NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

SPACE SHUTTLE MISSION
STS-51A

PRESS KIT
APRIL 1985

SPACELAB 3

STS-51A INSIGNIA

S84-40148 -- The space shuttle Discovery en route to Earth orbit for NASA's 51-A mission is reminiscent of the soaring eagle. The red and white trailing stripes and the blue background, along with the presence of the eagle, generate memories of America's 208-year-old history and traditions. The two satellites orbiting the Earth background amidst a celestial scene are a universal representation of the versatility of the space shuttle. The artwork was done by artist Stephen R. Hustvedt.

The NASA insignia design for space shuttle flights is reserved for use by the astronauts and for other official use as the NASA Administrator may authorize. Public availability has been approved only in the form of illustrations by the various news media. When and if there is any change in this policy, which we do not anticipate, it will be publicly announced.

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RELEASE NO: 84-149 **November 1984**

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DISCOVERY'S SECOND MISSION SCHEDULED

Space Shuttle Discovery's second mission in space, set to be launched no earlier than Nov. 7, 1984, will be highlighted by two satellite deployments and two satellite retrievals. Mission 51-A will be an eight-day mission with a launch at approximately 8:18 a.m. EST, and a landing targeted for 7:57 a.m. EST, Nov. 15, on the Kennedy Space Center Shuttle Landing Facility runway.

The 51-A mission will feature the deployment or the Canadian communications satellite Anik D2 (Telesat H) and the Hughes LEASAT 1 (Syncom IV-1) communications satellite, both destined for geosynchronous orbit. The two satellites to be retrieved are the Palapa B-2 and the Westar VI spacecraft which were deployed during Mission 41-B In February 1984. After a successful deployment, failure of the Payload Assist Modules (PAM) attached to the satellites put them Into unusable low-earth orbits about 600 miles above the Earth.

The 3M Company's Diffusive Mixing of Organic Solutions (DMOS) experiment will be carried in the mid-deck and will be the first attempt to grow organic crystals in the microgravity environment of the orbiter. 3M scientists will study the crystals produced in the DMOS experiment for their optical properties and other characteristics that might ultimately have important applications to 3M's businesses in the areas of electronics, Imaging and health care.

The Radiation Monitoring Equipment (RME) experiment will also be carried again in the middeck.

Commanding the five-member crew will be veteran Frederick H. Hauck, with pilot David M. Walker, and mission specialists Anna L. Fisher, Dale A. Gardner and Joseph P. Allen comprising the rest of the crew. Anna Fisher and David Walker are the only two rookies on the crew list, the other members having flown on STS 7, 8 and 5, respectively.

The launch window on Nov. 7 extends for 18 minutes after the predicted 8:18 a.m. liftoff. Launch must occur no later than Nov. 11 so that Discovery is inserted into the same orbital plane as the satellites to be retrieved, and during a period which permits the orbiter to rendezvous with the two satellites while also maintaining satisfactory deployment opportunities for the LEASAT and Anik spacecraft. The daily inplane launch opportunity occurs roughly 32 minutes earlier each day after Nov. 7, and the five-day launch opportunity recurs every 45 days for a daylight launch.

The two spacecraft will have been maneuvered, using onboard attitude adjustment systems, to bring them into 207-by-22O-mile high parking orbits for recovery. During this process the spin rates of the satellites will have been reduced to about 1 rpm. The satellites will be in near identical orbits, with Palapa trailing the Westar about 700 miles.

The mission profile calls for insertion into a 184-by-172 1/2-mile orbit inclined 28.45 degrees to the equator. Once in orbit, the crew will check out the Canadian-built Remote Manipulator System, or RMS, which is critical to the retrieval success. They will also activate some of the smaller payloads aboard, such as the Diffusive Mixing of Organic Solutions and Pocket Radiation Monitor experiments. The first rendezvous phasing to fine-tune the orbit will also be completed.

On flight day two, the crew will raise its orbit to about 186 miles and circularize it, then will check out, spinup and deploy the Canadian Anik satellite and its PAM booster rocket. The crew will use the television camera mounted on the end of the manipulator arm to view the PAM motor firing about 45 minutes after deployment, and will take a number of other readings and measurements, in addition to again fine tuning their orbit.

The following day will feature the "Frisbee" deployment of the Hughes LEASAT spacecraft, similar to that deployed during the 41-D mission. Firing of LEASAT's integral perigee kick motor will also be observed with the TEN'S end-effector camera, and mission specialists Allen and Gardner will perform an extensive checkout of their spacesuits in preparation for their retrieval spacewalks later in the flight.

Flight day four is listed as a backup deployment opportunity for either the Anik or LEASAT satellites, if necessary, and the crew will also perform a co-elliptic orbit maneuver to place the orbiter in the same orbital plane as the Palapa satellite. The crew will also take experiment readings and depressurize the cabin to 10.2 psi in preparation for their spacewalk the next day.

