory, mission specialists Don Lind and Dr. Norman Thagard, and mission specialists Lodewijk van den Berg and Taylor Wang.

TODAY
APRIL 30, 1985

Satellites: one works; one doesn't

By CHET LUNNER
TODAY Aerospace Writer
and Wire Reports

Despite a record-setting start, the Space Shuttle Challenger's crew was able to successfully deploy only one of two "homemade" satellites Monday.

The failed deployment and some plumbing difficulties were among several problems plaguing the Challenger just hours after it rocketed from Kennedy Space Center at 12:02 p.m.

A computer glitch briefly delayed the launch but didn't keep NASA from setting a record.

Challenger was launched only 17 days after Discovery started its last journey April 12. The previous shortest turnaround was 34 days.

While ground crews were satisfied with their work, the seven astronauts wasted no time in making a little history of their own. At 4:15 p.m., they deployed the small NUSAT satellite. The spacecraft, built from donated parts by Weber State College students in Utah, became the first privately developed spacecraft ever to be deployed from a Shuttle.

"It's on its way. The antennas are up," a crew member told NASA as NUSAT left its Getaway Special canister.

The same wasn't true 15 minutes later. Despite two attempts, the crew wasn't able to deploy the second Getaway Special satellite known as GLOMR, Global Low Orbiting Message Relay.

Inside

Excitement clicks on the faces of Bryce Williams, right, and his sister, Shawnna, during Monday's launch. A national group brought the terminally ill Phoenix, Ariz., youth to see Challenger off. For his and other Shuttle stories, see 3A.

"No joy on the GLOMR deploy," mission commander Robert Overmyer said.

The canister containing the failed satellite could be seen fully opened in television footage sent from Challenger, but the system to push the satellite into space failed to operate.

The satellite did not leave the Shuttle's cargo bay, so an-

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TODAY
APRIL 30, 1985

Lind family, friends cheer flight success at celebration

By DOUG COHEN
TODAY Writer

At about 7:30 p.m. Monday, Don Lind and his six fellow astronauts probably were preparing for dinner in space.

At the same time, the Lind family was meeting with more than 150 friends at a Rockledge church to pay tribute to Lind and the space program.

Before Monday's Challenger liftoff, the Lind family planned to have a small post-launch celebration. But Gene Waters, TODAY's classified advertising manager, volunteered to throw a bigger celebration at the Church of Jesus Christ of Latter-Day Saints, where he's stake president.

Friends of Lind came from as far as Utah, Texas and Idaho to attend the celebration.

Church member Craig McCreary — who works as a Shuttle mechanical systems manager for NASA — said he was there because "I've known Don since he became an astronaut and I love the space program."

Lind, who works at NASA in Houston, is an active member of the Mormon church and has volunteered many times to speak with children at the church in Rockledge about the space program, said McCreary.

Lind's wife, Kathleen, thanked everyone for coming and referring to her husband said, "Everyone's safe because there's a Mormon on board."

Lind — a mission specialist on the Shuttle Challenger — became an astronaut in 1966. Lind has a bachelor's degree in physics from University of Utah and a doctorate in high-energy nuclear physics from the University of California at Berkeley. He was awarded the NASA exceptional service medal in 1974 and was a backup pilot for Skylabs 3 and 4.

By now, Lind's immediate family is used to the fact that he's an astronaut. But they know it is more than just an ordinary job.

"It seems like another job after a while, but you know it's not, because Dad is going into space," said Lind's 15-year-old daughter, Lisa.

Lisa said her family was "fairly calm" the morning of the launch because they're confident the Shuttle program is safe.

"But things were not calm enough to be routine," she said.

Lind's son, Dave, 28, said Monday's flight was the first launch he has seen since the Apollo 15's liftoff in 1971.

"There is a lot more meaning to it when a member of the family is on top of the rocket and it's going up," he said.

Lind's other children — Carol Ann, Donna, Douglas, Kimberly, Lisa Christine and Daniel Leslie — also were at the celebration.

TODAY Staff Photo by Theresa DeCapua

FRONT ROW: CAROL, KATHLEEN, LISA, DANIEL LIND
. . . back, Kim, Dawna Kuhn, David, Doug at church party

TODAY
APRIL 30, 1985

TODAY—UPI

SEN. JAKE GARN, R-UTAH, WATCHES LIFT OFF WITH REP. BILL NELSON, D-FLA. . . . Garn, who flew on an April Shuttle mission, said he'd rather be riding on Challenger

Senator views first launch at KSC

By LAURIN BRACEY
TODAY Staff Writer

Even though U.S. Sen. Jake Garn made history this month when he became the first public official to soar into space, he had never watched a launch from Kennedy Space Center until Monday.

"This was his first one . . . and it was probably just as well," quipped Garn's administrative aide, Jeff Bingham. "It was a pretty exciting thing for him."

The Utah Republican, who returned to Earth 10 days ago, viewed Monday's liftoff from VIP bleachers.

Garn, who oversees NASA's $7.5 billion budget as chairman of the Senate appropriations subcommittee, spent seven days in space aboard the Space Shuttle Discovery, which was launched April 12.

As part of his role during the mission, the congressman performed medical experiments on himself.

Although he suffered bouts of nausea during his first two days in space, he made this statement as Challenger roared skyward: "I wish I was up there instead of down here."

Garn was one of only a handful of VIPs attending the noon launch.

U.S. Rep. Bill Nelson, a Melbourne Democrat, and U.S. Rep. Don Fuqua, a Democrat from Altha, who attend most of the liftoffs, were there. But unlike earlier Shuttle missions, Monday's flight attracted few celebrities to the VIP viewing site.

Instead, there were a lot of people wearing black T-shirts.

Sporting a "spirit of camaraderie," employees and analysts of EG&G wore T-shirts with "Spacelab 3" scrawled across the back.

One of Discovery's passengers — Lodewijk van den Berg — is a scientist for EG&G, a major KSC contractor at KSC.

ORLANDO SENTINEL
APRIL 30, 1985

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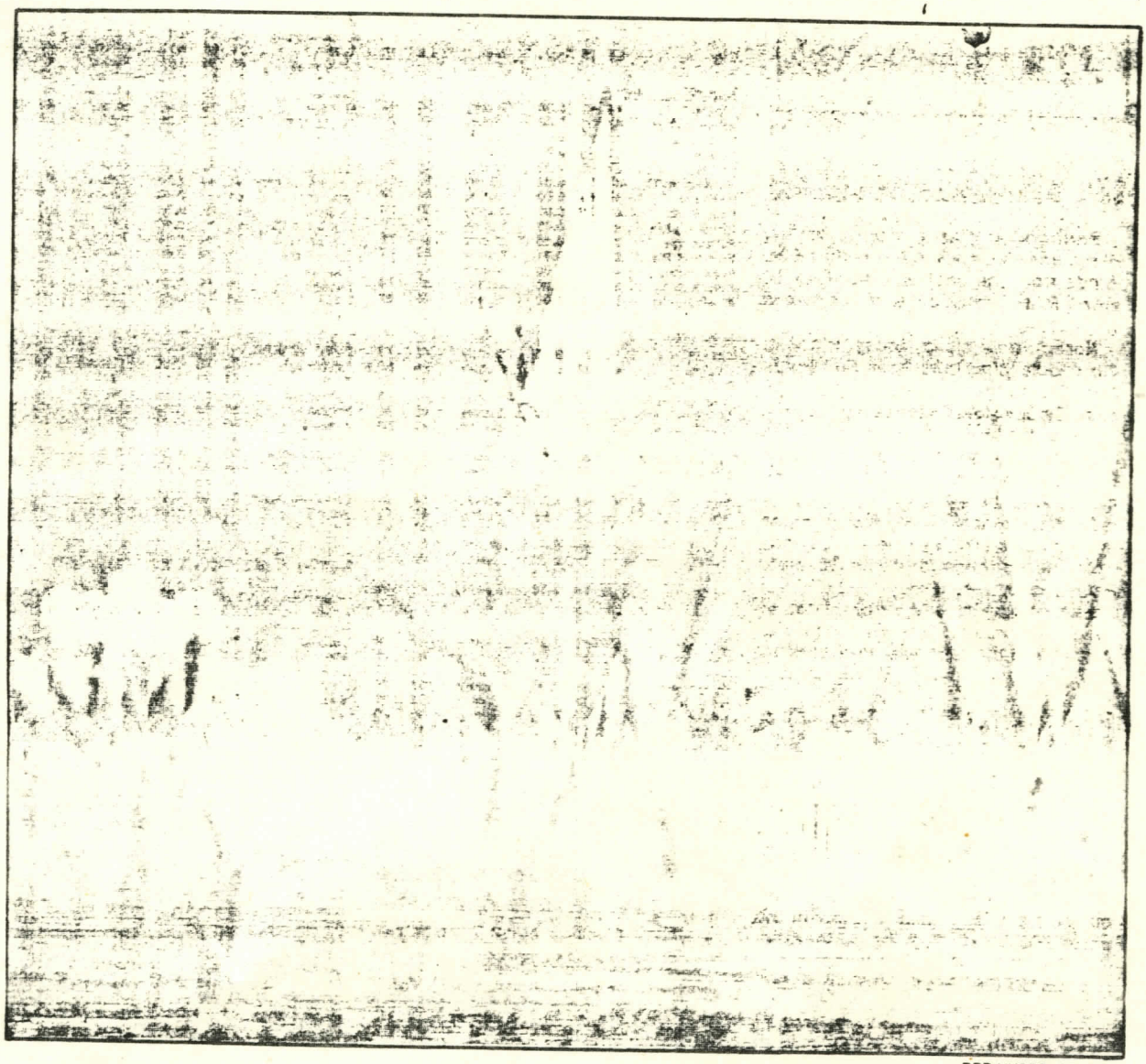

RED HUBER/SENTINEL

Challenger carries Spacelab aloft as a shuttle aims for the heavens for 17th time.

