National Aeronautics and
Space Administration

Washington, D.C.
20546

Reply to Attn of: MOE-8

Prelaunch
Flight Operations Report
No. M-989-83-06

TO: A/Administrator

FROM: M/Associate Administrator for Space Flight

SUBJECT: Space Transportation System Mission - STS-6

The enclosed STS-6 Flight Operations Report No. M-989-83-06 is herein submitted as required by HQMI 8610.1B, dated December 27, 1982.

L M Weeks 24 Feb '83

for JAMES A. ABRAHAMSON
Lieutenant General, USAF
Associate Administrator for
Space Flight

Enclosure

NASA Flight Operation Report

M-989-83-06

MISSION: STS-6 **LAUNCH DATE:** April 4, 1983

LAUNCH VEHICLE: Scout ____ Delta ____ A/Centaur ____ Atlas-F ____ Shuttle XX

LAUNCH FROM: KSC **SHUTTLE LANDING AT:** Edwards AFB, CA **DURATION:** 121hr.54min

PLANNED ORBITAL PARAMETERS: Apogee (km) 284.3 (153.5NM) Perigee (km) 284.3 (153.5NM)

Inclination (Deg) 28.45° Period (Min) 94.5

Launch Az Due East (90°) Altitude (km) 284.3 (153.5NM)

CREW: Commander Paul J. Weitz Payload Specialist(s) 1. ____

Pilot Col. Karol J. Bobko, USAF 2. ____

Mission Specialist(s) 1. Donald H. Peterson 3. ____

2. Story Musgrave 4. ____

	PAYLOAD	ORGANIZATION	CARGO WEIGHT
1.	Tracking and Data Relay Satellite System/ Inertial Upper Stage (TDRS-A/IUS)	SPACECOM/USAF	20,036 (44,172 lbs) Deploy 17,014 (37,509 lbs) kg
2.	Continuous Flow Electrophoresis System (CFES)	NASA	346.5 (764 lbs) kg
3.	Monodisperse Latex Reactor (MLR)	NASA	77.1 (170 lbs) kg
4.	Nighttime/Daytime Optical Survey of Lightning (NOSL)	NASA	23.6 (52 lbs) kg
5.	Get-Away Special (GAS) Experiments G-005 G-049 G-381	USAF Academy Asahi Shimban, Japan Park Seed Co. Chic.	576.5 (1271 lbs) kg
6.	Aerodynamic Coefficient Identification Package (ACIP)	NASA	83.0 (183 lbs) kg
		Payload Subtotal	21,144 (46,615 lbs) kg
7.	STS Operator	NASA	142 (315 lbs) kg
8.	Crew and Crew Equipment	NASA	1860.6 (4102 lbs) kg
		TOTAL	23,148 (51,032 lbs) kg

STS-6 DESCRIPTION

The STS-6 mission duration will be 120 hours and 19 minutes with the launch from Kennedy Space Center (KSC) on April 4, 1983, at 1:30 p.m. EST (18:30 Greenwich mean time (GMT)). The Orbiter will be inserted into a 153.5 N. Mi. circular orbit at a

28.45° inclination. After ascent by the Shuttle's main propulsion system engines and solid rocket boosters, the final orbit will be achieved by two orbital maneuvering system (OMS) maneuvers.

The OMS-1 maneuver will occur approximately 2 minutes after external tank (ET) separation. OMS-2 will occur at the apogee of the resultant OMS-1 orbit. The Orbiter will be in a payload-bay-to-Earth (-ZLV) attitude except for payload deployment, inertial measurement unit (IMU) alignments, Inertial Upper Stage (IUS) star scan, and possible payload radio frequency (RF) checks.

Deployment of the Tracking and Data Relay Satellite-A (TDRS-A)/IUS payload will occur on the first mission day at approximately 10 hours elapsed time (just prior to start of orbit 8). Payload injection into snychronous orbit will begin with IUS stage-1 solid rocket motor ignition on Orbit 8. Backup deployment/injection opportunities have been scheduled for orbits 9, 10, and 18. Scientific and flight test activities will be conducted throughout the mission. On the fourth day, the two mission specialists of the four-man crew will perform about 3.5 hours of extravehicular activity (EVA) in the payload bay. Prior to the EVA, the two suited crewmembers will prebreathe pure oxygen for a 3.5 hour period. The fifth day will be dedicated to deorbit and landing activities.

The deorbit maneuver will be executed approximately 57 minutes prior to the planned landing at 120 hours 19 minutes mission elapsed time. The cross range for the approach is approximately 378 nmi. The landing is planned for concrete Runway 22 at Edwards Air Force Base at 10:49 a.m., Pacific Standard Time, (18:49 GMT) on April 9, 1983.