Flight day five will see the final rendezvous maneuvers with the slowly spinning Palapa satellite. After Hauck and Walker have maneuvered the Discovery to within 35 feet of the Palapa satellite, Allen and Gardner will leave the orbiter airlock, Allen will don one of the Manned Maneuvering Units and will fly over to the Palapa satellite. Once stabilized at the bottom end of the errant satellite, Allen will insert a specially constructed Apogee Kick Motor Capture Device (ACD) into the spent apogee kick motor casing, which is inside the aft skirt of the Palapa. The six-foot long ACD will lock into place and special brake pads will allow Allen to use his MMU jets to stop the rotation of the satellite.
more-

Next, mission specialist Anna Fisher will use the RMS to capture a grapple fixture which is mounted to the ACD between Allen and the satellite. She will then maneuver the satellite into the cargo bay where Gardner will be stationed near a special support pallet. Gardner will then be able to remove the satellite’s omni-directional antenna and attach a separate bridge structure (A-frame) to the top end of the satellite, so the RMS can release the lower fixture and grasp the top one, allowing the satellite to be lowered into the cradle and latched into place vertically for the return to Earth.

After the arm has grasped the upper grapple, Allen will be free to undock from the satellite and reberth his MMU. Once Palapa is in its special pallet, the astronauts can remove the bridge structure from the top of the satellite so that the cargo bay doors can be closed shortly before return to Earth.

The next day, the spacewalkers will recharge their space-suits, perform any maintenance required and take scientific measurements while the other crew members perform other orbital adjustments for rendezvous with the Westar satellite. The following day will see a repeat of the satellite rendezvous, space walk and retrieval. Identical procedures will be followed, with Gardner performing the flyover, dock and stabilization, and Allen attaching the bridge structure from a work station in the payload bay.

The eighth day will include the completion of scientific tests, stowage of cockpit equipment, repressurizing the cabin to 14.7 psi and a checkout of the orbiter's flight control systems in preparation for deorbit and landing the next day.

On the final day, the crew will complete cabin stowage, turn off experiments, close the payload bay doors over the two rescued satellites and prepare for the deorbit burn just before the end of orbit 126.

The reentry and landing approach will begin with a deorbit burn as the orbiter crosses Australia. The ground track then arcs across northern Mexico and the Gulf, then trails its double sonic boom across central Florida on the way to a touchdown at Kennedy Space Center at about 7:57 a.m. EST. Mission duration will he about 192 hours.

After landing, the orbiter will be safed, the crew will depart and within several hours the craft will be towed into the Orbiter Processing Facility for post-mission turnaround activities, including the careful removal of the first two satellites ever to be returned to Earth from orbit in the Space Shuttle.

(END OF GENERAL RELEASE; BACKGROUND INFORMATION FOLLOWS)

51-A BRIEFING SCHEDULE

Time	Briefing	Origin
T-1 Day		
9.30 a.m. EST	Anik D2 (Telesat)	KSC
10:15 a.m. EST	Leasat (Syncom)	KSC
11:00 a.m. EST	3M -Experiment	KSC
12:00 p.m. EST	Palapa and Westar Retrieval	KSC
1:30 p.m. EST	Prelaunch Briefing	KSC
T-Day		
9:30 a.m. EST	Post Launch Press Conference	KSC (local only)
Launch Through End-of-Mission		
Times announced on NASA Select	Flight Director Change-of-Shift Briefings	JSC
Landing Day		
9:00 a.m. EST	Post Landing Briefing	KSC
Landing+1 Day		
1:00 p.m. EST	Orbiter Status Briefing	KSC

GENERAL INFORMATION

NASA Select Television Transmission

The schedule for television transmissions from Discovery and for the change-of-shift briefings from the Johnson Space Center, Houston, will be available during the mission at the Kennedy Space Center, Fla.; Marshall Space Flight Center, Huntsville, Ala.; Johnson Space Center; and NASA Headquarters, Washington, D.C. The television schedule will be updated on a daily basis to reflect any changes dictated by mission operations.

NASA has leased from RCA, Satcom F-1R, Transponder 9 (full transponder) to carry NASA Select television from launch through landing of Shuttle flight 51-A.

Satcom F-1R is located 139 degrees West longitude. Transponder 9 transmits on a frequency of 3880.0 MHz. Operating hours are 7:00 a.m. to 5:00 p.m. EST from launch through landing. To make available a TV dump of rendezvous and EVA, transmission times will he 6:00 a.m. to 5:00 p.m. EST on Nov. 13, and 5:00 a.m. to 5 p.m. EST on Nov. 14.

Status Reports

Status reports on countdown progress, mission progress, on-orbit activities and landing operations will be produced by the appropriate NASA news center.

Briefings

Flight control personnel will be on eight-hour shifts. Change-of-shift briefings by the off-going flight director will occur at approximately eight-hour intervals.

Transcripts

Only transcripts of the change-of-shift briefings will be available at the Shuttle news centers. Transcripts of air-to-ground transmissions have been discontinued.

