

Space News Roundup

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National Aeronautics and Space Administration

News Briefs

AI office set up

The Artificial Intelligence and Information Sciences Office (AIO) recently established within the Space and Life Sciences Directorate will be charged with responsibility for a broad field of endeavor, according to S & LS Director Dr. Joseph P. Kerwin. The office will explore such fields as artificial intelligence (which includes knowledge-based systems, expert systems, natural language understanding, computer vision, problem-solving and planning), robotics, teleoperators and automatic programming. The applications of this study will be primarily for the Space Station, Kerwin said. Jon D. Erickson has been appointed Chief of the office.

Moon bank proposed

Kate Thomas, writing in the Houston Post, reports that Lamar Savings Association of Austin is seeking "regulatory certification for a full-service branch on the Moon." The Austin-based company, which has run ads in Texas Monthly for the past year featuring space oriented paintings by Eagle Engineering's Pat Rawlings, is quite serious. As other companies gear up for space commercialization, said Lamar Board Chairman Stanley Adams, Lamar is serious about exploring the legal and regulatory ramifications of establishing a branch at a lunar colony. The idea was based in part on the findings of the Lunar Base Working Group which met at Los Alamos National Laboratory in April.

Biotechnology stressed

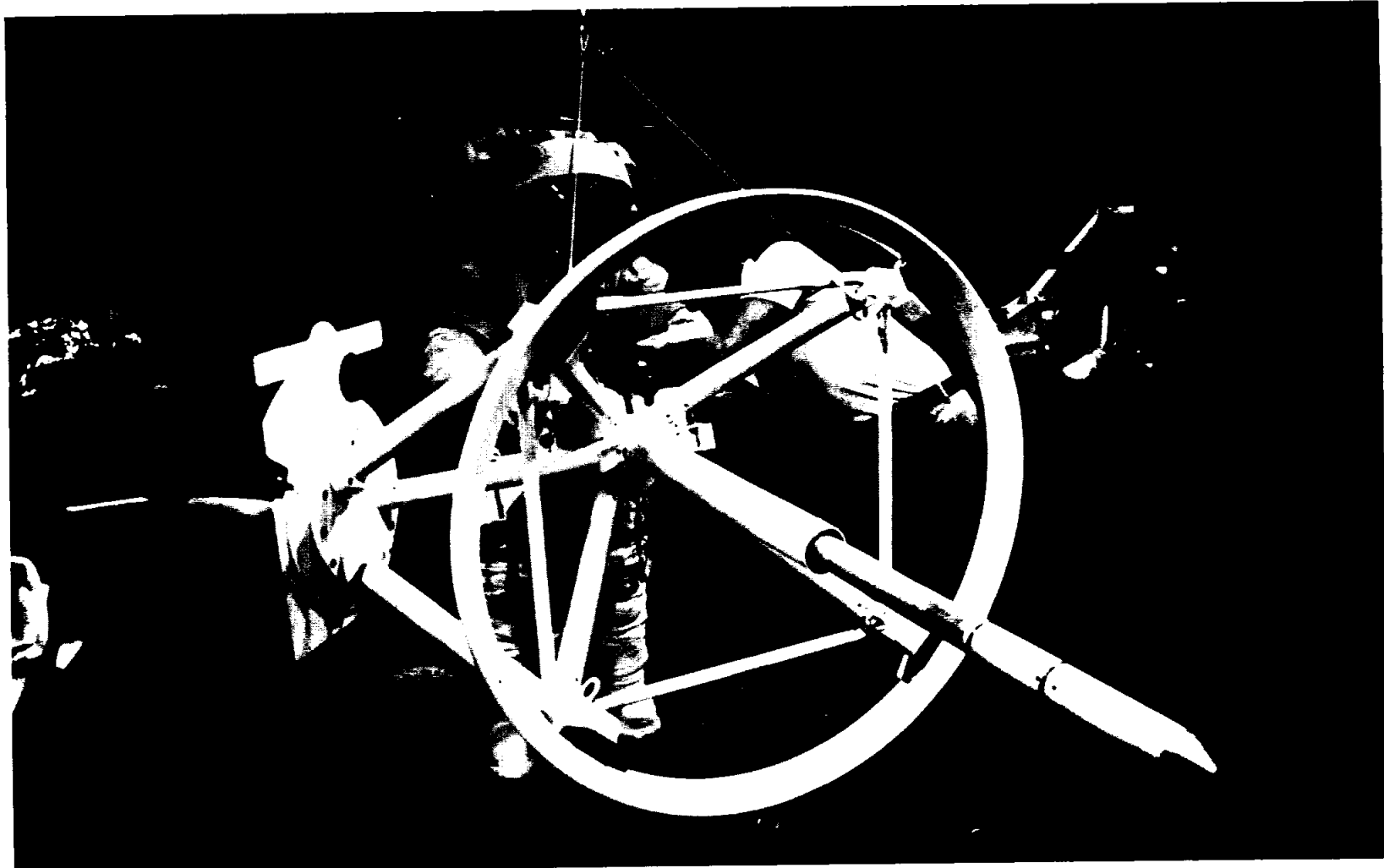
NASA has chosen two universities to become the focal point for the establishment of "centers of excellence" for biotechnology research. One center will be set up by the University of Arizona at Tucson, the other by the University City Science Center of Philadelphia. "We are talking about developing and manufacturing new classes of drugs and biologicals with the promise of enormous benefit for all mankind," said Richard E. Halpern, Director of Microgravity Sciences for NASA. The objective is to establish focal points for expertise in this field, Halpern said. The two centers will receive about \$450,000 annually in grants from NASA for a minimum of three years for seed money to promote additional support from industrial and educational sources.

ET goes west

The first Space Shuttle External Tank for use at Vandenberg Air Force Base arrived Oct. 21 after a 5,000 mile journey by barge, marking a major milestone in activation of the West Coast launch complex. The 154-foot external tank began its journey Sept. 25 from the Michoud Assembly Facility near New Orleans, and traveled on one of the covered barges formerly used to tow Apollo segments to the Kennedy Space Center.