Shuttle flies, 1 of satellites doesn't

Crew of 7 begins working 12-hour shifts in Spacelab

By James Fisher

OF THE SENTINEL STAFF

CAPE CANAVERAL — Loaded with world-class science experiments that have been eight years in the making, Challenger and its billion-dollar Spacelab roared into orbit Monday for a week of potentially astounding discoveries.

A menagerie of two squirrel monkeys and 24 rats joined the seven astronauts for the 12:02 p.m. liftoff, which marked the first time NASA has launched two shuttles in the same month. Discovery was launched April 12.

The mission was marred slightly Monday afternoon when one of two small satellites failed to eject from a container in the shuttle's cargo bay.

After three unsuccessful attempts, the container door was closed and the 152-pound satellite was considered "a hopeless case" for launch on this flight, a NASA spokesman said.

Astronauts began activating experiments in the 23-by-13-foot Spacelab soon after Challenger reached orbit. The experiments involve materials processing, crystal growth, fluid movement, life sciences, astronomy and atmospheric physics.

Please see **SHUTTLE, A-5**

A. 2

ORLANDO SENTINEL
APRIL 30, 1985

SHUTTLE

From A-1

The two monkeys, known as 3165 and 384-80, are the first monkeys to fly in space with humans.

After the mission the rats will be killed and studied, a plan which prompted some animal welfare activists to threaten to picket Kennedy Space Center during the launch. However, none did so.

The launch was delayed more than 2 minutes because of a computer glitch, but other than that "we had probably the smoothest countdown to date," said launch director Bob Sieck.

Challenger, making the 17th shuttle flight, blasted into an almost cloudless sky as it began a northeastern trajectory that took it into a wide, crisscross path over the equator 219 miles high.

"It looks like we're off to another good one," Sieck said.

Spacelab, built by the European Space Agency, is inside Challenger's cargo bay and is connected to the cabin by a 19-foot tunnel. The crew is split into gold and silver teams to man the lab around the clock in 12-hour shifts.

The gold crew worked during the day Monday while the silver crew slept in preparation to take over about midnight.

Commander Bob Overmyer, astrophysics expert Don Lind, physician William Thornton and fluids expert Taylor Wang are the gold team.

Pilot Frederick Gregory, physician Norman Thagard and materials science expert Lodewijk van den Berg are the silver team.

After activating Spacelab, part of the crew entered the module about 3:30 p.m. and began work.

At 4:17 p.m. they released the 115-pound NUSAT satellite that will calibrate air traffic control radar worldwide. The satellite was built by a research team at Weber State University in Utah.

Thirty minutes later they tried to release the global low orbiting message relay satellite without success. The satellite was designed to relay information gathered by oceanographic and ground sensors.

NASA officials weren't sure what caused the failure, but faulty transistor radio batteries used in the release process "certainly would be suspect," said space agency spokesman Jim Elliot.

On Friday, NASA had decided to cancel both satellite releases because of fears that the space environment would cause the batteries, located in the bottom of the containers, to fail.

Mission officials changed their minds late Sunday, deciding to move the launches from near the end of the mission to the first day in space.

Just after the satellite activity, Thornton began his first check of the animals, studying their reaction to weightlessness and how they are adapting to their cages.

Efforts to grow crystals could lead to advances in electronics, and the fluid experiments could help develop ways to process materials in space without using containers. Many industrial companies have shown an interest in this research.

Doctors also may find that biofeedback is a good treatment for spacesickness, and they should learn more about the effects of weightlessness when the rats' tissues are studied.

The crew Monday also set up a wide-field camera to take astronomical observations, requiring a series of maneuvers to position the shuttle.

In addition, they began an experiment that examines the composition and variations in the upper atmosphere.

After 19-year hold, Lind was set for 'Go!'

By Ruth Rasche

OF THE SENTINEL STAFF

CAPE CANAVERAL — Don Lind became an astronaut 19 years ago, but he had to wait until Monday for his first trip to space.

"I've been waiting a long time. I'm going to savor every moment of that flight," he said before the shuttle Discovery carried him and six other astronauts into orbit Monday for a week of scientific research.

Lind, 54, waited longer than any U.S. astronaut to make a spaceflight, a NASA spokesman said. He had expected to fly on Apollo 19 or 20 and become the second scientist to walk on the moon, but they were among the last three moon missions canceled by budget cuts.

"Don's sisters are real upset that everyone is making such a big deal about him having to wait 19 years for this," said Lind's 83-year-old mother, Elizabeth Lind of Midvale, Utah. "It makes him sound like he's dumb or something, but that's not it. He wanted to go on a scientific mission, and now he is."

A mission specialist, Lind is studying the upper atmosphere and the aurora australis, or southern lights.

"He's excited and thrilled with this assignment. He said at the end of the mission he's going to run around and get at the end of the line to go back up," his mother said.

Mrs. Lind watched her son's ascent with his wife, Kathleen, their seven children and Lind's sisters, Charlene and Kathleen.

"I'm not the least bit worried about Don," Lind's mother said. "He's had so many opportunities to get killed doing what he's done in his life, I just know he'll be coming back safe."

A commander in the U.S. Naval Reserve, Lind holds a doctorate degree in high-energy nuclear physics from the University of California at Berkeley. He became a scientist-astronaut in April 1966, more than three years before Neil Armstrong walked on the moon.

Lind helped develop science payloads for early shuttle missions, served as backup science-pilot for Skylab 3 and 4 and was a member of the rescue crew for the Skylab missions.

"Don always wanted to see what makes things work," Mrs. Lind said. "Of his 54 years, he's been asking 'why?' since he was 3. 'Why?' is his biggest word."

Lind will photograph the aurora australis as part of an experiment he designed. The aurora australis and its counterpart in the Northern Hemisphere, the aurora borealis, are luminous bands of light sometime visible in the night sky. They are believed to be caused by electrical discharges.

Mrs. Lind, who taught first grade in Utah for many years, said her son is eager to share what he knows with others.

"Don always was a problem to his teachers because he could finish his work so quickly," she said. "As he got older, he became a sort of unofficial tutor to his friends and he's been a teacher ever since.

"Don loves to teach young people because he knows that if we're going to have a future in space, they're the ones who will carry it on."

Astronauts, Challenger grant boy's wish

By JOAN HELLER
TODAY Staff Writer

TODAY
APRIL 30, 1985

The grown-ups say he's dying.

Bryce Williams insists he's just fine. But if the grown-ups wanted to grant him one last wish — to see a Space Shuttle launch and to meet an astronaut — he'd be happy to oblige.

And that he did Monday.

It was a good day for the 12-year-old from Phoenix, Ariz. The Space Shuttle Challenger got off after a minor hitch, well-wishing astronauts came to call and Bryce got a break from painful chemotherapy treatments he's undergoing to fight his cancer.

Decked out in bright-blue NASA spacesuits, astronauts Dick Covey and Mike Lounge greeted their young admirer with autographed pictures of themselves with Monday's Space Shuttle crew and posed for pictures destined for the Williams' family album.

Flanked by his father, Ted; mother, Pat; and sister, Shawnna, Bryce slipped into bashful silence and let Mom and Dad do the talking as the family awaited lift-off at the Kennedy Space Center VIP viewing area.

They talked and he stared in awe at the men in the blue flight suits.

As the clock ticked off the final moments before launch, Bryce said he preferred to worship the spaceship from afar.

"I'm not sure I'd want to go up," he said, peering from beneath his new NASA cap. "It sounds pretty scary."

Back home in Phoenix, Laura Kovacs was waiting to hear what Bryce thought of his big day at the space center.

A volunteer for the national "Make a Wish Foundation," Kovacs makes dreams come true for terminally ill children.

In the five years since the volunteer organization was founded in Bryce's hometown, 39 new chapters have been formed in the United States and 120 children have lived out their dreams.

Using money donated by businesses and individuals, the foundation paid the family's airfare and contacted the Titusville Area Chamber of Commerce for help.

Titusville chamber official JoAnn Richards said she had no trouble making Bryce and his family feel welcome. The Titusville Holiday Inn offered free accommodations for the family. And Lockheed Space Operations Co. donated T-shirts, stickers and decals and gave him the full celebrity treatment on the company's VIP bus to the launch.