SHUTTLE MISSION 51-A -- QUICK LOOK FACTS

Crew:	Frederick H. "Rick" Hauck, Commander David M. Walker, Pilot Joseph P. Allen, Mission Specialist 1 (EV-l) Anna L. Fisher, Mission Specialist 2 Dale A. Gardner, Mission Specialist 3 (EV-2)
Orbiter:	Discovery (OV-103)
Launch Site:	Pad 39A, Kennedy Space Center, Fla.
Launch Date/Time:	Nov. 7, 1984; 8:18 a.m. EST
Window:	18 minutes to 8:36 a.m. EST; launch must occur so that Discovery is inserted into an orbit in the same plane with the satellites to be retrieved. Launch time also must be within the period which permits rendezvous phasing with the satellites and acceptable deployment times for Telesat and LEASAT. The inplane launch opportunity occurs 32 minutes earlier each day. An acceptable launch period of 5 days occurs every 45 days for a daylight launch.
Orbital Inclination:	28.45 degrees
Altitude:	184 by 172 1/2 s.mi. apogee, initial orbital requirement after post insertion; 207-220 s.m. retrieval; 184 by 197 rendezvous altitude.
Mission Duration.	8 days, land on flight day 9; 126 full orbits, land on 127.
Landing Date/Time:	Nov. 15, 1984, 7:57 a.m. EST
Primary Landing Site:	Kennedy Space Center; weather alternate, Edwards Air Force Base, Calif.; Trans-Atlantic Abort, Dakar, Senegal; Abort-Once-Around, Edwards Air Force Base.
Cargo and Payloads:	Anik D2 (Telesat)/PAM-D Westar VI Retrieval/Pallet Palapa B-2 Retrieval/Pallet LEASAT (Syncom IV) Radiation Monitoring Experiment (RME) Diffusive Mixing of Organic Solutions (DMOS)
Highlights:	Deploy two satellites and retrieve two others.

SUMMARY OF MAJOR ACTIVITIES

Flight Day 1
Ascent
(MS 2 (adjust)
Remote Manipulator System (RMS) checkout
(MS phasing burn
Activate Diffusive Mixing of Organic Solutions (DMOS)
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
Cap measurement, alignment marks, tape measurement (DTO 0321)
Circularize orbit
Deploy Anik D2 (Telesat)
End-effector camera view of Anik D2 (Telesat) perigee kick motor

Flight Day 3
Deploy LEASAT (Syncom IV-l)
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 co-elliptic burn
10.2 cabin depress
Anik/Syncom backup deploy
Record PRM data
Activate HEM and record data
Rendezvous co-elliptic maneuver
Launch entry helmet oxygen prebreathe and depress cabin to 10.2 psi
Prepare EVA equipment and charge EMU (H20)
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 marks, tape measurement
EMU maintenance and recharge
Phasing burns for second rendezvous

Flight Day 7
Rendezvous 2
EVA-2 -- retrieve second satellite

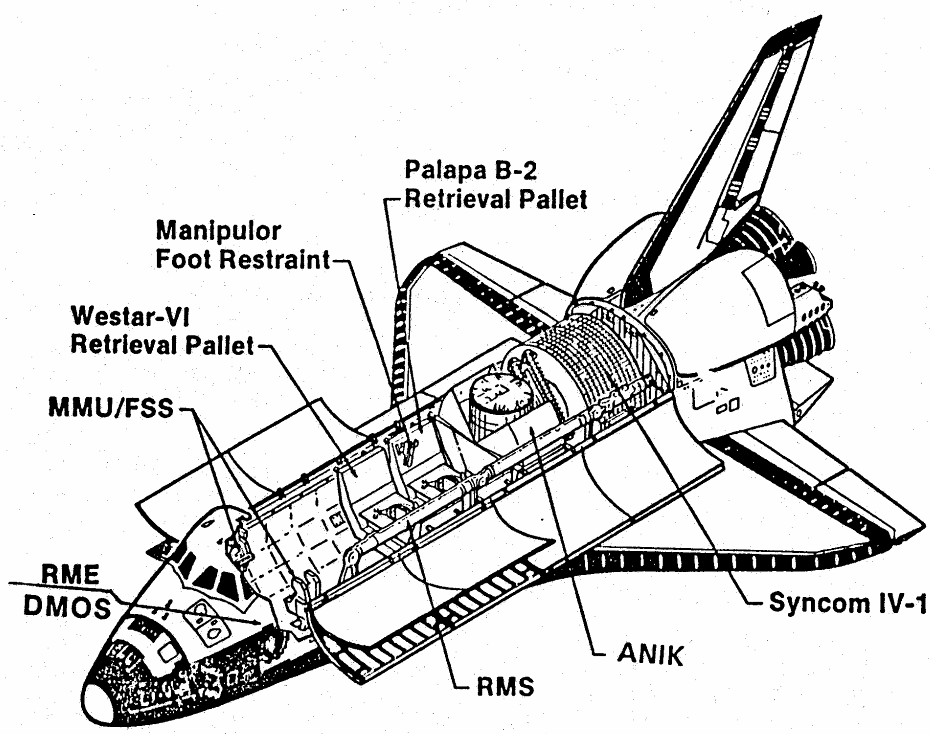
Flight Day 8
Hot fire test Primary Reaction Control System (PRCS)
Activate HRM and record data

Checkout Flight Control System (FCS)
Repressurize cabin to 14.5 psi
Post EVA entry preparation
Stow cabin

Flight Day 9

Prepare for deorbit
Deorbit burn on rev. 126
Entry/landing on rev. 127 at KSC

51-A CARGO CONFIGURATION



PAYLOAD WEIGHTS SUMMARY

	Pounds
Two Manned Maneuvering Units (MM(3) and Flight Support Stations	1,476
Pallet-Attach Structure	9,709
LEASAT (Syncom IV-1)	17,000
Telesat (Anik)/(PAM-D)	9,936
Radiation Monitoring Equipment (RME)	4
Diffusive Mixing of Organic Solutions (DMOS)	180
Total Payload Bay and Middeck Summary	38,305
Orbiter at Liftoff	261,697
Total Vehicle at Liftoff	4,518,761

ANIK D2 (TELESAT H)

Anik D2 is owned and operated by Telesat Canada, Ottawa. The satellite will join a network of five existing satellites designed to provide telecommunications services between locations in Canada.