Observation planned

The JSC Astronomical Society is looking for people in the JSC community who would be interested in observing and recording data on a series of eclipses of a bright double star by the moon on Jan. 15. This event will take place over a three minute interval before dawn along a one-mile wide path which crosses La Porte, I-45 at Little York and FM 1960 near Champions. A three-inch or larger telescope is required to observe the event. The information derived will be used to develop exact heights of lunar features at the Moon's south pole. For more information, call Paul Maley at x4549.



51-A preparations

STS 51-A EVA Mission Specialists Joe Allen, suited, and Dale Gardner, both the Palapa B-2 and WESTAR VI satellites during their spacewalks this week. For more on 51-A, turn to page 2.

Crew assignments announced

NASA last week named five astronauts as the crew of Space Shuttle mission 51-I, scheduled for launch in August 1985, and changed one previously announced assignment on another flight.

The 51-I mission will be commanded by Navy Cmdr. Robert L. "Hoot" Gibson, who served as pilot on Space Shuttle flight 41-B. Marine Lt. Col. Charles F. Bolden, Jr. was named as pilot.

Mission specialists are Drs. Franklin R. Chang-Diaz, Steven A. Hawley and George D. Nelson. Flight 51-I will be Chang-Diaz's first trip into space. Hawley was a mission specialist on flight 41-D and Nelson flew as a mission specialist on flight 41-C.

The seven-day mission, using the orbiter *Columbia*, will carry two communications satellites, the Syncom IV-4 and the American Satellite Company's ASC-1, and a materials processing experiment designated MSL-2.

In a crew change announcement, Air Force Col. Roy D. Bridges, Jr. has replaced S. David Griggs as pilot on Shuttle flight 51-F scheduled for launch in April 1985. Griggs also has been assigned as a mission specialist on flight 51-E scheduled to fly in February. The reassignment was made because the proximity of those two flights allowed insufficient time for training.

Flight 51-E is planned to carry the second Tracking and Data

Relay Satellite (TDRS) and another communications satellite, the Telesat-I. Flight 51-F is the Spacelab 2 mission.

Gibson was born in Coopers-town, N.Y., but considers Lakewood, Calif., his hometown. He joined NASA in 1978 after serving as a fighter pilot.

Bolden, a native of Columbia, S.C., served as a fighter pilot and test pilot prior to joining NASA in 1980.

Chang-Diaz, born in San Jose, Costa Rica, joined NASA with the astronaut class of 1980. His education is in mechanical engineering and applied plasma physics.

A native of Charles City, Iowa, Nelson flew the manned maneuvering unit on Shuttle mission 41-C

which retrieved and repaired the Solar Maximum satellite in April of this year. He came to NASA in 1978.

Hawley flew as a mission specialist on flight 41-D in August 1984. An astronomer, he joined NASA in 1978. He was born in Ottawa, Kan., but considers Salina, Kan., to be his hometown.

Bridges was born in Atlanta, Ga., and served as a fighter pilot and test pilot. He was named an astronaut candidate in 1980. This will be his first space flight.

Griggs was born in Portland, Ore., and served as a Navy fighter pilot and a NASA staff pilot prior to his selection as an astronaut candidate in 1978. Flight 51-E will be his first space mission.

Rings of Uranus photographed

Two astronomers have photographed evidence which points to a possible solar system around Beta Pictoris, a star 50 light years from Earth.

Employing special optical and computer techniques, Dr. Bradford A. Smith of the University of Arizona and Dr. Richard J. Terrile of NASA's Jet Propulsion Laboratory (JPL) photographed a vast swarm of solid particles, called a circumstellar disk, surrounding the nearby star. The disk is the first of its kind to be seen clearly in astronomical photographs.

Smith and Terrile's attention was drawn to Beta Pictoris by reports earlier this year by the IRAS (Infrared Astronomical Satellite) science team which stated that this star, and three others similar to it, showed abnormal amounts of infrared radiation, implying the existence of solid material orbiting around the stars.

There is some evidence to suggest that planets could have

formed around the star. The brightness of the star seen through its disk indicates that the innermost particles of the disk may have been swept away, and the formation of planets would produce such an effect. But the astronomers say they have not as yet been able to determine if there are actually planets around the star.

The circumstellar disk is believed to be made up of countless particles ranging in size from tiny grains less than a thousandth of an inch (10 microns) in diameter to the nuclei of comets a few miles across. The most likely composition includes ices, silicates and carbonaceous (organic) compounds, the same materials from which Earth and the other planets of the solar system are believed to have formed.

Questions to be answered are whether Beta Pictoris has existed long enough for planets to have formed and whether large plan-

etary bodies will necessarily form, even when the required materials are present.

Appearing nearly edge-on as seen from the Earth, the flattened disk extends outward to more than 40 billion miles (60 billion kilometers). This is more than 400 times the distance between Earth and the Sun.

The disk extends well beyond the regions close to the star where planets tend to occur. For this reason, much of the material seen in the pictures is, at present, too distant from Beta Pictoris to be directly involved in planetary formation. But it may include some material that was left over from the formation process and then ejected by planetary gravitational forces into space around the star.

Because the disk is so flat, it is believed to be very young, perhaps no more than a few hundred million years old. (Our Solar System is 4.5 billion years old.) An older disk, disturbed by planets

that might be orbiting Beta Pictoris, would not be as flat and much of the leftover debris would be ejected into interstellar space.

To the unaided eye, Beta Pictoris, which is twice as massive as the Sun and at least 10 times as luminous, appears as a faint (fourth magnitude) star in Pictor, an obscure constellation in the southern skies. To those living throughout much of the Earth's northern Hemisphere, Beta Pictoris remains permanently below the horizon; for Americans, it can only be seen clearly from the extreme southern parts of the country.