"Everybody's been terrific," Richards said.

Having arranged for dream vacations to Disneyland and Disney World — and after setting up trips for makeovers and rodeo performances — Kovacs said the happiness of her young friends makes up for the diseases' sadness.

"You have to separate yourself from the illness," Kovacs said. "You have to think about the memories you're giving the family and the time you've given them away from the disease, away from medical problems, away from bills and away from worry."

Pat Williams admits she needs a break.

"It's difficult," the child's mother said. "The (tissue) cancer was found in Bryce's foot last July. He had four surgeries that month.

"I'm a registered nurse and a teacher and I handle his chemotherapy, which makes it easier," Mrs. Williams said.

"Bryce keeps me up," she said. "He's very positive and very independent. He keeps saying, 'I'm cured, Mom. I'm OK.' "

Ted Williams said he is resigned to the fact that he can't know how long Bryce will live.

In the meantime, Bryce is enjoying himself.

Before returning home Saturday, he has several appointments to keep — with former Apollo astronaut Fred Haise today, Shamu the killer whale at Sea World Wednesday and Pluto at Disney World Thursday.

ORLANDO SENTINEL
MAY 1, 1985

Rats! Cloud of cage litter adds Spacelab frustration

By James Fisher
OF THE SENTINEL STAFF

CAPE CANAVERAL — Floating rat food and feces and faulty equipment complicated work Tuesday aboard Spacelab, but shuttle astronauts reported the growth of some exotic crystals and other scientific progress.

The space laboratory, tucked in Challenger's cargo bay, filled with a cloud of the foul-smelling stuff when physician William Thornton tried to clean the cages of 24 rats and two monkeys in the 23-by-13-foot science module.

Mission Control told all of the astronauts to wear surgical masks while the particles floated in the lab.

Problems with scientific equipment already had forced the shutdown of two experiments and affected several others. Plumbing and communications glitches also continued to plague the 17th shuttle mission, which began Monday.

But scientists on Earth said they are still encouraged about the mission. They pointed out that a lot has been accomplished despite difficulties.

"All in all, we've done fairly well. We've had some problems and we've developed some workaround, and this is what Spacelab is all about," said mission scientist George Fichtl at Johnson Space Center in Houston. "I think ... everything will work out fine for most of the experiments."

An attempt to refill food trays and clean the animal cages Tuesday afternoon brought on a "literal flood" of dried rat food particles and feces streaming into the lab in the weightlessness of space.

Thornton struggled to contain the particles of pulverized food bar and feces, but said "they are coming out of cracks and everything."

Challenger commander Bob Overmyer said the air in the lab was fouled and work with the

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cages was stopped.

Overmyer said the particles "really came out in a cloud." The particles "really don't smell that great. I'm not too happy about it."

Air filters in the spacecraft eventually should remove any smell, officials said.

The animals have seemed to enjoy the weightless environment, in some cases eating while upside down.

The floating food and feces was the latest in a series of problems.

Astronauts got few astronomy pictures from a wide field camera because of a power problem and a later malfunction of Spacelab's airlock door. A bent handle prevented the door from opening to expose the camera to the space environment.

A urine collection experiment also was shut down when it failed to work properly Monday evening. NASA had reported that urine was spilled around the shuttle cabin, but Tuesday "it was still unclear" whether the substance was urine or only water, said space agency spokesman Charles Redmond.

Although the urine experiment isn't collecting science data, it is being used to provide some engineering information, Redmond said.

Scientists on Earth and in Spacelab also had trouble getting one of three crystal-growth experiments working properly Tuesday afternoon and will have to do without some data, Fichtl said.

The crystals grown in Spacelab could be used to detect infrared light, X-rays and gamma rays and would be beneficial in nuclear power, medical and other fields.

Fichtl reported that pressure was dropping around a laser used in an upper atmospheric study and that could affect the quality of the data it collects during the mission, scheduled for a week. The experiment is an examination of the composition and variations in the upper atmosphere around the world.

By Tuesday afternoon the crew apparently had corrected most problems with radio transmissions that were interrupting each other, and difficulties with the shuttle's water supply.

Despite these irritations, reams of valuable data were being collected in the Spacelab module.

Spacelab fluid expert Taylor Wang studied the performance of liquid drops in space as part of an effort to learn how substances might be mixed in space without using any containers.

Astrophysicist Don Lind took pictures of a flickering aurora in the upper atmosphere. The bands of light are being studied from a distance of only several hundred miles.

Crew members floated above and below each other in the module crammed with high technology, wrestling with unwieldy, thick science manuals.

The crew is in two 12-hour work shifts. The gold team on the day shift is Overmyer, Lind, Wang and Thornton. The silver team on the night shift is pilot Frederick Gregory, Dr. Norman Thagard and materials processing expert Lodewijk van den Berg.

TODAY
MAY 1, 1985

Rats! Shuttle's just a mess

By CHET LUNNER
TODAY Aerospace Writer
and Wire Reports

Challenger, an orbiting plumber's nightmare, continued to circle the Earth on Tuesday as water and waste leaks plagued its crew for a second day.

Several of the 15 experiments aboard the flight have experienced malfunctions since Challenger lifted off from Kennedy Space Center at 12:02 p.m. Monday for a weeklong mission 219 miles above Earth.

None of the problems have affected the operation of the Shuttle, which is flying with its tail pointed down to minimize disruptions to the delicate experiments aboard, NASA officials said.

Tuesday's leak developed in Spacelab, where Dr. William Thornton reported "a flood" of tiny pieces of rat food and feces floating into the laboratory area when he tried to feed some of the 24 rodents aboard.

Spacelab is using two squirrel monkeys and the rodents as "test pilots" for newly designed, high-tech cages NASA calls Research Animal Holding Facilities. No experiments are planned in flight, but the rats will be killed and autopsies performed at the end of the mission.

"There was a flood of partially eaten crumbles of pellets, of feces, bits of feces that were floating free," Thornton said after he opened a food tray and attempted to feed one rat.

Thornton earlier reported a similar "cloud" of smelly particles escaped from another cage.

"They don't stop when the door isn't open," he reported to Mission Control. "They are still floating out."

Mission Commander Robert Overmyer said the odor of the monkey food — a mixture of fish meal and grain — had fouled Spacelab's air, and that some monkey manure had escaped as well.

NASA advised the crew to don surgical face masks as a precaution.

Officials added that any smell should be removed eventually by air filters in the

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TODAY
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Rats! Challenger's a mess

RATS!, From 1A

spacecraft, but since they are in zero-gravity, the astronauts must perform the clean-up by capturing each of the floating particles.

The spill added to the problems of Spacelab 3. Two experiments already are disabled, including one that added an odor problem of its own Monday — from spilled urine in the Shuttle's main cabin. A third experiment suffered a short circuit, but engineers said an attempt would be made today to correct the electrical connection.

Later Monday, the crew had to rig a makeshift water supply system when the fresh water supply located in Challenger's galley failed. That remained an intermittent problem Tuesday, NASA officials said.

Still, the astronauts managed to crank up seven scientific studies and an expert said "a lot of good things are happening."

The monkeys and rats, test subjects in the Spacelab 3 module in Challenger's cargo bay, appeared to be enjoying the experience and all seemed healthy, officials said. A television view showed one monkey slowly spinning in weightlessness while he looked out a window of his cage.

Despite the problems, the seven-man crew of astronauts settled into an around-the-clock, two-shift routine of operating the billion-dollar laboratory and most scientists on the ground said they were pleased with crew's work.

"I would rate it very high," said George Fichtl, the Spacelab mission scientist.

The astronauts grew crystals, sampled the Earth's atmosphere, tested a method of controlling space sickness with thought and took pictures of dramatic natural lights flaring over the planet's poles.

Overmyer reported seeing two bursts of aurora lights over the Earth's poles. The spacecraft is orbiting to higher latitudes than most Shuttle missions, bringing the Northern and Southern lights within view.

The spacemen also took readings on the Earth's atmosphere at sunrise and sunset in an experiment that measures the contents of the air above the planet surface. Officials said an instrument being used was slowly degrading, due to the loss of a pressurized gas, but it was expected to complete the atmospheric study.

There was less certainty about another experiment.

Despite numerous suggestions from Mission Control, astronauts were unable to open an outer hatch in a scientific airlock, preventing the use of an astronomical camera.

Astronaut Norman Thagard reported that a latch pin was bent, blocking opening of the hatch.

"If we could just go one millimeter more, the pin would lock up," he said.

The crew is divided into two shifts to keep the lab humming 24 hours a day. Overmyer, Thornton, Don Lind and Taylor Wang, a Jet Propulsion Laboratory scientist, are on the Gold Team. Pilot Bob Gregory, Thagard and Lodewijk van den Berg, a crystal growth expert, are on the Silver Team.

Challenger is scheduled to land on the lengthy dry lake bed runway at Edwards Air Force Base, Calif., on Monday.

