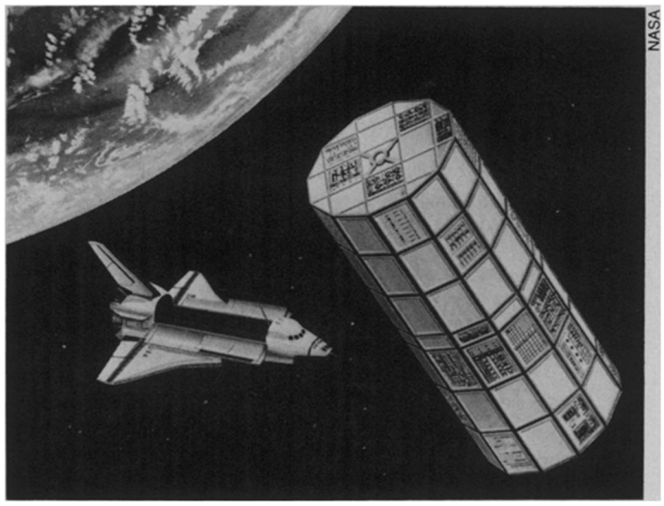
Launchlog '84: NASA Embarks on Its Busiest Year



The Long Duration Exposure Facility (LDEF) will be deployed during 1984's second space-shuttle flight, and will carry 51 experiments in space for about a year until another shuttle brings it home.

More U.S. astronauts may fly in space this year than in the entire pre-shuttle era

By JONATHAN EBERHART

The National Aeronautics and Space Administration's tenative launch schedule for 1984 calls for the busiest, most complex year of spaceflights in the agency's quarter-century of existence. As many as 10 space-shuttle missions are planned, twice as many manned flights as NASA has ever before conducted in a single year, with the last seven separated by intervals of a month or less. Crewing those 10 missions will be a total of 45 astronauts (plus others that may be included in the Defense Department flight scheduled for July) — two more than went into space with the Mercury, Gemini, Apollo, Skylab and Apollo-Soyuz programs combined, the entire U.S. pre-shuttle era. And besides the shuttles, there are scheduled a dozen launchings by old-style, "expendable" rockets, including one that will carry not one satellite, but three.

Some of the dates (see chart) may change, particularly those for the expendables, but though there will be no moon-landings or planetary flybys, NASA is gearing up for what could be the most ambitious year of space operations in its history.

The action is set to begin on Feb. 3 with the 10th space-shuttle launching (now designated mission 41-B — see chart footnote), delayed from Jan. 30 to permit replacement of two auxiliary power units that were damaged by fire due to a fuel leak on the previous flight (SN: 12/17/83, p. 391). Besides deploying communications satellites for Western Union and the government of Indonesia, the crew will try maneuvering through space outside the shuttle — without benefit of safety tethers — using complex backpacks that are later planned for tasks such as the servicing of ailing satellites. The backpacks, called Manned Maneuvering Units or MMUs, carry their own guidance systems and will be getting a shakedown prior to their real test, the replacement during the next shuttle flight of malfunctioning parts of the Solar Maximum Mission satellite.

A host of other experiments are planned, but flight 41-B's final act is to be a major advance for the whole shuttle program — the first shuttle landing at Kennedy Space Center in Florida rather than at California's Edwards Air Force Base. Returning each shuttle to its launch site is expected to save NASA considerable sums of money and time by eliminating the need for transferring personnel and equipment across the country (including the shuttle orbiter itself, bolted to the back of a 747). If all goes well, seven of the year's remaining nine scheduled shuttle flights will be aimed at Florida homecomings.

The highlight of the next flight, 41-C, will be the "Solar Max" repair, which NASA hopes will not only save the troubled satellite, but justify the device's modular design principle (SN: 9/6/80, p. 152; 2/20/82, p. 118). Intended to enable parts to be replaced by simply unplugging faulty "black boxes" and inserting new ones (without even bringing the satellite back to earth), it has been touted as a potentially major cost-cutter, prolonging the life of expensive pieces of hardware that were formerly written off for problems as trivial as blown fuses. The same shuttle flight will see the first deployment of NASA's Long Duration Exposure Facility, a simple, passive rack intended to sit in orbit for a year or so and expose diverse test samples to the space environment, after which another shuttle will bring it back down for study.