To make the observation, the astronomers used a 100-inch (2.5 meter) telescope at the Las Campanas Observatory near La Serena, Chile, operated by the Carnegie Institution of Washington, D.C. A CCD (Charge-Coupled Device) electronic camera and a coronagraph were attached to the telescope. The coronagraph is an

(Continued on page 4)

Opinion

Feminine perspectives

"It was an important day for women," KHOU-TV newscaster Felicia Jeter said Oct. 11. She was describing the events of a day which saw the first spacewalk by an American woman. She might also have added that it was a Space Shuttle mission in which the confluence of assignments and events brought a larger number of women into key roles than is usual. To say that the involvement of women like Kathy Sullivan and all of those around the Agency in supporting roles is important is both true and at the same time very nearly patronizing. It should come as no surprise that women are capable, that they are competent and involved. Yet this is still newsworthy, still the subject of some commentary. Maybe one day it won't be. For now, the commentary is to be expected, and the point does need to be made that after many years of breaking down barriers, women are not only involved in what used to be called "a man's world," they are also good at it to the same extent that men are good at it. The initial tokenism and what sometimes passed for enlightenment has given way to a situation where women are involved in integral ways, and that is an important development. Consider the past few weeks at JSC. Two of the experts on the STS 41-G crew happened to be women. One was Kathy Sullivan, who made history with her first EVA by an American woman, the other was Sally Ride, who can tell you a thing or two about what it means to break down barriers. Neither of the two is surpassed by any man or woman in some of the complex operations performed aboard the Space Shuttle. Given their training and the goals they have set for themselves, that should be no surprise. Elsewhere around JSC, the story is the same. The two flight controllers who were honored with the hanging of the mission plaque after the 41-G landing were women, Payloads Officers Michele Brække and Linda Godwin. The Orbit 2 Team Data Processing Systems Officer, Elizabeth Cheshire, and the Planning Team Flight Activities Officer, Karen Ehlers, along with Planning Team EECOM Barbara Pearson and Public Affairs Commentator Billie Deason, also added to the number of women in the Flight Control Room. Much of the back room support for these operators came from women, such as Cindy Daniels of McDonnell Douglas, who tracked the commanding problems during the ERBS deploy, a critical mission function. The list goes on. Many of the people who made mission television possible were women. A trusted right hand to Mission Operations Director Gene Kranz, Jan Pacek, was ever present in the MCC. One of the highest ranking women within the Agency, JSC Associate Director Dr. Carolyn Huntoon, was a familiar sight in the building, attending to the duties of her office. And as always, the secretaries of JSC held things together as people of both sexes slipped into the frenetic mission mode. The recent accomplishments of women here haven't been limited to Shuttle missions. A week after the flight of STS 41-G, Connie Alexander of the Employee Assistance Office was named the National Woman of the Year by the American Business Women's Association. Alexander was honored for her humanity, not her gender. Having said all of this, it is difficult for your editor to draw a conclusion without sounding patronizing, and it is patronizing to comment on a woman's performance in view of the fact that men around JSC have not been honored for jobs well done simply because they are men. At this time and place, however, it is appropriate to contemplate and even applaud the substantive contribution of women in our highly demanding technical atmosphere. The next great step will have come when editorials such as this are no longer written.

Earthy concerns

Why don't people capitalize the name of our planet? Granted, it's a pet peeve, and the Earth will keep turning whether we capitalize the name or not. But it is a perplexing question if one but notices that other planetary names are always capitalized. Why doesn't Earth merit the same treatment? The logic of how we capitalize words, especially words we use in the space business, seems to have leaked out through a pinhole someplace, and it really has to make you wonder. Consider that, under any circumstance, whether beginning a sentence or ending it, the capitalization for Mars, Mercury, Jupiter and Saturn is upper case — august, stately and dignified upper case. Even battered and torn Amalthea, that pitiful little potato of a moon near Jupiter, is capitalized. Poor old Earth, on the other hand, usually shows up as earth, and derivatives such as earthy and earthen are also listed in everything from the *Oxford Dictionary of Modern English Usage* to the *Associated Press Style Book* as taking lower case capitalization. What's a matter with these people? Don't they know they are practicing the grossest, most bigoted form of reverse planetary chauvinism? It almost seems a form of spoiling the nest. Earth is our home. She is the most beautiful planet we know of. Saturn is great if you like rings which are all twisted around and confuse everybody, or if you like mottled cloud cover that looks like banana pudding gone bad. But the face of the Earth is an ever-changing panorama, a splendid and peaceful tableau like no other. If Mars is uppercase and Martian is uppercase (or Saturnian for that matter), someone please explain why the same doesn't apply to earth and earthen? And the old saw about the word "earth" also meaning "dirt" just won't wash (so to speak). If some half-baked wordsmith from the 16th Century wants to equate the name of his home planet with mud, that's his business. But if you want to raise your Earthly consciousness, don't use some high blown phrase like "he tilled the noble earth." Say something like, "he plowed," and leave it at that.

NASA
Lyndon B. Johnson Space Center

Space News Roundup

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Editor, Brian Welch

51-A at a glance

Mission overview

Crew: Rick Hauck, CDR
David Walker, PLT
Joe Allen, MS-1 (EV-1)
Anna Fisher, MS-2
Dale Gardner, MS-3 (EV-2)

Launch: Nov. 7, 7:18 a.m. CST

Orbiter: *Discovery*, OV 103

Cargo: Telesat-ANIK/PAM-D
WESTAR VI retrieval pallet
Palapa B-2 retrieval pallet
LEASAT (SYNCOM IV)
Radiation Monitoring Experiment (RME)
Aggregation of Red Blood Cells (ARC)
Diffusive Mixing of Organic Solutions (DMOS)

Orbit: 28.45 degrees

Duration: 8 days, land on Flight Day 9;
126 full orbits, land on Rev 127

Landing: 6:57 a.m. CST Nov. 15, KSC



Weight summary

Two Manned Maneuvering Units (MMU) and Flight Support Stations	1,476 lbs.
Retrieval pallets	9,709 lbs.
LEASAT (Syncom IV-1)	17,000 lbs.
Telesat-ANIK (PAM-D)	9,936 lbs.
Radiation Monitoring Equipment (RME)	4 lbs.
Diffusive Mixing of Organic Solutions (DMOS)	180 lbs.
TOTAL PAYLOAD BAY AND MID DECK SUMMARY	38,305 lbs.
ORBITER AT LIFTOFF	261,697 lbs.
TOTAL VEHICLE AT LIFTOFF	4,518,761 lbs.

