NASA 1983: A busy year on the pads

The National Aeronautics and Space Administration conducted a dozen launchings in 1982, including three flights of the space shuttle. If this year's schedule holds, the agency will nearly double that number, with five diverse shuttle missions as well as 18 satellite launchings by "expendable" rockets.

Targeted for later this month is shuttle mission number 6, termed STS-6, which will be the maiden voyage of Challenger, second in a fleet that NASA hopes will ultimately include five or even six shuttlecraft. The flight's principal task will be the deployment of the first Tracking and Data-Relay Satellite, TDRS-A, designed to take over the tracking of NASA's earth-orbiting satellites (and shuttles) from the existing ground-based system.

About three months later, STS-7, besides deploying a pair of communications satellites for Canada and Indonesia, will carry OSTA-1, a pallet of materials-processing ovens for NASA's Office of Space and Terrestrial Applications. In addition, an array of West German materials experiments known as SPAS-1 will be set out in space and retrieved later in the mission—the shuttle's first such "free-flier." The five-person STS-7 crew, the largest yet carried by the shuttle, will include Sally K. Ride, the first American woman to head for orbit, and Norman Thagard, a physician specializing in space medicine, who was added to the crew last month to investigate space-sickness problems that have affected about half the shuttle astronauts to date.

Another physician, William Thornton, will conduct similar studies aboard STS-8, whose crew will also include Guion Bluford Jr., the first black American to fly in space. The STS-8 itinerary includes the deployment of a second TDRS tracking satellite, as well as that of INSAT-B, a communications-and-meteorology satellite being sent aloft for India to replace INSAT-1, which was launched — and stopped working—last year.

The European Space Agency's Spacelab research module will go for its first ride aboard STS-9, after which STS-10 will be devoted to a classified mission for the Defense Department. (Five other U.S. military payloads, including one for the Defense Nuclear Agency and a pair of navigation beacons for the Navy, are also scheduled to be launched by NASA during the year, though not aboard the shuttle.)

The major scientific satellite on this year's launch schedule is IRAS, an Infrared Astronomy Satellite jointly involving the U.S., the Netherlands and the United Kingdom. Built around a single, cryogenically-cooled, 57-centimeter telescope, IRAS has generated high hopes among astronomers, for whom it represents the first chance to survey the infrared sky from outside the interfering blanket of earth's atmosphere.

Held over from last year is the launching of an atmosphere-research satellite called San Marco D/L, an Italian/U.S. project that will include drag measurements made during the low portions of the device's 260-to-950-kilometer-high orbit. Italy is also participating with NASA in a joint plan to conduct still lower-level studies with a 1987 satellite that will be trolled from the shuttle by a 100-kilometer-long tether.

Three meteorology satellites are being launched for the National Oceanic and Atmospheric Administration. Two of them, NOAA-E and -F, will also carry relay transponders as the first U.S. entries in SARSAT, a multi-national Search-And-Rescue Satellite-Aided Tracking system organized to help locate downed aircraft and stranded marine vessels. The system passed its first test last year when a Soviet satellite, COSPAS, aided the rescue of a downed plane in Canada.

As in the last several years, the major part of NASA's 1983 launch business will be communications satellites, with nearly a dozen on the schedule. —*J. Eberhart*

1983 NASA Schedule

Date	Mission	Description
Jan.	STS-6	shuttle payload: TDRS-A
Jan.	IRAS	Infrared Astronomy Satellite (U.S./ Netherlands/UK)
March	NOAA-E	meteorology, search-and-rescue
March	Intelsat V-F	communications
March	RCA-F	communications
April	STS-7	shuttle payload: Anik C (Canada), Palapa B (Indonesia), SPAS-1 (W. Germany), OSTA-1
April	GOES-F	geosynchronous meteorology satellite (NOAA)
May	San Marco D/L	atmospheric research (U.S./Italy)
June	STS-8	shuttle payload: TDRS-B, INSAT-1B
June	DNA	Defense Department
June	Galaxy A	communications
July	Navy 21	navigation
July	Telstar 3A	communications
Aug.	AF-1	USAF
Aug.	RCA-G	communications
Aug.	NOAA-F	meteorology, search-and-rescue
Sept.	STS-9	shuttle payload: Spacelab 1
Sept.	Galaxy B	communications
Oct.	NATO 3-D	communications
Nov.	STS-10	shuttle payload: DOD
Nov.	Navy 22	navigation
Dec.	AF-2	USAF
Dec.	Intelsat VA-A	communications

Arkansas: Shakes, rattles, but no roll

Arkansas has the jitters. Since Jan. 12, 1982, seismographs have recorded about 20,000 very small earthquakes in a six square kilometer area of north central Arkansas. The quakes threaten no one, and rarely are noticed by local residents. Scientists are puzzled, though, about the cause of the quakes, why they have persisted for so long, and what, if anything, the quakes suggest about seismic risks in "stable" midplate regions.

The geological term for a small cluster of quakes is "swarm." Usually, swarms occur in areas that have faults caused by movement of the earth's crustal plates, or where there are volcanoes. But this swarm is centered 170 kilometers southwest of the nearest major fault, the New Madrid (SN: 10/10/81, p. 232), and there are no volcanoes anywhere nearby. "It's very difficult to explain so many earthquakes over such a small area over such a long period of time," says Arch C. Johnston, director of the Tennessee Earthquake Information Center in Memphis. Johnston says that near the New Madrid area, swarms usually last about a week.

The area of seismic activity is "very confined" and shows no sign of spreading, Johnston says. When the quakes first were recorded at permanent stations last January, geologists quickly pinned down the location of the swarm, and took portable instruments to the site. When they went back the next day to check the record, the seismograph had recorded 1,500 earthquakes. "It blew us away," Johnston says. "You could be in the earthquake business all your life and not get a seismogram like that."

One possible explanation for the Arkansas swarm is that a preexisting zone of reduced crustal strength has been reactivated by plate motions. Johnston ventures one step further and speculates that the swarm may indicate that a small tongue of magma has worked its way up beneath the shallow Arkansas crust, and is causing minor quakes as it moves along. He cites some similarities to a recent earthquake swarm in the Mammoth Lakes area of California (SN: 6/12/82, p. 390), which geologists believe was triggered by upward movement, or intrusion, of magma. That area, however, has a long history of volcanic activity; Arkansas does not.

Detailed gravity and magnetic surveys might be able to identify a magma intrusion. In the meantime, there appears to be little or no chance that the seismic activity will affect other parts of the region. The total energy released by the 20,000 quakes is equivalent to that of a single earthquake which itself would be noticed by most people but still would not cause significant damage. —*C. Simon*