

Weather Report: NASA GOES Astray

NASA missed a chance to save up to \$334 million on the GOES-NEXT weather satellites — more than one-third of the estimated \$934 million cost of building the five problem-plagued craft. The agency also failed to make contractors involved in the program perform engineering tests that NASA usually requires before developing large projects. So concludes an investigative report by the Government Accounting Office (GAO), released last week at a sometimes stormy congressional hearing.

Both the report and testimony at the hearing cast further doubt on the space agency's ability to launch the first of the scheduled GOES-NEXT satellites before the only other similar U.S. satellite now aloft begins wobbling out of orbit sometime in 1993. Without a replacement satellite, the report notes, U.S. meteorologists will lack many of the data they need to reliably forecast hurricanes, tornadoes and floods (SN: 7/6/91, p.5).

At the hearing, jointly sponsored by two House Science, Space and Technology subcommittees, NASA officials continued to assert that the agency can launch the first of the new craft — known as GOES-I — by December 1992. But several members of Congress urged the National Oceanic and Atmospheric Administration (NOAA), which owns and operates the weather satellites, to strongly consider alternatives such as buying or leasing a foreign satellite.

"NASA cannot retroactively fix a fundamentally flawed product produced by a flawed system," Rep. Howard Wolpe (D-Mich.) charged. Moreover, both Wolpe and a GAO investigator pointed out that GOES-I will likely only match the performance of the now-orbiting GOES-7, while costing five times as much.

Mismanagement by the space agency, poor performance by contractors and an unexpectedly complex design all contributed to the weather satellites' woes, the GAO report states. It notes that NASA's actions at the start of the program in 1984 set the stage for the current problems — which include satellites three years behind schedule and bearing a price tag nearly triple the 1986 estimates for their construction and launch.

For instance, unlike the current U.S. weather satellite, which spins in space, the new GOES is designed to stare fixedly at Earth. But the complexity entailed by that requirement, notes the GAO report, "led to additional analyses, redesign and remanufacture of parts, which resulted in increased costs and delays."

Making a challenging situation even tougher, the agency admitted to the GAO that it provided contractors with little guidance and technical expertise. In addition, NASA decided to forgo preliminary tests before getting the project fully underway — an apparent attempt to meet a tight launch schedule.

At the hearing, Louis J. Giuliano, president of ITT Defense, Inc., in Arlington, Va., which is building key infrared sensors for GOES, summarized the consequences of that decision. "Problems which ordinarily would be identified earlier in the program, when solutions are more easily accommodated, were not surfaced until later...when they had greater cost and schedule impacts."

Despite the delays and equipment problems, NASA until recently gave its main GOES-NEXT contractor — formerly known as Ford Aerospace Corp. and now part of Loral Corp. — quarterly performance ratings usually ranging from "successful" to "highly successful." From 1985 through early this year, the agency awarded the company 69 percent of the available money in its contract — considerably more than a company with this track record should have received, Wolpe contended.

Letters gathered by the GAO reveal that in 1988, NOAA asked NASA to cap the contract, and that Ford Aerospace agreed to consider fixing the cost of building the satellites at \$600 million. But the space agency declined to act. This year, the estimated price of building the satellites rose to \$934 million. "NASA missed an opportunity," testified Loral Corp. President Frank C. Lanza.

Documents presented at the hearing also reveal new information about five infrared detectors that for unknown reasons suffer impaired sensitivity. One of these detectors, designed to image cloud cover, had resided inside an instrument

intended for GOES-I up until a year ago. Only last month, NASA had reported that none of the defective sensors were in the imaging devices intended for the GOES craft, suggesting the sensors were spares damaged in storage.

ITT memos indicate that the sensitivity of the detectors — one of which was inadvertently lost during retesting — was not properly measured at the outset, making it hard to gauge exactly how much sensitivity the devices have lost. Other documents show that ITT lacks up-to-date blueprints of design changes made to GOES-I.

Congress may wish to withhold 1992 funds for GOES-NEXT until NOAA and NASA solve current technical and scheduling problems, the GAO report said. Congressional staff say they believe NOAA's most likely option will be to borrow or purchase a GOES-7 duplicate — now destined for Japan — that is under construction at Hughes Aircraft Corp.

— R. Cowen

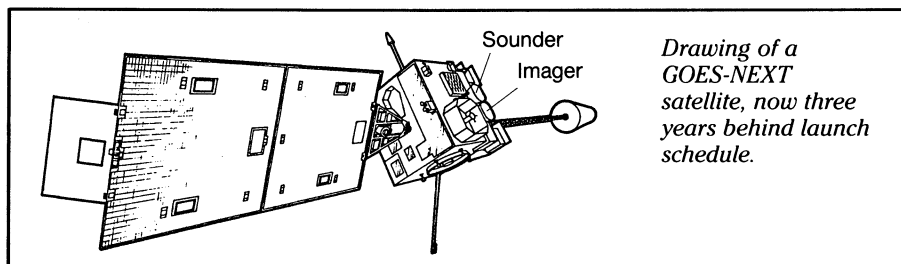
Ancient ax helps date early Greeks

In the sediment of an ancient lake bed, Boston University archaeologists have found a flint hand-ax that provides new clues to the prehistoric settling of Europe. The ax, assigned a preliminary age of between 200,000 and 400,000 years, confirms that early Stone Age human ancestors lived in Greece.

"This is the most significant discovery for the early prehistory of Greece in some 30 years," asserts James R. Wiseman, director of the expedition known as the Nikopolis Project. He and his colleagues announced the find last week at a press conference in Boston.

In May, the scientific team began fieldwork in the region of Nikopolis, a site on the western peninsula of Greece founded by the Roman emperor Augustus in commemoration of a 31 B.C. war victory. On June 3, expedition member Curtis Runnels noticed the ax sticking out of undisturbed sediment in an eroded gully running through the lake bed, about 20 miles north of Nikopolis.

The researchers say the 9-inch-long specimen is an Acheulean hand-ax, named for a French site where similar implements turned up in the early 1800s. In western Europe and Africa, archaeologists have found numerous Acheulean hand-axes at sites spanning the period from 1.6 million to 200,000 years ago. Scientists do not know exactly how human ancestors used these pieces of flaked



Drawing of a GOES-NEXT satellite, now three years behind launch schedule.

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