LAUNCH LOG '85: BIG PLANS

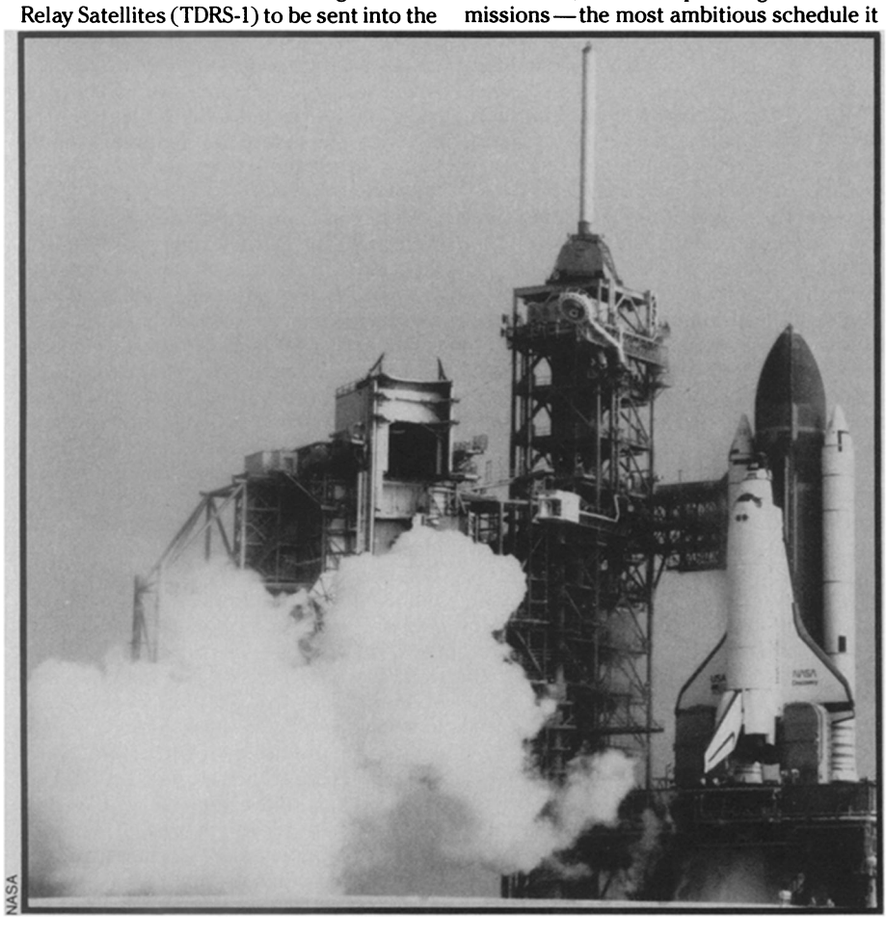
. . . with some big ifs

By JONATHAN EBERHART

As 1984 began, the National Aeronautics and Space Administration's planning schedule for the year listed 10 missions by the space shuttle and a dozen launchings by the conventional rockets that NASA calls "expendables." By year's end, exactly half of them had come to pass—five shuttle flights and six expendables.

In 1983 and 1984, two problems occurred whose consequences had wide-reaching effects, though neither was the fault of the shuttle itself. In April of 1983, during the maiden flight of the shuttlecraft Challenger, the malfunction of an Air Force booster rocket called the inertial upper stage (IUS) caused the first of NASA's Tracking and Data Relay Satellites (TDRS-1) to be sent into the wrong orbit from the point at which the shuttle had properly deployed it (SN: 4/16/83, p. 244). This delayed plans not only for other satellites depending on the IUS to reach their planned orbits, but also for a variety of projects such as the Spacelab research module (which would spend all its time in the shuttle's cargo bay), dependent on the TDRS to relay their data. Then, during a mission last February, the (also properly shuttle-deployed) Westar 6 and Palapa B2 communications satellites suffered twin mistreatments from twin upper-stage boosters of another sort, called a PAM, or Payload Assist Module (SN: 2/18/84, p. 100). And as with the IUS, other PAM-equipped satellites could only wait out the months while the problem was diagnosed.

For 1985, NASA is planning 13 shuttle missions—the most ambitious schedule it has ever attempted. And if there should be a malfunction on the very first of them, planned for launching on Jan. 23, it could affect as many as eight of the rest, and possibly others to follow.