The Tracking and Data Relay Satellite System (TDRS-A)and Inertial Upper Stage (IUS) are described by a separate MOR T-313-83-01. The IUS vehicle description is on Page 16 of that MOR. The Monodisperse Latex Reactor (MLR) Experiment is described by MOR E-420-03-82-02. The Nighttime/Daytime Optical Survey of Lightning (NOSL) is described by MOR E-420-04-82-03.

Information on the other payloads is provided on Pages 4 and 5. Flight crew data is provided on Page 6.

A companion MOR, the Orbital Flight Test Reference Document (MOR No. M-989-81), issued March 2, 1981, describes equipment, facilities, and systems common to Space Shuttle flights and can be used in conjunction with this STS-6 Flight Operations Report.

The mission objectives for STS-6 are:

1. Deploy TDRS-A/IUS
2. Accomplish assigned experiments and test objectives

Approved: ______________________
Associate Administrator for Space Flight

PAYLOADS

Aerodynamic Coefficient Identification Package (ACIP)

The ACIP instruments will sense vehicle motions during flight from entry initiation to touchdown. The objective is to provide data for postflight determination of aerodynamic coefficients, aerocoefficient derivatives and vehicle handling qualities to support the rational removal of flight placards.

Continuous Flow Electrophoresis System (CFES).

During CFES operation, a sample of biological material is continuously injected into a flowing medium which carries the sample through a separating column where it is under the influence of an electric field. The force exerted by the field separates the sample into its constituent types at the point of exit from the column where samples are collected.

Get-Away Special (GAS)

There will be three GAS experiments on the flight. These are from (1) Asahi Shimban, Japan (G-005), (2) the USAF Academy (G-049) and, (3) the Park Seed Company, South Carolina (G-381).

The Asahi Shimban newspaper experiment was proposed by two Japanese high school students to make artificial snow flakes in weightlessness of space. This GAS was designed and manufactured by Nippon Electric Co. (NEC), the leading satellite maker in Japan. Scientists have speculated that there will be very symmetrical snow crystals in weightlessness or that some spherical crystals may be formed in space, but no one knows the correct answer. The experiment is expected to contribute to crystallograpy, especially the crystal growth of semi-conductors or other materials from a vapor source.

The USAF Academy Cadets are conducting six experiments with their GAS. The experiment sequence is: (1) Metal Beam Joiner -- to demonstrate that soldering of beams can be accomplished in space; (2) Metal Alloy -- to determine if tin and lead will combine more uniformly in a zero-gravity environment; (3) Foam Metal -- to generate foam metal in zero-gravity forming a metallic sponge; (4) Metal Purification -- to test the effectiveness of the zone-refining methods of purification in a zero-gravity environment; (5) Electroplating -- to determine how evenly a copper rod can be plated in a zero-gravity environment; and (6) Micro-Biology -- to test the effects of weightlessess and space radiation on micro-organism development. At a designated time in the flight, an astronaut will turn on two switches to start the electronicaly-sequenced experiments. Upon return from orbit, the experiment samples will be compared to base-line samples produced on Earth.

The George W. Park Seed Company, Inc., payload consists of 46 varieties of flower, herb, and vegetable seed to study the impact of temperature fluctuation, vacuum, gravity forces, and radiation on germination rate, seed vigor, induced dormancy, and varietal purity.

An objective is to see how seeds have to be packaged to withstand space flight. The company plans to study the effects of the extreme temperature changes and radiation on the seeds. In some instances, extra doses of radiation may be beneficial to farmers.

STS-6 FLIGHT CREW DATA

Commander: Paul J. Weitz

Mr. Weitz a retired Navy Captain, was selected as a NASA Astronaut in April 1966. He served as pilot in Skylab 2 between May 25 and June 22, 1973. Mr. White received a Bachelor of Science degree in Aeronautical Engineering from Pennsylvania State University in 1954 and a Master of Science in Aeronautical Engineering in 1964.

Pilot: Col. Karol J. Bobko, USAF

Col. Bobko was selected as a NASA Astronaut in September 1969. He served on the support crew for the Apollo-Soyuz Test Project (ASTP) in 1975. He received a Bachelor of Science degree from the US Air Force Academy in 1959 and a Master of Science degree in Aeronautical Engineering in 1970.

Mission Specialist: Donald H. Peterson

Mr. Peterson, a retired USAF Colonel, was selected as a NASA Astronaut in September 1969. He served on the support crew for Apollo 16. He received a Bachelor of Science degree from the U.S. Military Academy in 1955 and a Master of Science degree in Nuclear Engineering in 1962.

Mission Specialist: Dr. Story Musgrave (MD)

Dr. Musgrave was selected as a NASA Astronaut in August 1967. He was assigned as mission specialist on the first and second Spacelab mission simulations. He is an MD specializing in general surgery and has earned a Bachelor of Science degree in Math from Syracuse University in 1958, an MBA from UCLA in 1959, and a Doctorate of Physiology and Biophysics from University of Kentucky in 1979.

STS-6 CREW