Anik D2 is a spin-stabilized communications satellite of the cylindrical, drop-skirt design and is a sister spacecraft to the Anik Dl satellite launched by NASA on a Delta rocket in 1982. Both satellites use the PAM-D as a perigee kick motor for insertion into geosynchronous transfer orbit. The satellites are manufactured by Spar Aerospace Ltd. of Toronto, Ontario,

Upon launch from the orbiter by springs, the 9-foot tall, 2,727-pound satellite will be spinning at about 50 rpm for stability. About 45 minutes, or one half earth orbit, later its PAM-D boost motor will be ignited by an onboard timer, kicking the satellite into an approximately 190-by-22,300-mile elliptical orbit. At a selected high point in that orbit, another, smaller rocket motor inside the satellite will be fired by ground controllers to increase the satellite's speed and circularize the orbit at geosynchronous altitude of roughly 22,300 miles.

Controllers will then properly orient the spacecraft, despin its antenna section to point at Earth, extend the lower skirt to expose additional solar cell banks and begin circuit testing in preparation for commercial use.

After apogee motor burnout and all extensions, the satellite will weigh 1,452 pounds and measure 21 feet, 5 inches tall. Final operational location will be over the equator at 111.5 degrees West Longitude, or almost due south of Salt Lake City, Utah.

LEASAT 1 (SYNCOM IV-1)

LEASAT I, also known as Syncom IV-1, is the second of four satellites which will be leased by the Department of Defense to replace older FleetSatCom spacecraft for worldwide UHF communications between ships, planes and fixed facilities. A Hughes 115381 design, LEASAT spacecraft are designed expressly for launch from the Space Shuttle and utilize the unique "Frisbee” or rollout method of deployment. This particular spacecraft was to have been launched during Mission 41-D, but was replaced by a sister craft to allow Hughes to replace a component in one of this satellite's UHF relay circuits.

Installation of the spacecraft in the payload bay is accomplished with the aid of a cradle structure. The cradle permits the spacecraft to be installed lying on its side, with its retracted antennas pointing toward the nose of the orbiter and its propulsion system pointing toward the back. Mounting the antennas on deployable structures allows them to be stowed for launch.

Five trunnions (four longeron and one keel) are used to attach the cradle to the Shuttle. Five similarly located internal attach points are used to attach the spacecraft to the cradle.

Another unique feature of the LEASAT series of satellites is that they do not require a separately purchased upper stage, as have all the other communications satellites launched to date from the Shuttle. The LEASAT satellites contain their own unique upper stage to transfer them from the Shuttle deploy orbit of about 182 s.mi. to a circular orbit 22,300 s.mi. over the equator.

Each satellite is 20 ft. long with the UHF and omnidirectional antennas deployed. Total payload weight in the Shuttle will be 17,049 lb. The satellite's weight on station at the beginning of its planned seven-year life will be nearly 2,900 lb. Hughes Space and Communications Group builds the satellites.

Ejection of the spacecraft from the Shuttle is initiated when locking pins at the four contact points are retracted. An explosive device then releases a spring that ejects the spacecraft in a "Frisbee" motion. This gives the satellite its separation velocity and gyroscopic stability during the 45-minute coast period between deployment and ignition of the perigee kick motor. The satellite separates from the Shuttle at a velocity of 1.6 feet per second and a spin rate of about two rpm.

Deployment of the LEASAT satellite triggers an onboard automatic sequencer. The sequencer configures the satellite for firing of the solid propellant perigee motor. The telemetry, tracking and command antenna is deployed; attitude electronics, spacecraft power and telemetry are initialized; and the spacecraft spin rate is increased to 30 rpm.

A series of maneuvers, performed over a period of several days, will be required to place LEASAT into its synchronous orbit over. the equator. The process starts 45 minutes after deployment from Discovery with the ignition of the solid propellant perigee motor, identical to that used as the third stage of the Minuteman missile, which will raise the high point of the satellite's orbit to about 9,545 s.mi.

Two liquid fuel engines that burn hypergolic propellants, monomethyl hydrazine and nitrogen tetroxide, are used to augment the velocity on successive perigee transits, to circularize the orbit and to align the flight path with the equator. The first of three such maneuvers raises the apogee to 12,420 s.mi., the second raises the apogee to 16,445 s.mi. and the third to geosynchronous orbital altitude, At this point the satellite is in a transfer orbit with a 182-s.mi. perigee and a 22,300-s.mi. apogee. The final maneuver, again performed by the liquid propellant engines, circularizes the orbit at the apogee altitude.