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TODAY

APRIL 26, 1985

Crewmen and craft shipshape

• Rocketeers mark 40th year in U.S., 17A

By MICHAEL LAFFERTY
TODAY Staff Writer

4-26

Six members of Challenger's seven-man crew arrived at Kennedy Space Center Friday, just hours after the countdown for Monday's launch began.

Pilot Frederick Gregory, mission specialists Norman Thagard, William Thornton and Don Lind, and payload specialists Taylor Wang and Lodewijk van den Berg arrived at KSC at 5:25 p.m. looking fit and at ease.

Mission Commander Robert Overmyer was scheduled to arrive about

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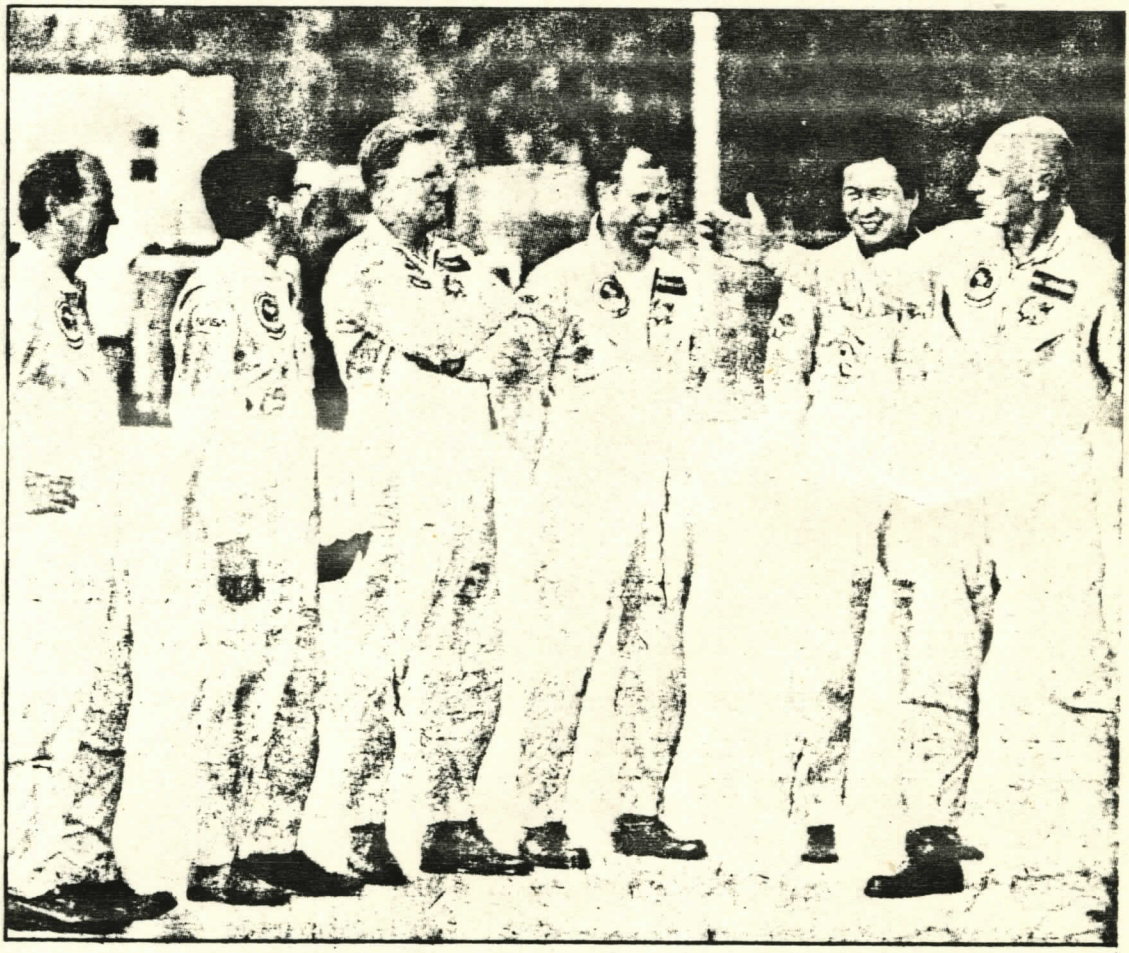

TODAY Staff Photo by William Id

MOST OF CHALLENGER'S SEVEN-MAN CREW ARRIVES AT KSC FRIDAY . . . Thagard, van den Berg, Lind, Gregory, Wang, Thornton; Overmyer not present

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Crewmen, craft shipshape

CREWMEN, From 1A

2 or 3 a.m. today, KSC spokesman Jim Mizell said Friday night.

Workers spent most of the day continuing to ready Challenger for its flight. The 55-hour countdown, complete with several built-in delays, began at noon Friday.

Launch is set for noon Monday, although NASA will have up to another hour to launch Challenger should last-minute problems occur.

This flight will have more space veterans aboard than any other mission so far this year.

Three of the crewmen have been on previous Shuttle flights.

"The more flights you have, the more veterans you're going to have to rotate back into the system," NASA spokesman Dick Young said.

The mission — No. 17 in the Shuttle program — will center on the huge Spacelab 3 resting in Challenger's cargo bay. Crew members have been split into gold and silver teams and will alternate 12-hour shifts so that experiments can be monitored around the clock.

Heading the mission is Overmyer, a 48-year-old Marine colonel who was pilot of the fifth Shuttle flight. A native of Ohio, Overmyer was selected as an astronaut in 1969 and has worked on the Skylab and Apollo programs.

Gregory, a 44-year-old Air Force colonel, is making his first voyage. He became an astronaut in 1978 and has eight years of experience as a NASA test pilot. A native of Washington, D.C., he is second in command aboard the Shuttle.

Thagard, 41, flew on the seventh Shuttle flight in 1983 in which two telecommunications satellites were deployed. During that mission, he conducted medical tests and collected data associated with space motion sickness. He became an astronaut in 1978.

Thagard, a native of Jacksonville and a Florida State University graduate, will monitor several experiments. He primarily will be responsible for monitoring experiments involving two squirrel monkeys and 24 rats.

Alternating shifts with Thagard is fellow mission specialist Thornton. His primary responsibility also is monitoring the primates and rats.

A native of North Carolina, Thornton, 56, was a mission specialist on the eighth Shuttle flight, and also studied the space motion sickness phenomenon.

Thornton, selected by NASA as a scientist-astronaut in 1967, developed the Shuttle treadmill, which allows astronauts to exercise during flights.

Lind, 54, is the third mission specialist. He helped develop and is in charge of Spacelab's "Auroral Imaging Experiment," designed to observe and record auroras — spectacular displays of pulsating and flickering light that occur in certain regions of the world.

A native of Utah, Lind never has been on a Shuttle flight. He was selected as an astronaut in 1966 and developed scientific payloads for early Shuttle missions.

Wang, a 45-year-old payload specialist, is a native of China but an American citizen. He invented and will be in charge of an experiment on the behavior of drops in zero gravity.

The study of drop behavior could lead to the development of new containerless processing techniques and apply to the separation of metal from ore and to chemical engineering.

Wang, who never has flown a Shuttle mission, is program manager for materials processing in space at the California Institute of Techology's Jet Propulsion Laboratory.

Van den Berg, 53, is a native of the Netherlands and an American citizen. He is in charge of experiments that call for growing crystals using a vapor process.

His experiments could have an impact on the development of radiation detection devices used in monitoring nuclear power plants and in the medical field.

He is an EG&G Corp. employee in Goletha, Calif., and has never flown a Shuttle mission.

New space command to Colorado Springs

The Associated Press

WASHINGTON — Defense Secretary Caspar Weinberger on Friday said he has accepted a recommendation from the Joint Chiefs of Staff to locate the headquarters of the new U.S. Space Command in Colorado Springs, Colo.

The final go-ahead on the site, where the Air Force already operates its own space command, will be contingent upon completion of an environmental impact assessment by the Air Force, Weinberger said.

The Pentagon announced last November that President Reagan had decided to authorize creation of an umbrella, or unified, space command. It will report directly to Weinberger and the joint chiefs, embracing responsibilities that currently are divided between the Air Force and Navy.

Between them, the two services have more than 100 active satellites for such jobs as communications, weather forecasting, navigation, spy photography, the monitoring of nuclear testing and to provide early warning of nuclear attacks.

ORLANDO SENTINEL
APRIL 26, 1985

Shuttle crew arrives as countdown starts

By James Fisher 4-26

OF THE SENTINEL STAFF

CAPE CANAVERAL — Six of the Challenger's seven crew members arrived at Kennedy Space Center on Friday to prepare for Monday's launch of the shuttle with Spacelab tucked in its cargo bay.

Inside Spacelab will be an array of scientific experiments, two squirrel monkeys and 24 rats.

Challenger commander Bob Overmyer spent extra time Friday practicing landings in a jet trainer at Edwards Air Force Base in California's Mojave Desert and was expected to arrive at the space center at 2 a.m. today.