51-A summary of major activities

Flight Day 1

Ascent
OMS 2 (adjust)
Remote Maneuvering System (RMS) Checkout
OMS Phasing Burn
Activate Diffusive Mixing of Organic Solutions (DMOS) - 3M
Activate (Pocket Radiation Monitor) PRM
Rendezvous Phasing

Flight Day 2

OMS Height Adjust Burn
OMS Circularization Burn
Record PRM Data
Activate and Record Handheld Radiation Monitor (HRM) Data
Gap Measurement, Alignment Marks, Tape Measurement (DTO 0321)
Circularize Orbit
Deploy Telesat-ANIK
End-Effector Camera View of Telesat Perigee
Kick Motor

Flight Day 3

Deploy LEASAT (Syncom IV-1)
End-Effector Camera View of Syncom Perigee
Kick Motor
EVA Equipment Check
Checkout Extravehicular Mobility Units (EMUs) 1, 2 and 3
Rendezvous Plane Change
Activate PRM

Flight Day 4

OMS Phasing Burn
OMS Coelliptic Burn
10.2 Cabin Depress
Telesat/Syncom Backup Deploy
Record PRM Data

Activate HRM and Record Data
Rendezvous Coelliptic Maneuver
Launch Entry Helmet (LEH) Oxygen
Prebreathe and Depress Cabin to 10.2 psi
Prepare Extra Vehicular Activity (EVA) Equipment and Charge EMU (H₂O)
RCS Rendezvous Phasing Burn

Flight Day 5

Rendezvous 1
EVA-1 — Retrieve First Satellite

Flight Day 6

Rendezvous Phasing
Activate HRM and Record Data
Gap Measurement, Alignment Parks, Tape Measurement
EMU Maintenance and Recharge
Phasing Burns for Second Rendezvous

Flight Day 7

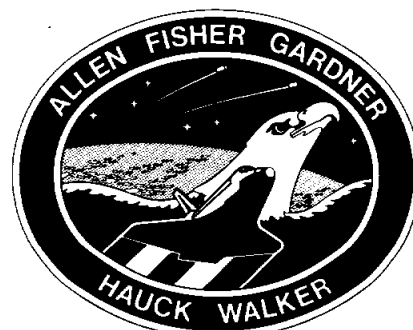
Rendezvous 2
EVA-2 — Retrieve Second Satellite

Flight Day 8

Hot Fire Test Primary Reaction Control System (PRCS)
Activate HRM and Record Data
Checkout Flight Control System (FCS)
Repressurize Cabin to 14.5 psi
Crew Press Conference
Post EVA Preparation
Stow Cabin

Flight Day 9

Prepare for Deorbit
Deorbit Burn on Rev 126
Entry/Landing on Rev 127 at KSC



Interview

Paul Scully-Power

Postflight reflections on a watery planet

Paul D. Scully-Power, born and raised in Australia, was as surprised as anyone to become the first naturalized U.S. citizen—not to mention dedicated oceanographer—to fly aboard the Space Shuttle. The idea was to take advantage of the 57-degree high inclination orbit of Flight 41-G for observing the dynamics of the world's oceans. Scully-Power, who has a long history of participation in the space program going back to Gemini, was chosen for that role last summer. A physical oceanographer, he has specialized in the measurement and dynamics of ocean eddies, which are circular currents as much as 100 miles across. "It's recently been discovered that the key to understanding the total ocean dynamics is tied to understanding the ocean eddies," he said pre-flight, and during the mission he saw not only circular eddies, but spiral eddies, ocean fronts, ocean shears and internal waves. All of those features are relatively new to an understanding of the oceans, and a clear understanding of those dynamics, Scully-Power says, is essential to knowing how 75 percent of this planet operates. Shortly after his post-flight press conference, he sat down with the Roundup to discuss what he saw.

Roundup: You said pre-flight that one thing you hoped to observe was the interaction between the southern oceans in spring time and the northern oceans in autumn, with the idea that this might be a significant element. How did that turn out?

Scully-Power: That's one of the things that was intriguing. I'm not a meteorologist, but I am pretty certain there was anomalous meteorology going on, for two reasons. The first thing I realized as soon as we got on orbit was that there was far more cloud cover around than I expected. My guess is that at that time of the year you could look at the total Earth and you would expect about 30 percent cloud cover. I would say we were looking at more like 60 or 70 percent cloud cover while we were up there, throughout the whole Earth, and that really surprised me.

Roundup: Do you now think that is a fairly standard amount of cloud cover?