The satellites are spin-stabilized with the spun portion containing the solar array and the sun and earth sensors for attitude determination and Earth pointing reference, three nickel-cadmium batteries for eclipse operation and all the propulsion and attitude control hardware. The despun platform contains two large helical UHF Earth-pointing communications antennas, 12 UHF communication repeaters and the majority of the telemetry, tracking and command equipment.

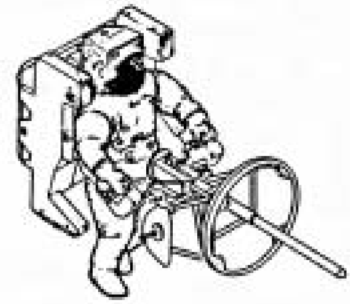
Hughes Communications Services, Inc. will operate the worldwide LEASAT satellite communications system under a contract with the Department of Defense, with the U.S. Navy acting as the executive agent. The system will include five LEASAT satellites, one of which will be a spare, and the associated ground facilities. Users will include mobile air, surface, subsurface and fixed Earth stations of the Navy, Marine Corps, Air Force and Army. The satellites will occupy geostationary positions south of the United States and over the Atlantic, Pacific and Indian Oceans.

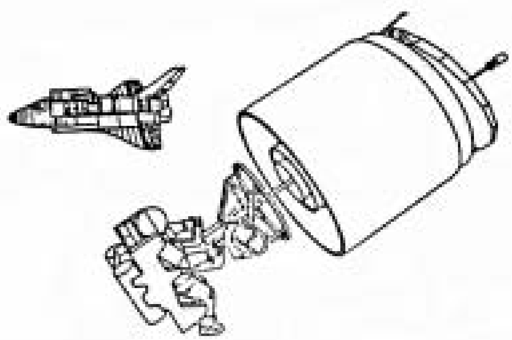
HS-376 SATELLITE RETRIEVAL OPERATIONS

The following computer-generated graphic images depict the sequence of events associated with the astronaut EVA activities to retrieve and berth the two HS-376 satellites, the Palapa B-2 and the Westar VI.

The scenes depict only one retrieval; the second retrieval will involve procedures and activities identical to those depicted for the first.

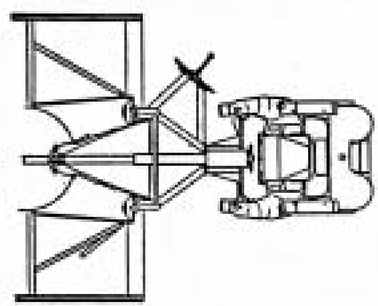
EV-1 with apogee kick motor capture device attached.





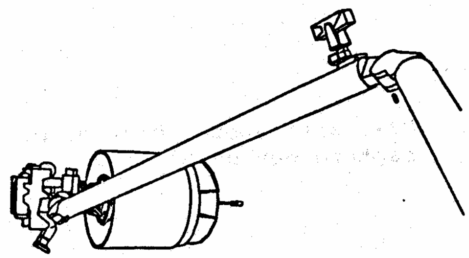
EV-1 with HS-376 satellite captured.

Cut-away view showing capture device locked inside HS-376.

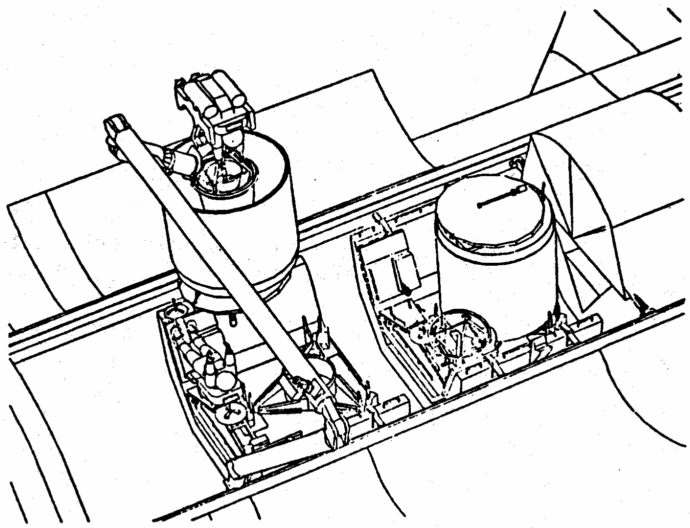


SCENE 1 SATELLITE CAPTURE

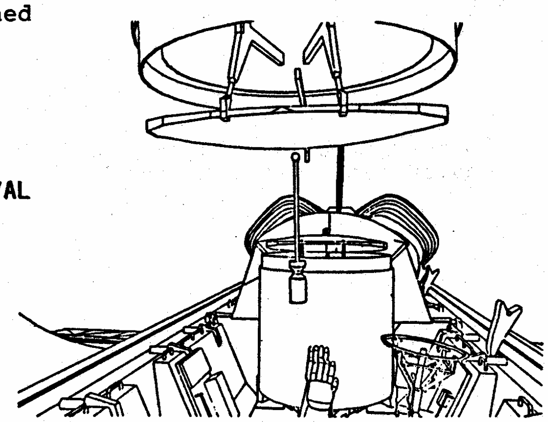
EV-1 with HS-376 moves close to orbiter so robot arm can attach to grapple fixture.