The countdown for the 17th shuttle mission began at noon Friday and most of the crew arrived 5½ hours later.

"We're absolutely excited to be here," said astronaut Don Lind. "This mission is going to be significant because it is the first time in the space program when . . . scientists who designed their own experiments will be executing those experiments in space."

Arriving with Lind were pilot Frederick Gregory, Norman Thagard, William Thornton, Taylor Wang and Lodewijk van den Berg.

The two monkeys, selected from among four candidates Friday, will be the first to fly on a space mission with humans. They and the rats will be used to test a new type of animal enclosure to prepare for future animal studies in space.

The rats will be decapitated after the flight to allow studies of how weightlessness affected their tissues.

Animal rights activists Friday threatened to demonstrate near the space center on Monday to protest the use of research animals in space.

"Challenger's liftoff means that every painful experiment performed on animals on Earth will now be performed in space," Alex Pacheco, chairman of People for Ethical Treatment of Animals, said in a

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statement.

NASA officials said a screening committee that includes a member of the Humane Society has reviewed use of the monkeys and rats.

The countdown toward a noon launch Monday began on time and was going "very well" by evening, said NASA spokesman Dick Young.

The weeklong mission, which could be extended a day for more science work, would end at 12:03 p.m. May 6 on the dry lake bed at Edwards. The landing site was switched from the space center this week because there is more room for error in California, NASA officials said.

Discovery blew a tire when its brakes locked on landing last week and "that was a con ideration" in the decision because Challenger will be heavier than normal while carrying Spacelab, Young said.

The European-built Spacelab, which first flew aboard Challenger in November 1983, provides a shirt-sleeve science environment connected to Challenger's cabin by a tunnel.

Crew members will split into two 12-hour shifts to perform the very precise and sensitive science work.

Life sciences experiments include a test of biofeedback techniques as a treatment for space sickness, and the test of a system that collects and measures urine samples.

The crew also will reserach crystal growth, study fluid movement in weightlessness, observe Earth and space and launch two small, inexpensive satellites.

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PHOTO/NASA

Astronauts for Challenger's upcoming mission are (clockwise from left) Don Lind, Taylor Wang, Norman Thagard, William Thornton, Lodewijk van den Berg, Frederick Gregory and Bob Overmyer.

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Men and monkeys team up on shuttle

Spacelab research highlights mission that begins Monday

By James Fisher

OF THE SENTINEL STAFF

CAPE CANAVERAL — Monkeys blazed America's trail into space so humans could follow, and both will travel together for the first time Monday when the shuttle Challenger rockets skyward with the $1 billion European-built Spacelab in its cargo bay.

NASA officials said the weather outlook is good for the noon liftoff, when the shuttle will carry an all-male contingent of seven astronauts, two squirrel monkeys and 24 rats into space for a week of scientific research.

Space agency officials decided Saturday to cancel the release of two small satellites late in the mission because of concern that transistor radio batteries used during the release procedure would not work.

Although the animals are attracting extensive publicity, the focus of the 17th shuttle mission is processing of materials and research of fluid movement. The work could lead to production of remarkably pure crystals, a better understanding of the atmosphere of Jupiter and other scientific advances.

Challenger's mission, set to end at Edwards Air Force Base in California at 12:03 p.m. May 6, begins only 17 days after the liftoff of Discovery, the shortest time between launches yet.

The two squirrel monkeys weigh a little over 2 pounds each and are about 20 inches long. They and the rats are traveling into space to test new animal cages that will be used in future spaceflights.

The rats will be decapitated after the flight so their tissues can be distributed to 20 scientists nationwide for analyses of the effects of spaceflight.

Animal welfare activists have objected to the research and threatened to picket Monday outside Kennedy Space Center against the use of research animals in space.

All NASA animal research is reviewed by a California-based review panel that includes a humane society official, the wife of a member of Congress and a Jesuit priest who also is a college ethics instructor.

Panel member Jane Hutchison, a representative of the Humane Society of Santa Clara Valley, said she

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wasn't on the committee when the Spacelab rat research was reviewed. She said she is concerned about the use of any animals for research on Earth or in space.

"But I accept the fact that it's going to go on," she said. "Within that framework, I would say the people at NASA in general are concerned about the animals. I feel pretty comfortable with them."

She believes activists have every right to protest, but would make more progress by trying to work with scientists rather than "being combative."

Sources say high-level NASA officials have been worried about negative public reaction to the rat experiments and would prefer that aspect of the mission be played down.

As for the "monkeynauts," don't confuse them with the celebrity primates that heralded the space age during flights in the late 1950s and early 1960s, scientists say.

There are no cute names like Enos, Ham or Able. Animals are but numbers in the shuttle era. Challenger's monkeys are 3165 and 384-80, the breeding numbers assigned to them by professional research animal suppliers.

"We do not name them. Most people in laboratory situations do not name them. They very definitely are not pets," said Paul Callahan, project manager for the life sciences payload.

The last U.S. monkey to fly into space was Bonny, a male that flew aboard a Biosat satellite in 1969. A NASA official said he died "shortly after re-entry," but more details weren't available Saturday.

The animal research is important, space agency officials said, but only a minor part of the 15 experiments aboard Spacelab.

Experiments will be done in life sciences, materials processing, fluid movement, atmospheric physics and astronomy.

The 23-foot laboratory module, which provides a shirtsleeve environment, is connected to the shuttle cabin by a 19-foot tunnel. A pallet with remote controlled experiments is attached to the cargo bay behind Spacelab.

Challenger's commander is Bob Overmyer, a veteran of the fifth shuttle flight, and the pilot is space rookie Frederick Gregory.

Norman Thagard and William Thornton, who each have flown on the shuttle once before, will perform medical experiments and observe how the monkeys and rats react to weightlessness.

Astronaut Don Lind, a physicist, will conduct astronomy and atmospheric physics experiments. Lodewijk van den Berg, a chemical engineer and senior scientist with EG&G Corp. of Goleta, Calif., will try to form three types of pure crystals in weightlessness.

Taylor Wang, a physicist with the Jet Propulsion Laboratory in Pasadena, Calif., will study the behavior of fluids in weightlessness.

The monkeys and their rat colleagues will be housed in new "animal holding facilities" designed to provide maximum comfort and safety to the animals while allowing scientific research in space, said Callahan.

"The flight is to determine that we can care for animals in space as well we can care for them on the ground," he said.

The rats and monkeys will each get a separate living space within lockers, be fed automatically on demand and have their wastes directed into absorbent trays below by air flows.

Astronauts will fill the food dispensers, replace waste trays, and watch and videotape the animals' behavior. They can provide veterinary care if needed, Callahan said.

They monkeys will eat nutritionally balanced, banana-flavored pellets and the rats will gnaw on 10-inch food bars that have the consistency of a soft dog biscuit, he said. Scientists have devised ways to carefully measure how much the animals eat and drink.

Electronic systems also will monitor the temperature, humidity and other cage living conditions, and the animals' movements will be recorded as they break a light beam.

A transmitter surgically imbedded in the abdomens of four rats will provide data on their heart rate and body temperature, Callahan said.

Scientists purposely chose only male animals.

"It's not that we're a sexist organization," Callahan said. Female rats and monkeys go through hormonal changes that could affect their behavor and make accurate scientific measurement difficult.

The monkeys have experienced zero gravity during special airplane flights, and all the animals have been acquainted with simulated spaceflight conditions aboard Spacelab.

The two small satellites had already been loaded aboard Challenger and will remain in cannisters in the cargo bay.

The nine-volt batteries used in the release process have proved vulnerable to corrosion and quick energy loss in the super-cold vacuum of space, officials said.

Lacking time to find a substitute energy source, they chose to postpone the release of the satellites to a later flight.

One of the satellites, owned by a research team at a small Utah college, was designed to measure antenna problems of air traffic control radar worldwide. The other was a military satellite built by Defense Systems Inc. of Virginia.

Rats, monkeys to join tests in space

Spacelab going up on shuttle for wide range of studies

By James Fisher

OF THE SENTINEL STAFF

CAPE CANAVERAL — Four squirrel monkeys and 24 rats will join seven space shuttle crew members when Challenger is launched in late April for seven days of around-the-clock scientific experiments on the Spacelab.

The laboratory is connected to the shuttle's cabin by a tunnel in the cargo bay. It will carry a dozen experiments in the life sciences, plus observation of Earth and space, crystal growth, and the movements of fluids in weightlessness.

The rats will be decapitated after the mission to permit extensive scientific studies. The monkeys are going up to test the effectiveness of new animal cages designed for use in space.

NASA hasn't set a launch date for the Spacelab mission, but the agency is aiming for April 29, officials said.

Meanwhile, NASA may announce today the new launch date for Discovery, which will carry U.S. Sen. Jake Garn and six others on a five-day mission to launch two satellites. Launch is expected sometime around April 12.

Spacelab was designed and built by the European Space Agency for $1 billion and flew aboard Columbia in November 1983. The modular lab can be changed in form for each mission and will fly once more this year.

