Launch delays jeopardize weather forecasts

Newly disclosed flaws in the next generation of U.S. weather satellites may prevent NASA from launching the first of these craft until well after a key satellite now in orbit runs out of fuel. By 1993, weather officials say, U.S. meteorologists may lack the satellite data they need to reliably track hurricanes, floods and tornadoes.

Only one U.S. weather satellite—known as GOES-7 — can spot and rapidly follow weather phenomena. Launched in 1987, the NASA-designed craft is operated by the Commerce Department's National Oceanic and Atmospheric Administration (NOAA). The satellite transmits visible-light and infrared images of cloud cover and data on temperature-humidity profiles back to Earth every half hour. These are the satellite cloud pictures displayed by television weather forecasters.

Several years ago, NASA began developing a $1.1 billion series of geostationary weather satellites — dubbed GOES-NEXT—to succeed GOES-7. Although the current satellite will reach its minimum life expectancy of five years next February, fuel conservation measures will likely extend its operations to 1993, says James Greaves, NASA's program manager for meteorological satellites. Yet even that may not provide enough time to prepare GOES-I — the first of the NEXT instruments — for launch, says NOAA scientist W. John Hussey. (The new satellites are named by letter, starting with I.)

NASA originally planned to launch GOES-I in 1989, but a spate of problems forced a three-year delay. The upsets included tests revealing a sudden malfunction of three infrared detectors stored for future use, although no such problems showed up in identical detectors on the still-grounded GOES-I. Other tests showed that a GOES-I "sounder" device, used to measure temperatures and humidity, transmits an unacceptably weak electrical signal. In addition, mirrors on the GOES-NEXT satellites buckled during uneven illumination by the sun (SN: 8/18/90, p.102). Greaves says NASA scientists believe they have now overcome the mirror flaws.

But last month's reports of additional defects provided "the straw that broke the camel's back," he says. In a June 25 meeting with NASA, officials with ITT in Fort Wayne, Ind.—a key contractor on the project— disclosed that two more of the 50 infrared detectors had markedly declined in sensitivity. Just one week earlier, ITT had told NASA that a nickel wire connecting the onboard detectors to other equipment unexpectedly showed temperature-related changes during tests simulating the space environment. In space, this would cause the satellite's imager to produce a blurry weather map that might not differentiate clearly between clouds and land features.

Metals less susceptible to temperature changes might be more appropriate than nickel, suggests Hussey. ITT spokesman Don Walters told SCIENCE NEWS his company has already given NASA suggestions for solving some defects, but he declined to provide any details.

Greaves says the unexplained problems with the stored detectors, which he calls the "heart" of the new satellites, pose a particular quandary. "Should we fly with [the current detectors] in the hopes that they won't also degrade? Or should we . . . take out the detectors and start over with different detectors?" He estimates that replacing the onboard units could delay GOES-I's launch until the fall of 1993, but adds that NASA still hopes for a late-1992 launch. The space agency plans to set a more definitive launch date on July 18, he says.

Nonetheless, NOAA officials formed a task force last week to investigate alternatives to relying on the flawed equipment. "There's a crisis in confidence," says NOAA spokesman Frank Lepore. Options include leasing a spare satellite from Europe or Japan, he says, or asking a European agency to nudge one of its extra weather satellites closer to the eastern United States. The latter plan would leave the western United States without continuous satellite coverage.

Some members of Congress blame poor management at NASA for the continuing satellite problems, echoing charges leveled at the agency last year after the discovery that the Hubble Space Telescope had a severely flawed primary mirror. "Hubble was a fiasco," says Rep. Howard Wolpe (D-Mich.). "GOES is too, but with one very important difference. GOES . . . puts people's lives at risk."

Wolpe chairs the investigative panel of the House Science, Space and Technology Committee. At a hearing on July 25, he says, the panel will release a Government Accounting Office report probing the troubled GOES program. — *R. Cowen*

Routine screen hints at fetal death risk

Some pregnant women with high blood levels of a commonly measured fetal protein may face up to 11 times the usual risk of losing their babies late in pregnancy, a new study indicates. However, since most women with the high protein levels do carry their babies to term, the study's authors view the test only as an adjunct to other methods for monitoring high-risk pregnancies.

The test measures maternal blood levels of alpha-fetoprotein, a substance of unknown function produced by the developing fetus. U.S. obstetricians already assay this protein early in pregnancy in roughly half of their patients, because expectant mothers with extremely high levels run a greater than 80 percent risk of bearing a baby with neural-tube defects. These birth defects, in which the tissue destined to become the fetal central nervous system fails to develop properly, often lead to open spinal cords.

U.S. screening programs for alpha-fetoprotein as a predictor of neural-tube defects began in the mid-1980s. In the course of such screening, obstetricians noted that the fetuses of some women with high alpha-fetoprotein levels died late in the pregnancy — even if they did not have neural-tube defects.

Those observations led D. Kim Waller of the University of California, Berkeley, and her colleagues to launch a retrospective study comparing the second-trimester alpha-fetoprotein levels of 612 women whose pregnancies ended in fetal death with those of 2,501 women who gave birth to live infants. The researchers discovered that the fetuses of women with double the average protein level were nearly three times as likely to die before birth as those whose mothers had normal alpha-fetoprotein levels. Women with more than three times the average level of this protein faced 11 times the risk of losing their babies late in pregnancy. The team reports its findings in the July 4 NEW ENGLAND JOURNAL OF MEDICINE.

"It hadn't been clear before our study that alpha-fetoprotein could predict a fetal death occurring at term," says Waller.

Surprisingly, 515 of the 612 fetal deaths occurred in women who had less than two times the average level of the protein, she notes. Until now, this was considered within the normal range of individual variation.

However, "this test would only identify between 8 and 10 percent of women destined to have a fetal death . . . so it's not a good screening test [for predicting fetal loss]," she adds. Indeed, one-third of the 78 fetal deaths occurring in women with more than twice the average alpha-fetoprotein levels can be attributed to chance, Waller says.

In an editorial accompanying the report, F. Gary Cunningham and Larry C. Gilstrap of the University of Texas Southwestern Medical Center in Dallas point out that "most fetal deaths in this study were not associated with elevated alpha-fetoprotein levels, and most women with elevated levels did not have fetal death." They suggest that obstetricians might prevent some fetal deaths by closely monitoring third-trimester mothers with high alpha-fetoprotein levels and proceeding with delivery if the baby shows signs of stress. — *C. Ezzell*