SCENE 2 ACD GRAPPLE



Robot arm with attached HS-376 and EV-2 astronaut positioned for omni antenna removal.

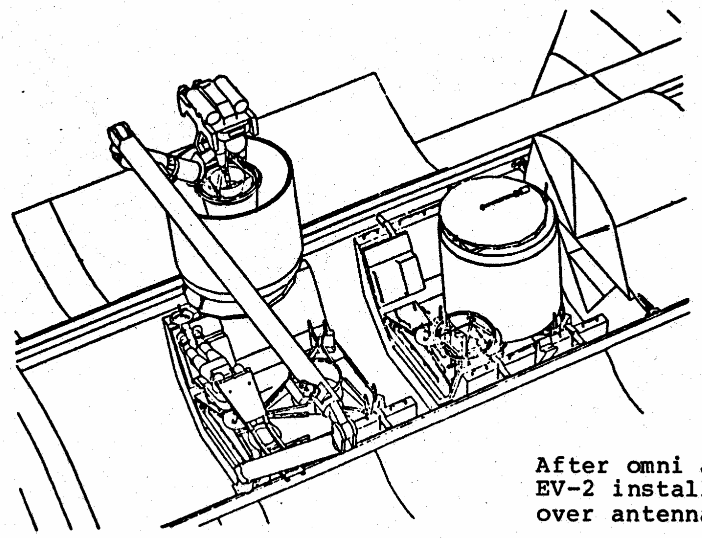


SCENE 3 OMNI ANTENNA REMOVAL

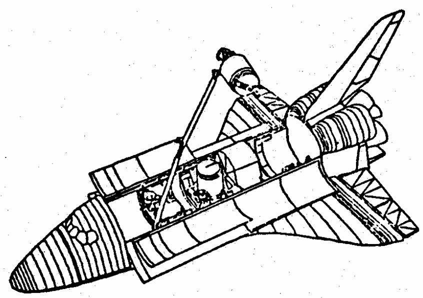
Orbiter bay view of omni antenna removal with EV-2 assisting in bay.

SCENE 4

ABS PLACEMENT



After omni antenna removal, EV-2 installs bridge structure over antenna dish.

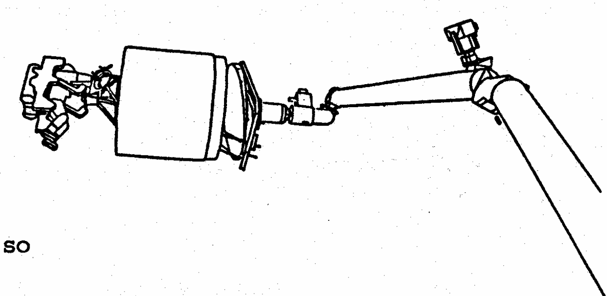


SCENE 5 TRANSFER POSITIONING

Robot arm positions EV-1 with attached HS-376 for turnaround transfer.

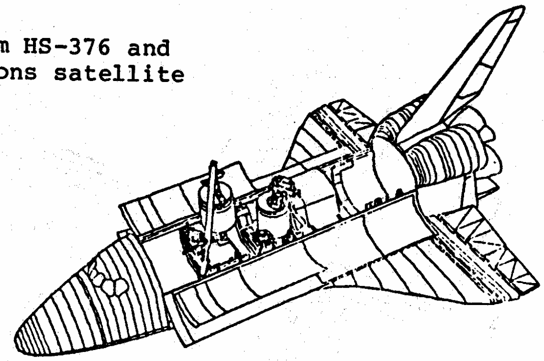
SCENE 6

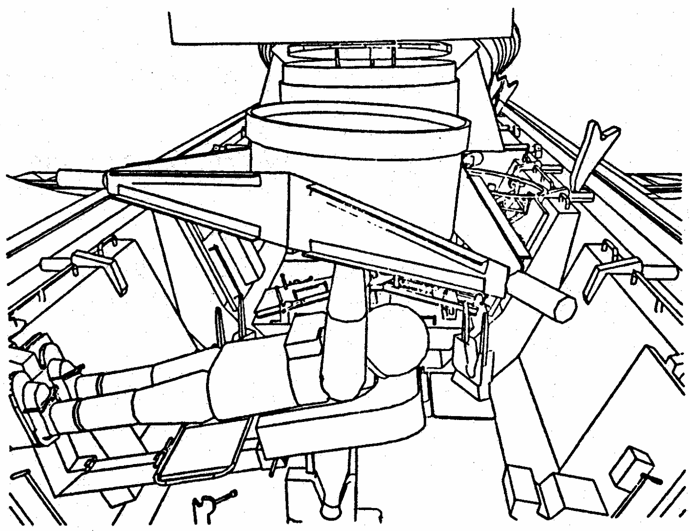
TRANSFER COMPLETE



EV-1 with HS-376 rotates so robot arm can grapple the bridge structure.

EV-1 uncouples from HS-376 and robot arm repositions satellite in payload bay.