The wide-ranging and sensitive work for science on the April mission will require that the crew split into two shifts to man the lab constantly. The shuttle also will be positioned carefully to avoid any thruster firings or other movement that would disturb the experiments.

One of the most significant results of the flight should be "to lay the groundwork for routinely carrying animals with us into space and wherever we go," said Dr. William Thornton, a physician crew member.

The crew members discussed their flight via closed circuit television Tuesday from Johnson Space Center at Houston.

Tests of the new "animal enclosures" should prove that animals can be handled safely in orbit, said Thornton, who performed medical experiments aboard the first Spacelab flight.

Crew members won't handle the animals, but they will watch their behavior regularly, change the waste trays and replace food in the dispensers.

The temperature and heart rate of four rats will be monitored constantly by surgically implanted sensors. All movements by the animals will be recorded as they break a light beam shining across the cages.

After the flight, the rats will be weighed and other general measurements taken before they are decapitated for study at Kennedy Space Center.

Researchers want to study their bones, pituitary glands and other tissues to better understand the effects of spaceflight and prepare for future life sciences experiments.

"This is our first chance to really examine tissue that has flown in space," said Evvie Rasmussen, speaking for NASA.

Thornton said he believes the animals will adjust well to weighlessness. Rats flew in a different type cage on the eighth mission and "they were literally doing back flips prior to re-entry. They were deliberately playing in their cages."

Other life sciences experiments include a test of biofeedback techniques as a treatment for spacesickness and the test of a system that collects and measures urine samples.

Crew members also will perform three experiments involving crystal growth in space, hoping to create larger and more perfect crystals for a variety of applications in electronics.

Also studies on the movement of drops of silicone and water in weightlessness could bring advances in metallurgy, chemical engineering, astrophysics, cloud physics or nuclear physics.

Two experiments will be mounted outside the Spacelab on a pallet in the back of the cargo bay. One will be for a study of the Earth's upper atmosphere and the other will determine the composition and intensity of ions streaming toward Earth's atmosphere from the sun and other sources.

TODAY
MARCH 27, 1985

Today
March
27.

Animals will join astronauts

By MICHAEL MECHAM
TODAY—Gannett News Service

WASHINGTON — Scientists working on laboratory techniques that may lead to new commercial uses for space will share the Shuttle Challenger next month with the largest number of mammals ever put in orbit.

Twenty-four laboratory rats and up to four squirrel monkeys will be aboard when Challenger carries the Spacelab research laboratory and seven astronauts aloft on a seven-day mission now set to begin April 29. Liftoff will depend on the schedule of a mid-April Shuttle mission, carrying Sen. Jake Garn, R-Utah.

The animals are mainly along for the ride this time. But in the future, astronauts will use them for much more ambitious projects, including surgery in space.

"The primary thing we're looking for is their health and well-being," Dr. Bill Thornton, 55, of Faison, N.C., said at a briefing Tuesday, telecast from Houston.

It was the health of astronauts that prompted NASA to recently reject four other squirrel monkeys set for the flight. Laboratory tests showed they carried the herpes virus samarai, which had been considered benign to humans until studies showed animal handlers had been infected.

Marine Col. Robert Overmyer, 48, of Westlake, Ohio, the mission commander, said NASA insisted on flying "germ-free" monkeys to remove even a remote chance that the crew might be infected.

Monkeys will serve as a "good analogue for man" on future research missions, said mission manager Joseph Cremin. He said NASA has not determined yet whether three or four monkeys will make this flight.

Astronaut Thornton, a physician and expert on physiological responses to spaceflight, noted that rats readily adapt to spaceflight.

Astronauts: Shuttle zoo fun, trouble

By MICHAEL MECHAM
TODAY—Gannett News Service

WASHINGTON — Food and waste particles from NASA's zoo were a nuisance on Space Shuttle Challenger, but the astronauts said Monday they enjoyed having monkeys and rats aboard — and the animals liked them as well.

"On launch, I don't know who was happier to see each other, the monkeys or me," said Dr. William Thornton, an expert in human space sickness who was, in the words of mission commander Robert Overmyer, the "wet nurse" for the two monkeys and 24 rats aboard the seven-day mission, which ended a week ago.

During the flight, Overmyer rebuked mission control on the problem of floating rat and monkey waste and food particles but he said his anger didn't last. Overmyer noted he was most concerned about breathing fece-contaminated food dust but that none of the crew has shown any signs of sickness.

"I guarantee you those animals had as much fun as we did," said Overmyer.

Taylor Wang, an expert in fluid dynamics at NASA's Jet Propulsion Laboratory, and Lodewijk van den Berg, an expert in crystal growth from EG&G Corp., a major federal nuclear energy research laboratory, said they easily handled their workload while in space, despite 12-hour days and the need to repair broken equipment.

ORLANDO SENTINEL
MAY 4, 1985

Spacelab crew's luck takes a turn

Astronaut handymen fix faulty experiments

By James Fisher
OF THE SENTINEL STAFF

CAPE CANAVERAL — Shuttle astronauts and scientists on Earth rejoiced Friday after two major experiments were repaired inside Spacelab, a victory for the problem-plagued science mission.

After trying for 2½ days, Challenger crew member Taylor Wang finally brought life to a fluid experiment Thursday night and on Friday was scurrying to make up for lost research time.

The crew also made electrical and computer changes to activate an experiment that studies low-level cosmic rays streaming toward Earth from the sun and other galactic sources.

"We've got some good joy to spread," mission manager Joe Cremin told reporters.

Scientists on the ground greeted the news that the cosmic ray experiment was working with "a considerable amount of whooping and hollering, and even a few tears around," Cremin said.

Although many of the 15 experiments have broken down since Monday's launch, the crew will return to Earth in two days with valuable results from all but one, NASA officials said.

A wide-field camera was unable to collect any usable astronomy photos because Spacelab's outside air-lock door would not open. Spacelab is a 23-by-13-foot module inside the shuttle's cargo bay.

Challenger is scheduled to land at 12:03 p.m. Monday on the dry lake bed at Edwards Air Force Base in California.

NASA reported that the 24 rats and two squirrel monkeys aboard were doing well. One of the monkeys showed more signs of improvement from a bout of space-sickness, eating from a crew member's hand and gulping more banana-flavored pellets.

The problem of floating animal food and feces, which has plagued the crew since Tuesday, was apparently reduced Friday. On Thursday, the crew began holding a vacuum hose nearby when changing food in the cages.

The success of the fluid experiment, called a drop dynamics module, was probably the most welcome news to NASA.

The experiment studies the reaction of drops of silicone and water when they are rotated and oscillated by sound waves in weightlessness.

Such research could lead to development of a process to mix materials in space without using a container, which might contaminate them.

Several companies have already shown interest in the process.

Wang, who began preparing the experiment nine years ago, had been trying to fix an electrical problem with the machine since Tuesday.

Thursday night, he solved the problem and was ecstatic.

"It's working, it's working!" Wang exclaimed.

Astronaut Don Lind said, "When it came on, you've never seen such joy on anyone's face."

Wang demonstrated the machine's principle by using sound waves in an acoustical chamber to spin a 1-inch ball Thursday night.

He began actual science work Friday, and hoped to work extra hours to make up for the loss of about half of his research time.

The experiment to study low-energy cosmic rays had not worked because it was not receiving messages from a Spacelab computer, officials said.

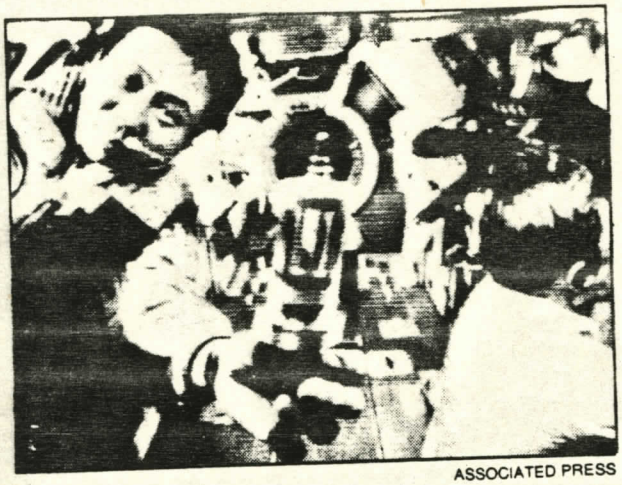
The crew solved the problem by connecting it to a computer and connectors that were switched over from an upper atmospheric experiment that had already stopped working.

They reprogrammed the computer to run the other experiment, and the switchover worked.

"The crew that launches with broken equipment brings back good equipment," said pilot Frederick Gregory.

