UOSAT-2 satellite comes back to life

Mere hours after its March 1 launching, during only its third orbit of the earth, the UOSAT-2 satellite unexpectedly stopped transmitting. It was laden with experiments for amateur radio operators, educators and others, and its controllers at the University of Surrey, England, tried repeatedly to bring it back to life, but to no avail. Two and a half months passed, with the lack of clues as to what had gone wrong recalling the even longer (and unsuccessful) effort to revive the Viking 1 landing craft on Mars (SN: 5/28/83, p. 340).

On May 14, yet another ground command was sent, in a fading hope of getting the satellite to resume its transmissions. And UOSAT-2 answered.

It was not on its best behavior. Following its reactivation, it would sometimes respond to commands, sometimes not. Now its engineers are working to understand its problem(s), and have expressed the hope that the situation will be in hand by early July, after which they plan to begin testing its diverse instruments.

But why is it working at all? What went right? The effort to save Viking (conducted from Jet Propulsion Laboratory in Pasadena, Calif.) had included numerous attempts to reprogram the lander's computer, with long sequences of commands based on one idea after another about what might have gone wrong. The UOSAT-2 team merely sent their satellite another instruction to start transmitting, with the sole difference that this time it worked. Why now?

It had been previously suggested that the craft's three command receivers might have been effectively deafened by electronic noise attributed to one of its transmitters. Indeed, that transmitter had malfunctioned during pre-launch checkout, but the "glitch" was thought to have been fixed. Even so, the satellite was equipped with a "watchdog" timer that was supposed to turn off all the transmitters if no commands from earth had been received in three weeks; but the 21 days passed, and numerous command attempts thereafter fared no better than the rest.

The timer had been included because of a hard-learned lesson. UOSAT-2 is also known as OSCAR 11 (Orbiting Satellite Carrying Amateur Radio), and one of its predecessors, OSCAR 9, had suffered a similar interference problem when a software error turned on both of its transmitters at once. Since there was no automatic shut-off switch, Robert Leonard of SRI International in Menlo Park, Calif., agreed to use that facility's huge, 150-foot antenna to send a powerful command that could drown out the interference, saying to the satellite, in effect, "Shut up and listen!"

UOSAT-2's problem appeared to be not noise, but dead silence. Even so, SRI International was consulted again. Martin Sweeting, the satellite's program manager in England, had suggested that it might be possible at least to confirm that the device was still "alive" (a key datum and morale booster that the Viking restoration effort never got) by listening for the much fainter electromagnetic noise radiating from one of its receivers. The noise would not have to be indicating a malfunction, just the receiver's normal "leakage" — about a million times fainter than the sought-after signals of the then-silent transmitters. But SRI had just the needed "ear" — a 100-foot radar research antenna that it was operating in Greenland for the National Science Foundation, fortuitously equipped to monitor the frequency of one of UOSAT-2's receivers.

As it happened, the manager of the Greenland station, Finn Steenstrup, was also an amateur radio operator, and was thus a kindred spirit with the numerous other radio "hams" who have been contributing expertise, time and even hardware to the OSCAR satellites since the series began in 1961. On May 11, he aimed the big dish antenna at the satellite's calculated position, and detected what appeared to be the faint emissions of its 1270 megahertz receiver on two successive orbits. The narrow listening angle of the 100-foot dish (together with the amplitude and other characteristics of the weak signal) gave additional confidence that UOSAT-2 was indeed the source. The word was passed to Surrey, and on May 14, Sweeting's newly inspired team sent up one more command for the satellite to begin transmitting on its own. Which it did.

It still has problems. Its responses to commands are intermittent, and its engineers are gingerly trying out its various operating modes as they attempt to work out the nature of the difficulty. One possible factor is believed to be the effect of varying temperatures on the craft's command decoder as different sides of the satellite are exposed to the sun. Readings from the craft's magnetometer as it moves through earth's magnetic field suggest that UOSAT-2 is tumbling, and the flight team's present task is to understand the complex motion so that it can be brought under control. (One part of the stabilization system — a simple "gravity-gradient" boom — was never initially deployed because communications were lost so early in the mission.)

Awaiting their chance are a variety of instruments ranging from a slow-scan television experiment to space-dust and particle/wave sensors. Also aboard, says an official of AMSAT, the Radio Amateur Satellite Corp., is a speech synthesizer designed to send telemetry data by voice to low-cost receivers within the reach even of high school classes. And while the Viking 1 lander succumbed only after exceeding its planned lifetime by 25-fold, UOSAT-2 still has its whole future ahead of it.

—J. Eberhart

Baby Doe rule—dead?

The new "Baby Doe" rule (SN: 1/21/84, p. 47) was effectively killed by a pair of federal court rulings last week. The rule, instituted by the Department of Health and Human Services (HHS), was intended to prevent withholding of beneficial medical treatment or nutrition from newborns solely on the basis of an impairment — except in those cases in which doing so would "only prolong the act of dying."

The rule, which took effect in February, was promulgated under a civil rights law known as the Rehabilitation Act of 1973. However, charging that as written the Rehabilitation Act protected only handicapped adults (including their right to accessible public buildings), a number of medical groups including the American Medical Association brought suit in March against HHS over the rule. Last week a U.S. District Court judge in New York ruled against HHS, agreeing with the medical groups that the federal government had overextended the reach of that act when it tacked on its Baby Doe rule.

In a separate but related action, the federal government's attempt to invoke the Baby Doe ruling in a case in Stony Brook, N.Y., was rejected both by a U.S. District Court and Court of Appeals (the latter on Feb. 22). On March 9, the Justice Department went back to the appellate court and asked for a full panel of judges to reconsider the February ruling made by a three-judge panel. But last week the court notified the Justice Department that its request for a reconsidered ruling was being denied. The earlier appellate decision — that the Baby Doe rule was an illegal extension of the Rehabilitation Act — would stand. The government has not decided whether it will appeal either decision. □

Stopping stones

The formation of certain calcium-containing kidney stones can be prevented with potassium citrate, Charles Y.C. Pak of the University of Texas at Dallas announced at a press conference last week.

The substance, he says, is useful in people with hypocitraturia, a low level of citrate in the urine. Normally, citrate binds calcium, preventing it from binding with other substances in the urine and seeding what can prove to be exceedingly painful crystals. "In appropriately indicated patients, potassium citrate may prevent new stone formation and lower the need for surgery," Pak says.

Potassium citrate may prove valuable in the 5 percent of kidney stone sufferers with hypocitraturia alone, plus as a supplement to other treatments, estimates John Pahira, a kidney specialist at Georgetown University in Washington, D.C. □