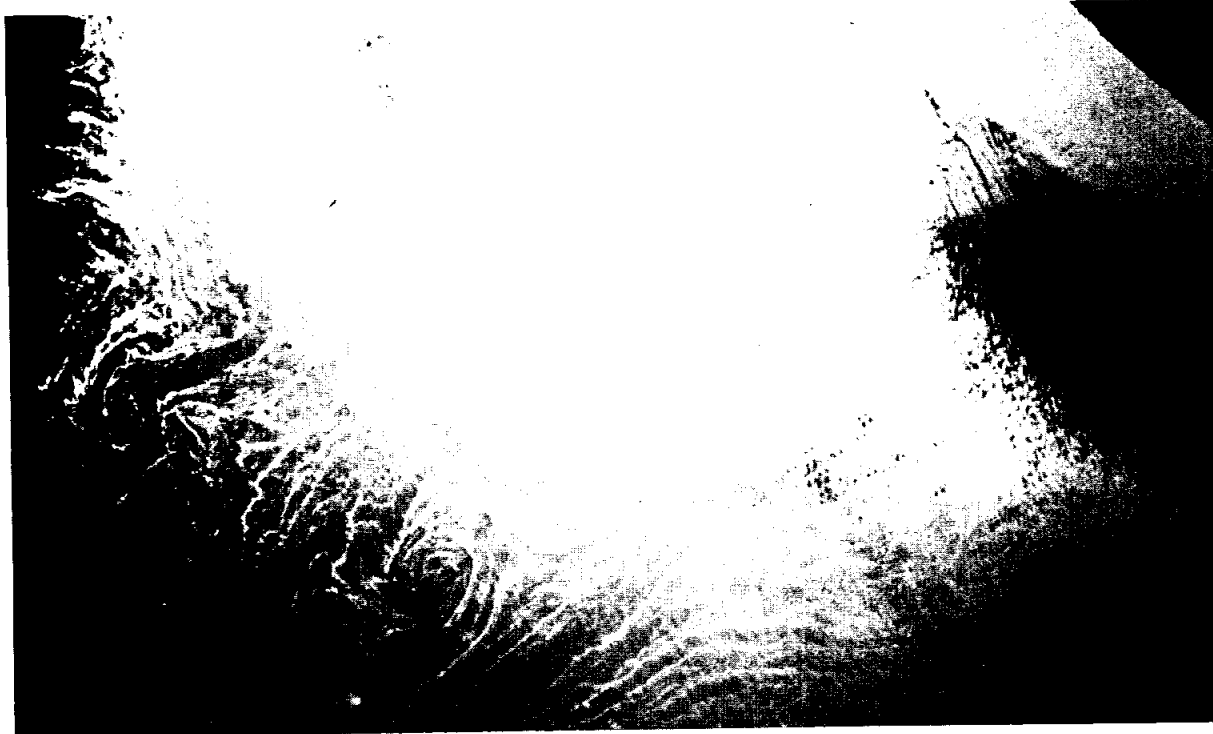
Scully-Power: I have no idea. It really surprised me. Now sure, there are numbers on what the normal cloud cover is on the Earth at different seasons. But the other thing was, since there was so much cloudiness, I didn't see a distinct difference between fall here and spring in the southern hemisphere. You would expect to notice a distinctly different amount of cloud in the northern than the southern hemisphere, or vice versa. And there wasn't, and that surprised me.

Roundup: And the cloud cover is influenced by temperatures, sun angles and other seasonal variations?

Scully-Power: Sure, and the fact that the meteorology is changing. It's in that transition period.

Roundup: Hasn't it always been thought that on either side of the intertropical convergence zone the oceans really are mixing into themselves, north and south, but not normally crossing the equator?

Scully-Power: Right. I think that is still the case in a general sense for major ocean currents. In fact the cloud cover was really surprising. I think the total cloud cover was anomalous. Beyond that, as you know, it is a multifaceted cause and effect. I don't know what the answer is. There were some areas which were pretty cloud free, like the Mediterranean and parts of the Indian Ocean. I got some very good results there. The amount of cloud did prohibit me from doing one thing I wanted. On several revs, I



These two views illustrate the dynamic features Scully-Power was able to observe during STS 41-G. Above, a "street" of cyclonic spiral eddies is visible in the eastern Mediterranean along one side of a current. Each of the spirals is approximately eight nautical miles in diameter. Below, a large wave packet can be seen coursing through the Strait of Gibraltar, a response of the ocean to a tidal pulse moving into the Mediterranean. This is the first high resolution photo ever taken of this phenomenon.



wanted to look top to bottom, for instance, at the Atlantic. I did that, irrespective of the cloud, but the fact is with that much cloud you don't get to look at the whole ocean, which is one thing I wanted to do. But there are hidden things, I guess. At one point there, I became aware of linear breaks in the clouds, which were running east to west. This was over solid cloud cover, but then you would come to this break that was about 16 miles wide and went east-west as far as the eye could see, and then there was another break further south. It was in the Pacific, and it turned out to be the equatorial counter current that caused the first break. The south equatorial current was the second break.

Roundup: And that difference in temperature between the currents and the ocean would affect the cloud cover directly above?

Scully-Power: Right, right. Absolutely. There are other factors besides temperature, but when it is all said and done, the ocean drives the atmosphere. The fact that there was anomalous cloud cover has got to be related to the ocean somehow, but I'm not sure exactly how.

Roundup: Does the cloud cover strike you as a feature of this mission that you would like to study in depth?

Scully-Power: I want to know why it was anomalous, firstly, and then I'll figure out whether it is worthwhile pursuing. I think there will

be some people looking at it. It might be tied up with this El Nino that was underway recently. A lot of the world's oceans have been anomalous for about 18 months. It stopped a few months ago, but maybe it is connected. I am not an expert on El Nino, but there are experts in this country and I'm going to check with them.

Roundup: Is the El Nino effect tied in any way to the kinds of structural, dynamic features you observed in the oceans?

Scully-Power: No, because El Nino tends to be an ocean basin type of event, right across an ocean basin. Actually, the most spectacular thing I saw was the Mediterranean with its dynamics, and I don't think that is El Nino-related.

Roundup: Let's talk about what you saw in the Mediterranean. You said pre-flight you expected at least one major discovery coming from this mission. Did the eddy field you saw in the Med count as that?