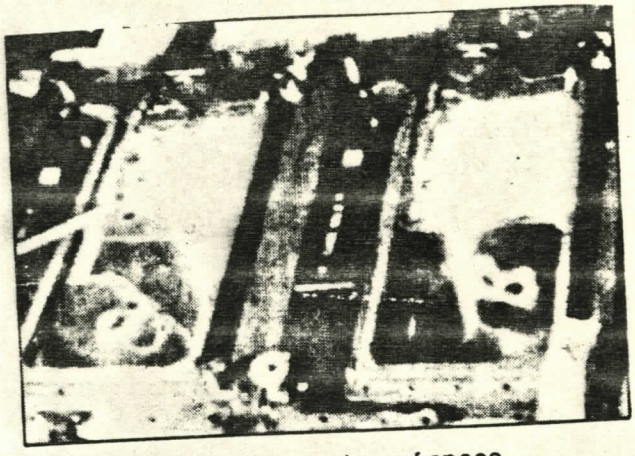
Mission control radioed, "You guys are doing a fantastic job. You started out with make-do and now you have most of your experiments up and running."

ORLANDO SENTINEL
MAY 5, 1985



ASSOCIATED PRESS

Taylor Wang shows special syringe
. . . fluid used in dynamics-of-drops experiment.



Monkeys check out wonders of space
. . . they look for weightless pen spinning by.

Spacelab reaps vast amount of data

Shuttle crew preparing for Monday landing in California

By James Fisher

OF THE SENTINEL STAFF

CAPE CANAVERAL — With science work running smoothly, Spacelab astronauts had gathered enough information by Saturday to fill 44,000 books of 200 pages each, mission officials reported.

They also had taken 2.5 million frames of video data, information that will keep scientists on Earth busy for months analyzing basic results.

This is good news for the mission, which has been plagued with several equipment breakdowns, one unusable experiment and floating animal food and feces since Monday's launch.

"We're extremely pleased at this point in the mission we're doing this well," said mission manager Joe Cremin.

Spacelab's 15 experiments will advance scientific knowledge of astronomy, atmospheric physics, materials processing, fluid movements and life sciences.

A wide-field camera for astronomy photography is the only instrument that will provide almost no information. A Spacelab air lock couldn't be opened, preventing the camera's use.

The crew today will begin winding down the science work to prepare for Monday's landing at 12:05 p.m. on the dry lake bed at California's Edwards Air Force Base.

The weather outlook is favorable, officials said.

Spacelab officials on Earth say they expect particularly good results from crystal growth experiments, aurora photography, a study of fluid drops and an upper atmospheric study experiment.

The atmospheric equipment took more than 160 million measurements of the atmosphere before it died Thursday because of a pressure loss, Cremin said.

Meanwhile, the two squirrel monkeys and 24 rats seem to be enjoying their weightless space travel. One of the two monkeys began eating well Friday, signaling an end to his spacesickness problems.

Television pictures Saturday showed the monkeys watching intently as crew member Dr. William Thornton suspended a pen in front of their cages.

"These animals are totally different in their response to humans now," he said.

"They actually seek companionship up here. We've established a friendship."

Officials reported some surprising results from an experiment that studies the reaction of liquid drops that are manipulated by sound waves in weightlessness.

The tests could lead to development of a means to mix substances without using a container, which could contaminate them.

A 1-inch drop of water and glycerine changed shape as it was spun by the sound waves, and then surprised scientists by stopping its rotation and returning to normal shape very quickly when the sound waves were turned off.

Scientists on Earth said they didn't expect the drop to stop spinning so fast in the gravity-free environment, and that result will spur new theories about fluid movements.

TODAY

MAY 6, 1985

NASA's ark floats back home today

The Associated Press

SPACE CENTER, Houston — Challenger's astronauts made final runs on their science experiments Sunday and prepared to fire the Space Shuttle out of orbit for a long fall toward a high-speed landing in California.

They also had another bout with airborne bits of food and feces from the rat cages in the Shuttle's mini-zoo.

Mission commander Bob Overmyer maneuvered the spacecraft Sunday for the first time in six days and reported "no problem at all."

Challenger "felt like a moving machine again," he said.

The spacecraft had been kept in a stable attitude that required no rocket firings. That enabled the astronauts to conduct their experiments, such as crystal growth, that require a near-perfect absence of gravity.

Challenger is scheduled to land on a dry lakebed runway at Edwards Air Force Base in California's Mojave Desert at 12:06 p.m. today at the conclusion of the weeklong flight. It will cross the California coast near Long Beach three minutes before landing, traveling three times faster than the speed of sound.

With their mission nearly done, the crew began to talk of home.

Pilot Bob Gregory had a post-landing request: "A beer might be nice, but all of us want an ice cream with chocolate and strawberries."

Dr. Bill Thornton said the two squirrel monkeys and 24 rats in the Spacelab 3 housed in the Shuttle's cargo bay were healthy and seemed to be enjoying the flight. He added about the monkeys: "We're bringing a couple back who are friendlier than when they came up."

But Dr. Norman Thagard and Lodewijk van den Berg put new food trays in the rat cages Sunday and again had to wield vacuum cleaners to battle a cloud of food particles and rat feces that floated out into the science module.

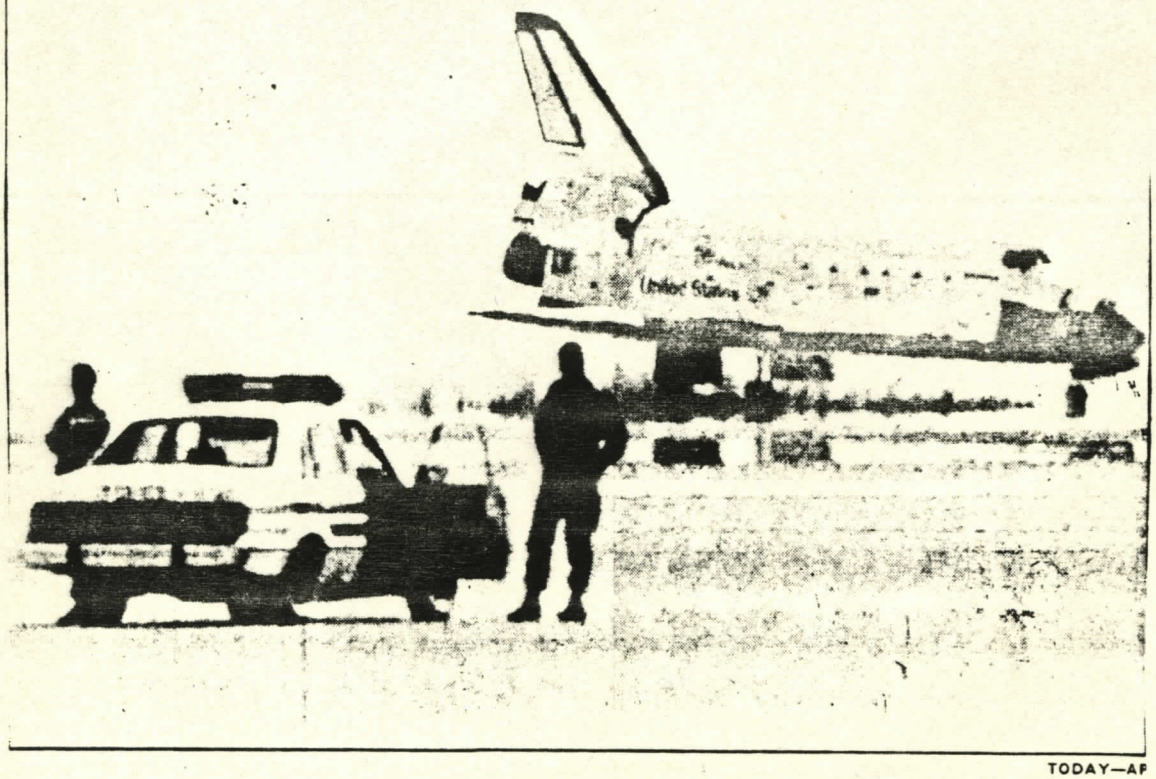
"We still get a lot of debris," Thargard told Mission Control. "They really have to work on this problem of the food tray changeout."

The two astronauts wore surgical gowns, masks and gloves for the half-hour cleanup, and Thagard recommended that goggles be added.

Science mission director Joe Cremin said prime objectives had been achieved on most of the 15 experiments. He said the crew gathered enough science data to fill 50,000 volumes and collected more than 3 million separate frames of video data.

TODAY
MAY 7, 1985

'Super' flight ends smoothly



TODAY—AP

CHALLENGER ROLLS PAST CRUISER AND TWO OF CALIFORNIA'S FINEST
. . . NASA says 7-man crew, two monkeys and 24 rats weathered mission well

• NASA officials bubbl over mission success, 12A

By CHET LUNNER
TODAY Aerospace Writer

EDWARDS AIR FORCE BASE, Calif. — With its plumb ing fixed, cages cleaned an experiments salvaged with ir flight ingenuity, Space Shuttl Challenger glided smoothl back to Earth on Monday, sul fering none of the heavy dam age the previous Shuttl landing generated.

Challenger's seven-ma crew, two squirrel monkey and 24 white rats returned t Earth one week and four mir utes after their departure fror Kennedy Space Center, wher the spaceplane originally wa scheduled to land.