Mission 41-D will be the maiden flight of the newest shuttle orbiter, Discovery, marking the growth of the fleet to three. The flight will include setting out two more communications satellites in orbit, photography of the earth using a large-format camera controllable either from within the shuttle or from the ground, and deployment tests of a solar-cell array that will open up to a length of 105 feet. In addition, the shuttle's first commercial payload specialist, Charles D. Walker of McDonnell Douglas Co., will be along to tend an electrophoresis device producing biological materials in weightlessness. The experiment has flown four times before, but this will be the first time that its resultant materials will be intended for actual clinical testing in animals — and if all goes well, humans — by Ortho Pharmaceutical Corp. of Raritan, N.J. Both firms and NASA hope that this will ultimately lead to the first commercial marketing of a product manufactured in space.

A classified Department of Defense (DOD) payload will be the sole business of mission 41-E in July. Next, the crew of 41-F will deploy three commercial communications satellites as well as the Naval Research Laboratory's SPARTAN-1 X-ray astronomy camera (they will retrieve the camera about 48 hours later). That flight is now scheduled to end in California with the shuttle's first hands-off, automatic landing.

An Earth Radiation Budget Satellite to measure the planet's balance of incoming and reflected solar energy will be deployed during flight 41-G. And riding in the shuttle's payload bay will be two remote-earth-sensing devices — W. Germany's spectrometer-equipped SPARX-1 and NASA's multi-instrumented OSTA-3 pallet. Among the OSTA sensors will be a refined version of the SIR-A synthetic-aperture radar system that startled scientists after the shuttle's second flight by revealing unsuspected topographic details beneath the sands of the Sahara desert (SN: 6/26/82, p. 419).

The second of NASA's Tracking and Data Relay Satellites, TDRS-B, could be deployed during mission 41-H, if engineers are satisfied that they have corrected the malfunction of the Inertial Upper Stage (IUS) booster rocket that placed TDRS-1 in the wrong orbit last April. Otherwise, the

1984 NASA Launch Schedule

Date	Mission	Description
Feb. 3	**Shuttle mission 41-B (Challenger):***	
	SPAS-01A	materials-processing module
	Palapa B-2	communications satellite (Indonesia)
	Westar VI	communications satellite (Western Union)
March	**Landsat D′**	earth-observations satellite (NOAA)
Apr. 4	**Shuttle mission 41-C (Challenger):**	
	LDEF-1	Long Duration Exposure Facility deployment (NASA)
	Solar Maximum Mission	satellite repair (NASA)
April	**Navy 21**	navigation satellite (DOD)
May	**Intelsat VA-A**	communications satellite (Intelsat)
June	**Galaxy C**	communications satellite (Hughes)
June 4	**Shuttle mission 41-D (Discovery):**	
	OAST-1	solar-cell and solar-array tests (NASA)
	LFC-1	Large Format Camera, for earth photography (NASA)
	Telesat I	communications satellite (Canada)
	Syncom IV-1	communications satellite (Hughes)
July 14	**Shuttle mission 41-E (Challenger):** Defense Deparment payload	
Aug. 9	**Shuttle mission 41-F (Discovery):**	
	SPARTAN-1	deploy and retrieve X-ray astronomy instrument (NRL)
	SBS-D	communications satellite (Satellite Business Systems)
	Telstar 3-C	communications satellite (AT&T)
	Syncom IV-2	communications satellite (Hughes)
Aug.	Intelsat VA-B	communications satellite (Intelsat)
Aug.	NOAA-F	meteorology and search-and-rescue satellite (NOAA)
Aug. 9	**AMPTE—Active Magnetospheric Particle Tracer Explorers (U.S./W. Germany):**	
	IRM	Ion Release Module (W. Germany)
	UKS	United Kingdom Subsatellite (UK)
	CCE	Charge-Composition Explorer (NASA)
Aug. 30	**Shuttle mission 41-G (Columbia):**	
	OSTA-3	remote-sensing pallet
	SPARX-1	remote sensing (W. Germany)
	ERBS	Earth Radiation Budget Satellite
Sept.	**Navy 22**	navigation satellite (DOD)
Sept.	**NATO III-D**	communications satellite (NATO)
Sept. 28	**Shuttle mission 41-H (Challenger)** Defense Department payload or TDRS-B	
Oct. 24	**Shuttle mission 51-A (Discovery):**	
	MSL-1	Materials Science Laboratory 1 (NASA)
	Telesat H	communications satellite (Canada)
	GAS Bridge	multiple Getaway Special payload
	———	PAYLOAD UNASSIGNED
Nov.	**Intelsat VA-C**	communications satellite (Intelsat)
Nov. 21	**Shuttle mission 51-B (Challenger):** Spacelab 3	materials processing (NASA)
Dec.	**AF-16**	USAF payload
Dec. 17	**Shuttle mission 51-C (Discovery):**	
	TDRS-B or C	Tracking and Data Relay Satellite (NASA)
	MSL-2	Materials Science Laboratory 2 (NASA)
Dec.	**San Marco D_L**	atmosphere studies satellite (Italy/U.S.)