Scully-Power: Yes. The fact that these spiral eddies, which are new in oceanography, were interconnected over the whole length and breadth of the Mediterranean was just a tremendous observation. The other thing that has never been heard of before involved the Gulf Stream, which has been studied for literally hundreds of years. But no one has ever made mention before of spiral eddies associated with the Gulf Stream. There are. On the shoreward side

of the Gulf Stream, there was a whole bunch of them. They are between the Gulf Stream and the coastline. I'm not sure if there is a cause and effect there. I have to get away and think about it. There were oceanographic research ships around, as there always are, and they knew what areas I was going to be looking at, so I'll get some ground truth data. But no one has even postulated before that there were spiral eddies at least close to the Gulf Stream, that they were there all the time. And as I say, they are not in the Gulf Stream, and I'm not saying they are connected with the Gulf Stream, but the proximity of these two features has not been seen before.

Roundup: Didn't you mention in one of the evening tag ups during the flight that you had seen some internal waves within the Gulf Stream also?

Scully-Power: That's true, and they seem to be associated with the north wall of the Gulf Stream, the shoreward boundary of the Gulf Stream. One time in passing, there seemed to be some internal waves associated with the north wall, very close to it.

Roundup: How did these waves seem to be moving? Were they moving into the Gulf Stream or trying to move across the boundary and into the ocean?

Scully-Power: I don't know because you see, you are not sitting at a fixed point looking at it. That's one of the problems. I

think the big advantage of having man in space is to make an observation like that, and now we say, 'Okay, there are internal waves associated with the north wall of the Gulf Stream, now let's focus our satellites on that to go get a time series.' No one had bothered doing that. They would think it a waste of time to go willy nilly training your satellites here, there and everywhere just on the off chance that something is going to happen. But I think if anyone in my position makes an observation like that, then you've got something to hang your hat on. The question then is whether this phenomenon is there all the time, which way the waves are propagating, and all of the questions you are asking. That is the real value of this program. Someone can make an observation, and then you can turn your long-term, reliable sensors like the NOAA satellites, for example, on those features.

Roundup: Why can you see the Gulf Stream so clearly and distinctly from the surface, from the air and from space?

Scully-Power: In the Gulf Stream you have two things going for you. One is the color change, which you don't always get with ocean dynamics. The other is Sun glint. If you think about it, you've got the Gulf Stream moving with sort of quiet water on the sides, therefore you have a shear. A shear means that the surface texture in the large scale has been changed by that shear. Then you put the Sun glint, a natural enhancer, into the picture, and it sort of jumps out at you.

Roundup: When you were looking at these sorts of features, aided if possible by Sun glint, where did you tend to locate yourself in the Challenger?

Scully-Power: You sit up front, in either the Commander's or Pilot's seat, and you pick the side that the Sun is on. The Orbiter is upside down, so you turn yourself upside down relative to the Orbiter. Those front windows are slanted back, so when the Orbiter is payload bay to Earth and your head is pointed toward the floor of the flight deck, that's the best way of looking at it. It's what I call a gondola position. It's just like sitting in a big gondola and looking out at a panorama. It's by far the best way of looking at the Earth.

Roundup: What if there is no Sun glint at all? Can you still pick out anything?

Scully-Power: Yes, those features that you can see in color like the Gulf Stream. There are three ways of seeing the ocean, basically. The Sun glint we've talked about, color we've talked about, and the other is cloud patterns, which we've sort of alluded to. In some cases, an ocean front, for example, will have a line of clouds associated with it. Just like you have land breezes and sea breezes with lines of clouds, an ocean front can have a cloud line associated with it. An ocean front is similar to a weather front. It is a temperature differential just like the atmosphere. You have convergences or divergences in the atmosphere, you have exactly the same sort of phenomena in the ocean. And quite often, I saw that there were cloud lines associated. So that is the third fundamental viewing mode, what you might call atmospheric manifestations.

Roundup: What is the difference between an ocean front and an internal wave?

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Scully-Power

(Continued from page 3)

Scully-Power: Well, a front tends to have two different types of water masses coming together, so you've got temperature differences and you've got motion differences. An internal wave has totally different dynamics. The ocean is horizontally layered in density, as you know if you've ever been diving. As you go deeper it gets colder, and that means the density is increasing. But if you've done a lot of diving, you know you can suddenly go from warm water to cold water. That is a so-called density interface, which is temperature. Now whenever you've got a strong horizontal density interface, you can have a wave propagate along that line, and that's an internal wave.

Roundup: Another feature we've spoken about is spiral eddies. You took a picture of several eddies lined up in the Mediterranean. Do you know how they are born?

Scully-Power: Well, the point is, spiral eddies are so new in the field of oceanography we don't know. But, for example, if that is a well ordered street of spirals, then I would say they are relatively new. Therefore they would have had to have been born somewhere in that area. The question is, why? That's what I have to go look at.

Roundup: Does anybody have a hypothesis yet?

Scully-Power: No, not yet.

Roundup: How many people are working this subject worldwide?

Scully-Power: Very few, because

we haven't come out and made a big thing about spirals yet, but I think one of the things from this flight will be to bring this to the world oceanographic community that these things really exist. We didn't want to rush out and make a big thing about it if spirals only exist every ten years in a few certain places. I think one of the things from this flight is that this phenomenon is important to oceanography because spirals exist in all sorts of places.

Roundup: Based on this flight, do you think a Sun-synchronous polar orbit would be the best vantage point for studying the oceans from space?

Scully-Power: Not necessarily Sun-synchronous. Because the big thing about this is you can see features at different angles and different lighting conditions. I saw the Med many times from different angles and you do get a different feeling for it, you start to integrate things. Now my guess is you probably aren't going to have a space station put up to do just oceanography, but if you did the ideal thing would be polar orbit but not Sun-synchronous.

Roundup: But maybe that isn't so far fetched. Already, a company is moving toward putting a private space platform in orbit. In several years, might it not be possible for organizations such as Woods Hole, Scripps and the Navy to place a manned platform in orbit to look at the oceans?

Scully-Power: My personal feeling is that, just based on the history of science and technology, if you

carefully look at it, everyone always under predicts what is going to happen in the future. If mankind is running true to form, we are under predicting what will be happening in space in 25 years. Look how far we've come. If you asked any honest person to say, 25 years ago, what would you have predicted for today, no one would have guessed that people like me off the street would be flying in space, for example.