NASA officials at a pos landing news briefing used th words "fantastic," "super" an "excellent" to describe the mi sion's scientific accomplish

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TODAY
MAY 7, 1985

'Super' flight ends smoothly

FLIGHT, From 1A

ments. NASA switched Monday's landing to the 7-mile California runway here after Challenger's sister ship, Discovery, suffered brake damage and a tire blowout while landing in crosswinds at KSC April 19. Surrounded by the vast Mojave Desert, the margin of safety at the Air Force Base is much greater.

A series of housekeeping problems vexed Challenger's latest mission, including astronaut urine that spewed from an experimental collection device and animal feces that floated through the billion-dollar Spacelab module.

One small, "do-it-yourself" satellite was deployed without a hitch, but a second refused to leave its "Getaway Special" canister despite repeated efforts by the crew.

NUSAT, a satellite built from donated parts by Utah college students, is in orbit and will be used to calibrate air traffic control radar signals.

GLOMR, the Department of Defense-funded satellite that failed to deploy, will be scheduled aboard a future mission, NASA said.

The flight was designed to provide a microgravity environment for a number of sophisticated materials processing and life-science experiments.

"Of the 15 separate experiments," said NASA Science Director Burton Edelson, "we got a good deal of success in 14."

A special camera was not able to be fully tested because of mechanical problems with an airlock aboard Challenger.

Spacelab Mission Manager Joe Cremin gave the mission a success grade of "high B or low A — in the low 90s."

Monday's successful landing in the California desert does not change NASA's plans to use KSC as its primary landing site, said Jesse Moore, who heads the NASA Shuttle program.

"I don't want anyone to draw a conclusion. . . that all flights of the Shuttle program will go to (Edwards)," Moore said. "The runways here certainly offer us a lot of additional margin.

"Our objective is to land as many of the flights as we possibly can back at Kennedy Space Center," Moore said.

He noted that using the Edwards runway costs NASA in turnaround time between flights. Agency sources estimate the dollar cost of ferrying Challenger back to Florida atop NASA's special Boeing 747 at about $900,000.

Moore said the desert was chosen for this flight because NASA is still studying the exact cause of Discovery's landing damage.

Preliminary findings showed Discovery had touched down 20 feet left of center, then was pushed more than 60 feet by crosswinds. While brakes were being applied to pull the 100-ton Orbiter back on track, its brakes overheated, locked up and a tire exploded.

Moore said that stress gauges attached to Challenger's landing gear should provide NASA with the data it needs to deal with the KSC-type landing conditions.

Challenger scarcely had begun its mission when the first of its many "glitches" arose.

The urine device that spewed liquid into the Shuttle cabin was disconnected to stop that problem. Later, the fresh-water system quit functioning. It was coaxed into action by several sharp blows from a thirsty astronaut's hand.

Despite the frustrations, NASA announced that the experiments and investigations had produced enough new data to fill a small library.

Edelson said that 250 million bits of data and 3 million frames of video observations were amassed during the flight.

The crew members, looking healthy, left for Houston about 4 hours after the landing. They were: commander Robert Overmyer; pilot Frederick Gregory; mission specialists Norman Thagard, William Thornton and Don Lind; and payload specialists Taylor Wang and Lodewijk van den Berg.

Challenger's approach over Los Angeles marked the first time that a Shuttle had returned from space directly above the nation's second-largest city. The city's police department reported its switchboard was flooded with calls after the Shuttle's re-entry sonic booms set off burglar alarms throughout the city.

Challenger is expected to leave Edwards Friday and, after a stopover in Texas, arrive at KSC on Saturday, NASA said.

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ORLANDO SENTINEL
MAY 7, 1985

Shuttle brings home a scientific payload

By James Fisher

OF THE SENTINEL STAFF

The shuttle Challenger and its Spacelab cargo glided to a smooth landing Monday in the Mojave Desert, returning home with priceless scientific data that will keep analysts busy for months.

The landing at 12:11 p.m. EDT on the dry lake bed at Edwards Air Force Base in California, which was shown on closed-circuit TV at Kennedy Space Center, appeared much softer than Discovery's landing at the center last month.

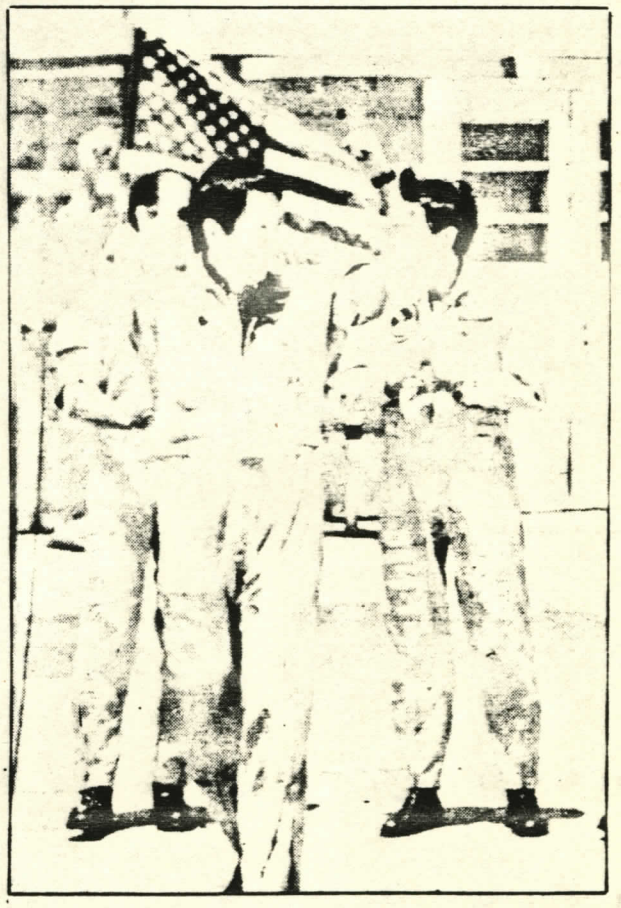
Discovery blew a tire and ripped another as it stopped on the concrete runway.

Two squirrel monkeys and 24 rats aboard Spacelab were reported "alive and well." They were moved to a waiting jet Monday afternoon and were to arrive at the space center Monday night, NASA officials said.

The rats will be decapitated so scientists can study how spaceflight affected their tissues. The monkeys won't be harmed, but will be studied before they are returned to NASA's Ames Research Center in California next week.

For scientists and NASA officials, the landing ended a weeklong mission that had a rocky start. Several of the 15 experiments malfunctioned and needed

Please see **SHUTTLE, A-5**



ASSOCIATED PRESS

Taylor Wang rejoices with crewmen . . . their mission gets a 'high B or low A' grade.

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ORLANDO SENTINEL
MAY 7, 1985

SHUTTLE

From A-1

repairs, but eventually all but one provided reams of valuable data.

A wide-field camera was able to take only one exposure because Spacelab's outside air-lock door would not open.

"I would describe this as a fantastic mission," said Jesse Moore, NASA associate administrator for spaceflight. "We're just delighted."

Mission manager Joe Cremin said he would give the mission a grade of "high B or low A."

The Spacelab crew of seven men conducted experiments in atmospheric physics, astronomy, crystal growth, the reaction of liquid drops to zero gravity and life sciences.

Crewmen grew four crystals that are larger and appear more pure than anything that could be grown in Earth's gravity, and triggered new theories about the movements of liquids in weightlessness.

Other experiments captured spectacular photos of auroras and took millions of measurements about the upper atmosphere.

In all, the crew gathered enough information to fill 50,000 science books of 200 pages each. The data will take months to analyze and the results should be published within a year, space agency officials said.

Moore said NASA was particularly proud of completing two shuttle missions in 24 days, a boost for the agency's launch-a-month goal this year.

The crew members appeared fit when they left Challenger about 40 minutes after touchdown. Waiting for them in crew quarters was ice cream with chocolate and cherries, a request they had made from orbit on Sunday.

Robert Overmyer was commander of the 17th shuttle flight. Other crew members were pilot Frederick Gregory, physicians William Thornton and Norman Thagard, astrophysicist Don Lind, fluids expert Taylor Wang and crystals expert Lodewijk van den Berg.

Landing preparations aboard Challenger were interrupted by a false alarm that the cargo bay doors might not have closed properly, but NASA eventually cleared the shuttle for landing.

The re-entry path took the shuttle directly over Los Angeles. Twin sonic booms about three minutes before landing startled city residents and set off some burglar alarms.

The landing site was switched to California to give NASA officials more time to study the problems Discovery encountered last month.

Challenger's brakes were equipped with special instruments to give technicians information about brake stress and other factors on landing.

While the shuttle was still in orbit Monday, Thagard revved up the rivalry between Florida State University and the University of Florida.

A 1965 FSU graduate, Thagard told two women at ground control who also graduated from the university in Tallahassee that he knew the mission would go well because they are all Seminoles.

Van den Berg then said that "we have one poster hanging up on the middeck and that says 'Go University of Florida.'"

"If it does, it's been ripped down by now," Thagard replied.