NASA

It is a classified mission (designated 51-C), the first shuttle flight devoted entirely to Defense Department activities. Almost the only unclassified fact about it is that the (secret) satellite it will deploy will be sent toward its ultimate orbit by an IUS booster—the first one to be flown since its predecessor's malfunction left the TDRS-1 satellite in the wrong orbit.

One assumes, of course, that this second IUS will work fine. Because if it does not, its first effect will show up on the very next shuttle mission in line (51-E), a major part of whose purpose is deploying the long-awaited TDRS-2 satellite—on another IUS.

Then comes mission 51-G, which calls for neither IUS nor PAM. Its one satellite to be deployed will use another kind of upper-stage booster, and the flight's other principal item of business will be to retrieve (using the shuttle's remote control arm rather than spacewalking astronauts) NASA's Long Duration Exposure Facility, which has been subjecting various test samples to the space environment since it was left in orbit by a shuttle last April (SN: 4/14/84, p. 228). But if TDRS-2 has to be omitted from the previous flight, that empty payload space on mission 51-E may have to be filled by something else, such as the satellite now scheduled for mission 51-D, possibly creating a ripple effect that propagates out through subsequent missions. Later in the year, in fact, is tentatively scheduled the deployment of TDRS-3 (mission 51-L), also with an IUS, and if the TDRS-2 deployment fails, the next use of an IUS could be a long time coming.

But the consequences of an IUS failure on the TDRS-2 deployment could be far greater than the shuffling of later payloads to fill holes in the cargo manifest. Because scheduled on missions 51-F and (tentatively) 61-A are two flights of the complex Spacelab facility, both of which require the presence in orbit of *two* TDRS satellites to transmit their huge quantities of data to the ground.

The upper-stage boosters that have been causing the ripples, however, have had nothing to do with getting their satellites out of the shuttle so that the boosters can be ignited. The deployments themselves have worked perfectly, and this year NASA plans to inaugurate an additional method. At the end of April, on mission 51-B, two satellites are scheduled to be deployed from a pair of NASA's "Getaway Special" (GAS) canisters, containers that are made available at relatively low cost to customers interested in sending small, self-contained experiments and other payloads on a shuttle ride. In the past, however, NASA has insisted that all GAS payloads had to stay in their cans — nothing could be deployed from them into open space or even require opening the canister door to look out. The

1985 NASA Launch Schedule

Date	Mission	Description
Jan. 23	**Shuttle Mission 51-C (Discovery):**	
	classified mission	DOD payload
Feb. 20	**Shuttle mission 51-E (Challenger):**	
	TDRS-B	Tracking and Data Relay Satellite (NASA)
	Telesat I	communications satellite (Canada)
February	**Intelsat VA-B**	communications satellite (Intelsat)
1st qtr.	**AF-16**	USAF payload
1st qtr.	**Navy 22**	navigation satellite (DOD)
March 19	**Shuttle mission 51-D (Discovery):**	
	LDEF-1 retrieval	Long Duration Exposure Facility (NASA)
	Syncom IV-3	communications satellite (Hughes)
April	**Intelsat VA-C**	communications satellite (Intelsat)
April 30	**Shuttle mission 51-B (Challenger):**	
	Spacelab 3	multidisciplinary (NASA)
	NUSAT	ATC radar plotter (Weber State College)
	GLOMR	Global Low-Orbit Message Relay (NASA/DOD)
May 30	**Shuttle mission 51-G (Discovery):**	
	Spartan 1	X-ray astronomy: deploy/retrieve (NRL)
	Telstar 3-D	communications satellite (AT&T)
	Morelos A	communications satellite (Mexico)
	Arabsat A	communications satellite (Arab countries)
2nd qtr.	**Navy 23**	navigation satellite (DOD)
July 9	**Shuttle mission 51-F (Challenger):**	
	Spacelab 2	multidisciplinary (NASA)
Aug. 2	***Shuttle mission 51-I (Discovery):**	
	MSL-2	Materials Processing Laboratory 2 (NASA)
	AUSSAT-1	communications satellite (Australia)
	ASC-1	communications satellite (Amer. Sat. Corp.)
	Syncom IV-4	communications satellite (Hughes)
August	**Intelsat VA-D**	communications satellite (Intelsat)
August	**NOAA-G**	weather and search-and-rescue (NOAA)
Sept. 18	***Shuttle mission 51-J (Atlantis):**	
	classified mission	DOD payload; first flight of Atlantis
3rd qtr.	**AF-17**	USAF payload
Oct. 9	***Shuttle mission 61-A (Columbia):**	
	Spacelab D-1	multidisciplinary (Germany)
Oct. 15	***Shuttle mission 62-A (Discovery):**	
	classified mission	DOD payload; first Vandenberg launch
October	**GOES-G**	weather and environment (NOAA)
Nov. 1	***Shuttle mission 61-B (Challenger):**	
	Palapa BR-2	communications satellite (Indonesia)
	Morelos B	communications satellite (Mexico)
	Satcom KU-1	communications satellite (RCA)
	EOS-1	electrophoresis (McDonnell Douglas)
Nov. 27	***Shuttle mission 51-L (Atlantis):**	
	TDRS-C	Tracking and Data Relay Satellite (NASA)
	AUSSAT-2	communications satellite (Australia)
December	**San Marco D_L**	atmosphere studies satellite (Italy/U.S.)
4th qtr.	**AF-18**	USAF payload
4th qtr.	**FLTSATCOM-F6**	communications satellite (USN)
Dec. 20	***Shuttle mission 61-C (Columbia):**	
	Westar VII	communications satellite (Western Union)
	Satcom KU-2	communications satellite (RCA)
	MSL-3	Materials Science Laboratory 3 (NASA)
	EASE/ACCESS	space-structures assembly test (NASA)