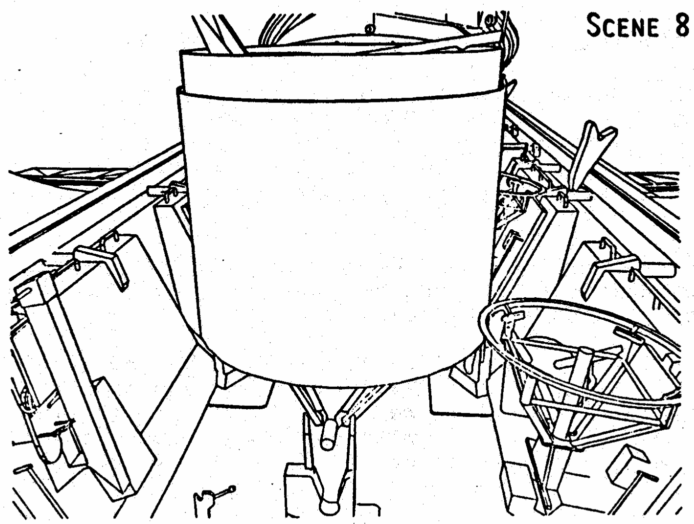




EV-2 attaches berthing adapter on HS-376 apogee kick motor.

Scene 7 Adapter Placement

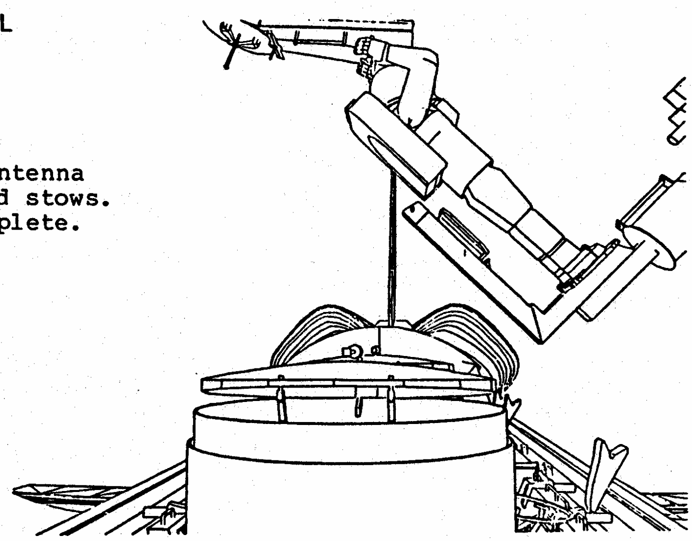
SCENE 8 SATELLITE BERTHING



Robot arm lowers HS-376 in payload bay for final berthing.

SCENE 9 ABS REMOVAL

Astronaut removes antenna bridge structure and stows. HS-376 berthing complete.



3M'S DIFFUSIVE MIXING OF ORGANIC SOLUTIONS (DMOS)

The major cabin experiment is the 3M Company's Diffusive Mixing of Organic Solutions (DMOS). DMOS is the first in a series of more than 70 organic and polymer science experiments that 3M hopes to conduct in space over the next decade under a 10-year commercial-use-of-space agreement that the company has proposed to NASA.

The DMOS experiment will be conducted in six football-size, stainless-steel chemical reactors designed and built by 3M. Each reactor has three Teflon-coated chambers.

Two experimental processes will be conducted. In the first, an organic chemical in solution is contained in one end chamber of the reactor. The solution is allowed to diffuse into the two remaining chambers, which are filled with an incompatible solvent that causes the organic chemicals to crystallize out of the solution.

In the second form of the experiment, two solutions of organic chemicals are contained in chambers on opposite ends of the reactor, separated by a center mixing chamber. As the chemicals in the end chambers are allowed to diffuse into the middle chamber, a chemical reaction takes place. The byproduct of the reaction Is less soluble than the reactants and, therefore, is expected to crystallize out of the solution.

Unlike Earth-bound experiments, the crystals formed in space are not subject to Earth's gravity and do not fall to the bottom of the reactor. Instead, they remain suspended, which should allow them to grow in size with exceptional purity.

The six reactors carried aboard flight 51-A will produce crystals from four different chemical systems:

- Reactor No. 1 contains urea in a toluene(methanol solvent mix;
- Reactor No. 2 and No. 3 contain cyanine tosylate and tetraethylanmmonium oxonol in chloroform, which, when diffused, will form cyano-oxonol salt;
- The contents of reactors No. 4, 5 and 6 are proprietary to 3M.

The chemicals contained in the stainless steel chambers are isolated from each other by electrically powered gate valves that are programmed to be opened over a five-hour period. This is done slowly so as not to create turbulence in the solutions.

The valves and the heaters used to promote diffusion will be activated by a 3M-built Generic Electronics Module (GEM) within 24 hours after the Shuttle has reached orbit.

Should the valves fail to activate automatically, they will be opened by a backup electronic system. The valves will remain open until the Shuttle lands and the experiment is returned to 3M. This will prevent crystals that might be attached to the valves from being severed.