*NASA is now designating space shuttle missions by a three-character code (e.g. 41-B) rather than a Space Transportation System flight number (e.g. STS-9). The first numeral indicates the last digit of the fiscal year (e.g. FY 1984); the second refers to the launch site ('1' is Kennedy Space Center in Florida, '2' is Vandenberg Air Force Base in California); the letter indicates the mission's originally scheduled position in the sequence of launches for that fiscal year.

mission may carry a second DOD payload.

Mission 51-A will have a little of everything — a communications satellite deployment, an extra load of Getaway Special (GAS) payloads (strung across the cargo bay in a structure called the GAS Bridge) and a Materials Science Laboratory containing a variety of experiments in crystal growth, containerless processing and the like. And there could be more: By the end of 1983, 62 percent of the flight's payload weight was still unassigned.

The next mission, 51-B, will be devoted to a second flight of the complex Spacelab research module (SN: 12/10/83, p. 373), this time devoted entirely to materials processing. It is called Spacelab 3 because Spacelab 2 (concerned with diverse scientific disciplines from astronomy to life sciences but using a yet-unflown configuration with no habitable laboratory section) has been delayed into 1985 by development problems with its instrument-pointing system.

If NASA can actually keep its demanding schedule on track, the final shuttle mission will be 51-C, carrying a third Tracking and Data Relay Satellite (or a second, if the IUS booster is not ready to carry TDRS-B on flight 41-H two months earlier), as well as another Materials Science Laboratory.

Interspersed with all the shuttle launchings, meanwhile, the agency plans up to a dozen liftoffs by conventional, unmanned rockets. One is to carry Landsat D′, the multi-spectral-band earth-observations satellite whose launch was advanced by a year in case its ailing (though still working) predecessor, Landsat D, should fail. The most complex non-shuttle mission is AMPTE, a set of three Active Magnetospheric Particle Tracer Explorer satellites launched by a single rocket to study earth's magnetic field. The first, called the Ion Release Module, will carry 14 cannisters of lithium and barium, releasing their contents into the magnetosphere over about a year and studying the resulting clouds as it flies through them. It will also release its own "subsatellite" to monitor the clouds' development, while a third satellite makes measurements at lower altitudes, below the magnetosphere. A cooperative project between the United States and Italy is the San Marco D_L satellite for atmospheric studies, scheduled for launch in December. Postponed from 1982 and again from 1983, liftoff is planned from Italy's San Marco Launch Facility, a converted oil-drilling platform anchored in the Atlantic Ocean off the coast of Kenya. And in addition to everything else, the non-shuttle list includes five more communications satellites, two U.S. Navy navigation satellites, an Air Force payload and the NOAA-F weather satellite (equipped also with a search-and-rescue system to spot downed aircraft and stranded ships) for the National Oceanic and Atmospheric Administration.

And a dozen shuttle flights are scheduled for 1985, and 17 for 1986. □