Roundup: Looking to the future, again, how would you make a case for space based studies of the ocean? Where is the scientific or economic return?

Scully-Power: Those two are both connected. Two thirds of this planet is water, and you better damn well understand how it's put together. Secondly, I think it's a fairly new observation among the community that the ocean is driving the atmosphere. People have been saying it for years, but a general acceptance of that idea has only been recent. Look at the economic benefits of just knowing what the atmosphere is going to do. Look at storm forecasting, for example. We are only going to understand this if we focus all of the different ways of observing on one event, like a hurricane. Those different ways include men and machines. I think a person would see things a satellite wouldn't. I'm not saying satellites are bad, and I'm not saying there's any competition, I'm saying if we get smart, one can feed the other. Someone like me can make an observation, then you can turn on those assets to do the detailed quantification of those phenomena. But someone's got to spot the phenomena first.



Scully-Power gives a thumbs up preflight.

Uranus rings photographed

(Continued from page 1)

optical device developed for detecting very faint objects close to brighter ones. The images were computer-processed at the University of Arizona and JPL.

Computer processing revealed what could not be seen in the

unprocessed image — two faint streaks of light extending radially outward to great distances from the star.

The work was jointly funded by the University of Arizona and NASA's Office of Space Sciences and Applications.

Roundup Swap Shop

Ads must be under 20 words total per person, double spaced, and typed or printed. Deadline for submitting or cancelling ads is 5 p.m. the first Wednesday after publication. Send ads to AP 3 Roundup, or deliver them to the Newsroom, Building 2 annex. No phone-in ads will be taken. Swap Shop is open to JSC federal and on-site contractor employees for non-commercial personal ads.

Property & Rentals

For lease: Small condo, all appliances furnished, near NASA and UH-CL, \$300/mo. Call 480-9657 after 5 p.m.

For rent: Galveston Gulf-front condo, treat yourself to a 2 day to 1 month vacation, completely furnished, low fall rates. Call Nussman, 488-7762.

For sale: Texas A&M duplex, good investment, spacious, very near campus, assume \$78K note/sell or trade, low equity for land. Call 482-7869.

For rent: Friendswood 3-2-1, lawn, trees, fenced, 1/4 miles walk to local schools, 800 Lochmoor, \$485/mo. plus deposit. Call 482-6816 evenings.

For sale: Beautiful wooded water-view lot at Pt. Lookout West on Lake Livingston, 75'x137', below market at \$3,500. Call 946-7587.

For rent: One room in 4 bdrm. Nassau Bay house, pool, 1 block from lake & park. Call Jay Trimble, x3695.

For sale: Clear Lake City-Camino South, 3-2-2 plus study/office or 4-2-2, owner flexible with terms. Call 488-3620.

For rent: Lot for full-size, all-electric mobile home, Dickinson, \$85/mo. Call 333-3446.

For sale/lease: Forest Bend, 4-2-2, on the park, new A/C, fans, extra insulation, fireplace, fence, \$62,900 or \$610/mo. Call 996-0981.

For sale: Freeway Manor, 3-1 1/2, FPL, family room, low equity. Call Jim, x3911.

For sale: Heritage Park, 3-2-2, attached garage, enclosed utility, fenced, \$51,500, assume \$27,200 FHA fixed 8 1/2%, with \$10K down, owner/agent carry 2nd at 12% for 10 yrs. Call Lt. Quinn, x4326 or x4771 or 481-0289.

For sale: 1.8 acres in Friendswood, all utilities, \$29,500. Call Janice, x5867 or 482-6888.

Cars & Trucks

1973 Opel Manta Rallye, new upholstery & carpet, low mileage tires, body excellent condition, needs engine (overhaul/rebuilt), \$400 or best offer. Call Webster, x4776 or 554-6892.

1984 Ford Pickup Shortbed, pick up payments of \$284.88/mo. Call Cecie, x3486.

1979 Pinto/as is, new tires with 49K miles, \$350. Call Cecie, x3486.

1979 Opel, 5 speed, A/C, radio, 35 miles/gal., \$1,195. Call 645-0901.

1978 Firebird Esprit, runs good, A/C, V8, some rust, \$1,250. Call 482-7733 after 5 p.m.

1950 Chevy 4-door, 97,000 miles, 3rd owner, refurbished and in excellent driving condition. Need to sell. Call Smith, x4571 or 471-2419.

1980 Trans Am, 30,000 miles, fully loaded, T-top, power locks/windows, turbo charged V-8, \$6,500. Call 334-2621 after 6 p.m.

1979 VW Rabbit diesel, 4 speed, A/C, sun roof, AM/FM/stereo, new tires, new battery, excellent condition, \$2,300. Call Bob, x4323 or 482-5984.

1976 MG Midget, good condition, \$1,500. Call Shelly, x5881.

1967 Ford 3/4 T Pickup, crew cab, Koenig tool boxes, AM/FM, runs well but needs some work, \$800. Call Don, 482-7102.

1975 Chevrolet Nova, 4-door, V8-262, A/C, good tires, best offer. Call Charles, 480-0009 5-12 p.m.

Boats & Planes

Gulf Coast Aero Club is now accepting limited number of new members. Six plane fleet (Cessna 152, 172; Piper CK140; Cherokee 6 place; Archer II; Retret Mooney). Call Mark, x6301 or 554-2538 after 6 p.m.

Prindle Catamaran 18' multi-color sails, trailer & accessories, \$1,980 firm. Call 947-2988 or 645-0901.

Sailboat with trailer 17' Thistle-family racer cruiser, good condition, new paint, 5 sails, must sell, \$2,200 both. Call Jim Sackett, 488-9025.

Audio & Video

Olympus mount lens, Kiron 28-105 F3.2, \$115. Call Wayne, x6226 or 486-7141.