All of the DMOS experiment apparatus except the GEM is sealed in a 3M-designed aluminum container that, in turn, is sealed in a NASA-supplied Experiment Apparatus Container (EAC). The EAC and the GEM will be housed in three of the orbiter's mid-deck lockers. The experiment hardware weighs 180 pounds.

RADIATION -MONITORING EQUIPMENT (RME)

The Radiation Monitoring Equipment (RNA)B) consists of hand-held and pocket-sized monitors which measure the level of background radiation present at various times in orbit. The two devices are self-contained and are powered by 9-volt alkaline batteries. At appointed times, the crew will take and record measurements of any radiation which penetrates the cabin. RME devices have flown on numerous previous flights and are part of long-term studies of radiation exposure during spaceflight.

STS-51A CREWMEMBERS

S84-40082 – Astronaut Frederick H. (Rick) Hauck, seated, is crew commander. Astronaut David M. Walker, pilot, stands next to the eagle, 51-A mascot. Others on the back row, l.-r., are astronauts Dale A. Gardner, Anna L. Fisher and Joseph P. Allen IV., all mission specialists.

BIOGRAPHICAL DATA

FREDERICK H. (RICK) HAUCK, 43, Captain, USN, is commander of the 51-A mission. A native of Long Beach, Calif., he became a NASA astronaut in 1978.

Hauck was orbiter pilot for the seventh Space Shuttle mission in 1983. During the flight, he operated the Canadian-built Remote Manipulator System, performing the first deployment and retrieval exercise with the Shuttle Pallet Satellite.

Hauck, a Navy ROTC student at Tufts University, Medford, Mass., was commissioned on graduation in 1962 and served 20 months as communications officer. He studied Russian at the Defense Language Institute in Monterey, Calif., and received a master of science degree in nuclear engineering from the Massachusetts Institute of Technology, Cambridge, in 1966.

DAVID M. WALKER, 40, Commander, USN, is the pilot for Shuttle mission 51~A. He became a NASA astronaut candidate in 1978, completing his training the following year.

Walker was graduated from the U.S. Naval Academy, Annapolis, Md., and received flight training from the Naval Aviation Training Command.

He completed two combat cruises in Southeast Asia as a fighter pilot aboard the carriers USS Enterprise and USS America. He was awarded six Navy Air Medals, a Battle Efficiency Ribbon, the Armed Forces Expeditionary Medal, the Vietnamese Cross of Gallantry, the Vietnam Service Medal and the Republic of Vietnam Campaign Medal.

JOSEPH P. ALLEN, 47, Ph.D., is Mission Specialist I on flight 51-A. He was selected as a scientist astronaut by NASA in 1967.

Allen received a doctorate in physics from Yale University, New Haven, Conn. He served as NASA Assistant Administrator for Legislative Affairs in Washington, D.C., returning to the Johnson Space Center in 1978 as senior scientist astronaut.

Allen was a mission specialist on the fifth Space Shuttle flight in 1982, the first fully operational flight of the Space Transportation System.

ANNA L. FISHER, 35, M.D., is Mission Specialist 2 on the flight of Space Shuttle 51-A. She was selected as an astronaut candidate by NASA in 1978, completing her training a year later.

She assisted In development and testing of the Remote Manipulator System (RMS), and served as crew evaluator for testing of the second, third and fourth Shuttle missions.

Fisher was graduated from the University of California, Los Angeles, with a bachelor of science degree In chemistry followed by a doctor of medicine. She specialized in emergency medicine and worked in several Los Angeles area hospitals. She supported the first orbital flight test launch and landings as physician in rescue helicopters and assisted in development of medical rescue procedures.

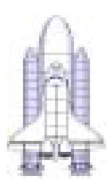
DALE A. GARDNER, 35, Commander, USN, is Mission Specialist 3 on Shuttle Mission 51-A. He became eligible for crew assignment in 1979 and served as a mission specialist on the eighth Space Shuttle mission in 1983.

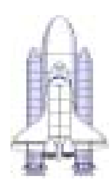
Gardner was graduated from the University of Illinois in 1970 with a bachelor of science degree in engineering physics.

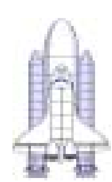
At the Naval Air Test Center in Maryland, Gardner was involved in F-14A development test and evaluation as project officer for the aircraft's inertial navigation systems. He participated in two WESTPAC cruises aboard the USS Enterprise.

SHUTTLE FLIGHTS AS OF APRIL 1985

13 TOTAL FLIGHTS OF THE SHUTTLE SYSTEM







STS-9 11/28/83 - 12/08/83	STS-41G 10/05/84 - 10/13/84	
STS-5 11/11/82 - 11/16/82	STS-41C 04/06/84 - 04/13/84	
STS-4 06/27/82 - 07/04/82	STS-41B 02/03/84 - 02/11/84	
STS-3 03/22/82 - 03/30/82	STS-8 08/30/83 - 09/05/83	
STS-2 11/12/81 - 11/14/81	STS-7 06/18/83 - 06/24/83	
STS-1 04/12/81 - 04/14/81	STS-6 04/04/83 - 04/09/83	STS-41D 08/30/84 - 09/05/84
OV-102 Columbia (6 flights)	**OV-099 Challenger (6 flights)**	**OV-103 Discovery (1 flight)**