Space shuttle missions are presently designated by a three-character code (e.g., 51-C) rather than a Space Transportation System flight number (e.g., STS-15). The first numeral indicates the last digit of the fiscal year (e.g., FY 1985); 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.

*Shuttle missions beginning with 51-I were essentially firm but not formally approved by NASA at the time of SCIENCE NEWS's deadline. Nominal launch dates and payloads may change.

out-of-GAS trailblazers will be two satellites, each deployed by springs, and each only after having met exhaustive specifications to ensure that they will not get stuck in the door of their cans during deployment.

One is NUSAT, the Northern Utah Satellite, developed and funded by students and faculty members at Weber State College in Ogden, Utah, Utah State University in Logan, New Mexico State University in Las Cruces, and a number of aerospace companies. NUSAT's purpose, besides confirming that the deployment system works, will be to record the areas of coverage of participating air traffic control radar systems, providing the resultant data to the Federal Aviation Administration. Emerging from the other can will be GLOMR, the Global Low-Orbiting Message Relay satellite, a joint project by a private company and NASA to demonstrate the centralized collection of oceanographic data from a variety of sensors. In addition, however, a number of grassroots pro-space organizations such as the World Space Foundation and the Independent Space Research Group have been seeking ways of launching privately developed payloads ranging from astronomy satellites to solar sails, and are likely to be paying interested attention to at least the potential of such low-cost access to orbit.

NASA's officially approved shuttle launch schedule at present includes only the six missions through 51-F in early July. Seven more, however, have been in various "states of flux," and approval for most of them is expected to be announced within a few weeks. Among the candidates are two more classified Defense Department missions. The first of these (51-J) may see the maiden flight of Atlantis, fourth member of the shuttle fleet, while the second (62-A) could be the first to take off from the West Coast, using Vandenberg Air Force Base in California. Besides facilitating the security requirements of military shuttle flights, the western launchpads will give the shuttle access to orbits that cross over earth's poles, necessary for satellites, either military or civilian, that require the whole planet to pass beneath them.

In addition to all the shuttle activity, NASA's plans anticipate the possibility of launching as many as a dozen payloads on expendable rockets. Not all the ones on the agency's calendar represent firm plans (Italy's San Marco D_L atmospheric research satellite, for example, has been postponed for three years in a row), but the flexibility and sometimes economy of not being tied to a specific shuttle mission still offers advantages for some customers. For whatever the reasons, however, the need for expendables has not faded away, and NASA has not been without takers as it pursues turning them over to the private sector.

The "expendables" could be around for quite a while yet, and regardless of whether the shuttle program has a "glitch-free" year in 1985, the business of reaching for space is likely to keep growing. □