Atari 2600 video game system with 28 games, make offer. Call 482-3009.

Heathkit SB102 transceiver, excellent working condition, power supply & speaker included, CW filter, \$275. Call Bob Alexander, x2901 or 393-1670.

23-Channel base station, TRC55 Realistic, \$175. Bearcat 210 programmable police scanner, \$175. Call Linda, x2001.

Cycles

Man's 26-inch Raleigh 3-speed bike, good condition. Call 334-1267 after 5 p.m.

1975 Yamaha RD350B, 8,000 miles, great shape, garaged, everything works, \$420. Call Phil Sheridan, x3404 or 474-2676.

1983 Honda XL200R, like new, never ridden on dirt, only 678 miles, \$1,495. Call Brad, 488-0723.

Household

Indoor ice cream parlor table, 2 chairs, \$75. Playpen, deluxe model, \$35. Both excellent condition. Call Nussman, 488-7762.

Dinette set, white wrought iron, glass top table, 60"x34", 6 chairs, \$150. Call 482-7643.

Barcalounger, brown tweed, good condition, \$50. 24" RCA color TV, console, cherry mahogany, good condition, \$250. Call 333-2335 after 5 p.m.

RCA Whirlpool electric dryer, new seal and belts, runs good, 10 years old, \$50. Call 482-1385.

Beautiful 10'x13' braided rug, Indian browns, reversible, used 8 months, \$200 or best offer. Call J.R. Smith, x4571 or 471-2419.

Kenmore freezer, 19.2 cu. ft., like new, \$250. Call Mays, x4726 or 554-2479 after 5 p.m.

Antique Chinese table, small buffet and china cabinet, \$700 all. Beautiful dining room table, seats 8, hand-carved sides and bases, \$250. Country French coffee table, \$35. Mahogany lamp table with magazine rack, \$30. Beautiful decorator coffee table, 3'x5', \$350. Call 488-5564.

French provincial bedroom suite, dresser, chest drawers, and desk, white. Call 488-2316.

Sofa and chair, good condition, \$130. Call Brent Fontenot, x4981.

Sofa, brown & beige velour, great condition. Call 996-9033 after 4 p.m.

Dinette set, laminated table with extension board, 4 swivel chairs, vinyl covered, wrought iron frame, \$195. Call 333-4882 evenings.

Bunk bed and mattress, \$95 or trade for hide-a-bed or queen. Call Wayne, x6226 or 486-7141.

Matching couch, loveseat and corner table, heavy green vinyl, excellent condition, \$100. Call 488-0500 after 5 p.m. or weekends.

Miscellaneous

Surfboard Hurricane, dual fin, designed for Gulf waves, perfect condition, almost new, \$230. Call 488-0266.

Wedding ring set, 10 karat gold, four diamonds, \$125 cash. Call Geraldine, x5094.

Oak firewood delivered, \$100/cord mixed, \$125/cord all split trunk section. Call 334-1267 after 5 p.m.

Found: "Quill & Scroll" high school pin in Bldg. 30 parking lot. Call x3406 to claim.

Lawnmower, push type, 2.5 HP, Tecumseh 4-cycle engine, 20" cut, less than 20 hrs. use, sell or trade with cash for Yazoo-type mower. Call 554-2065.

Trailer hitch, fits 1975-80 VW Rabbit, valley 1500 gross wt/150 hitch wt, \$62 new, sell \$30. Call Bob, x4323 or 482-5984.

IBM Selectric 2 typewriter, \$175. Antique key-wound pocket watch, \$100. 100 Nat'l Geographics, \$20. Beautiful string of amber beads, \$70. Call 488-5564.

Cookin' in the Cafeteria

Week of November 5-9, 1984

Monday: Cream of Potato Soup; Franks & Sauerkraut, Stuffed Pork Chop, Potato Baked Chicken, Meat Sauce & Spaghetti (Special); French Beans, Buttered Squash, Buttered Beans, Standard Daily Items: Roast Beef, Baked Ham, Fried Chicken, Fried Fish, Chopped Sirloin, Selection of Salads, Sandwiches and Pies.

Tuesday: Navy Bean Soup; Beef Stew, Liver & Onions, Shrimp Creole, Smothered Steak w/Dressing (Special); Corn, Rice, Cabbage, Peas.

Wednesday: Seafood Gumbo; Roast Beef, Baked Perch, Chicken Pan Pie, Salmon Croquette (Special); Mustard Greens, Italian Green Beans, Sliced Beets.

Thursday: Beef & Barley Soup; Beef Tacos, Diced Ham w/Lima Beans, Stuffed Cabbage (Special); Ranch Style Beans, Brussels Sprouts, Cream Style Corn.

Friday: Seafood Gumbo; Fried Shrimp, Deviled Crabs, Ham Steak, Salisbury Steak (Special); Buttered Carrots, Green Beans, June Peas.

Week of November 12-16, 1984

Monday: Veteran's Day Holiday.
Tuesday: Beef Noodle Soup; Baked Meatloaf, Liver & Onions, BBQ Spare Ribs, Turkey & Dressing (Special); Spanish Rice, Broccoli, Buttered Squash.

Wednesday: Seafood Gumbo; Broiled Fish, Tamales w/Chili, Spanish Macaroni (Special); Ranch Beans, Beets, Parsley Potatoes.

Thursday: Navy Bean Soup; Beef Pot Roast, Shrimp Chop Suey, Pork Chops, Chicken Fried Steak (Special); Carrots, Cabbage, Green Beans.

Friday: Seafood Gumbo; Broiled Halibut, Fried Shrimp, Baked Ham, Tuna & Noodle Casserole (Special); Corn, Turnip Greens, Stewed Tomatoes.

AT BUILDING #3

On Wednesday we feature The Reuben:

Corned Brisket, Swiss Cheese on a bed of Sauerkraut, Poupon Mustard on Rye and 1/4 Pickle. Delicious

Monday & Thursday check out our French Dip Sandwich