Improving ignition for chemical laser

A central problem of laser research has been to develop a device that will give off more energy in the form of light than it takes in as electricity. "Chemical lasers" accomplish this by adding the energy of an on-going chemical reaction, but the trick is how to hold the reactive chemicals and then ignite them all at once to produce a short, powerful laser pulse. Laser scientists from the Los Alamos Scientific Laboratory this week announced a recently successful approach, using the reaction of hydrogen and fluorine ignited by an electron beam, to produce a 30 nanosecond laser pulse of 2,300 joules energy.

In announcing the development at the Rocky Mountain Regional Meeting of the American Chemical Society this week, Reed J. Jensen, leader of the Los Alamos group, was quoted as saying the development would "make it possible to provide laser pulses near one million joules at an early date and at a low cost, so that the basic physics of laser-driven pellet implosion necessary for laser fusion can be investigated." He added that by increasing the pressure of the reactive gases, lasing time could be shortened many-fold.

Later, in an interview with SCIENCE NEWS, Jensen pointed up some of the difficulties that still lie ahead. To accumulate a million joules of laser energy, he said, would require adding together the beams of several chemical lasers, each of which would be no larger than 50,000 joules. Even those would require an ignition system powered by a 25,000 joule electron beam, which is "pushing the state of the art." Also, a hydrogen-fluorine laser has a wavelength nearly five times longer than optimum for pellet compression, and Jensen said that current experiments should show whether this difficulty could be overcome. □

A gray verdict on the space shuttle

The court renders its verdict. The loser appeals—surely the higher court will clear up the issue. The higher court listens, ponders, equivocates and clears its throat until the contestants begin to wonder if they'll ever see the end of it. At last the date is set for the Big Decision. More weeks drag on until finally, six months after it took on the case, the higher court speaks to the lower: "Why don't you—uh—take another look at the matter?"

Indecisive, after such deliberation, is scarcely the word. In a court of law, it would be only a step beyond refusing to rule on the case. In this case, however, the appeal was in the hands of the General Accounting Office, which reached its nonconclusion in the matter of whether the National Aeronautics and Space Administration had unjustifiably awarded a major space shuttle contract to Thiokol Chemical Corp. Lockheed Propulsion Co., Thiokol's competitor in the bidding, had protested NASA's decision to the GAO.

Throughout the GAO's musings, NASA had been trying to keep Thiokol going via short-term study contracts. But as the waiting dragged on, a more serious problem began to loom. The contract at issue was for the development of the huge, solid-propellant rocket motors that will be strapped on to the space shuttle to lift it into space. Many aspects of the contract, particularly the obtaining of materials, are "long lead-time items" that must be initiated early if development is to proceed without holding up the overall shuttle construction and test schedules. NASA Administrator James Fletcher and other agency officials were thus rather uptight about the delay, and, upon hearing the GAO's quasi-decision, were predictably boggled.

Even for the GAO, the 98-page decision, announced June 24, was a masterpiece of governmentese. NASA had concluded in its original decision that, in part due to less-costly procurement of the rockets' solid propellant (Lockheed would have built new facilities to produce it rather than buy it), Thiokol offered a $122 million saving. Lockheed contended that its own proposal would in fact be from $100 million to $200 million cheaper. The GAO finally concluded that Thiokol did seem to have the edge, but that it was only from $48 million to $63 million. Fletcher, said the GAO, should therefore decide whether to reconsider the selection. Not change the decision. Not even reconsider it. Just *decide* whether to reconsider it.

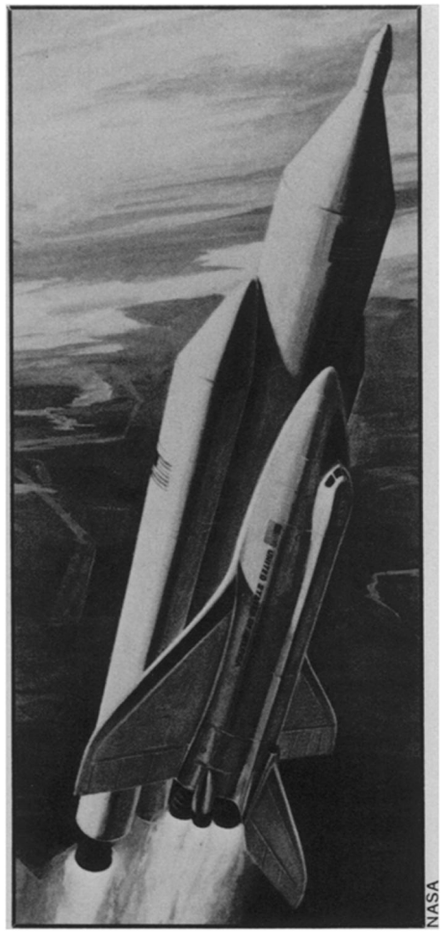
Big help. One GAO attorney, clarifying little but the presence of the uncertainty, added that his agency's decision was "not such that an award to Thiokol would be completely against what we said in the decision."

Fletcher wasted no more time. Within three days of the GAO's "decision," he announced that Thiokol would be awarded a six-month, $5.5 million contract, during which time a more definitive contract worth about $160 million will be negotiated.

There are differing versions, even within NASA, of what went on during those three days. George Vecchietti, NASA assistant administrator for procurement, was reported by AVIATION WEEK to have said that NASA management did "reconsider its decision as requested by the GAO." A space agency attorney involved in the matter, however, told SCIENCE NEWS that Fletcher, directed merely to "determine whether he should reconsider," simply determined that he shouldn't. "The initial rationale for the selection of Thiokol remains valid," Fletcher told the GAO, "even assuming, but without conceding, the correctness of the position taken by GAO respecting ammonium perchlorate [propellant] costs."

Reconsidered or not, the decision caused dire consequences for the Lockheed Propulsion Co., which may have to lay off as many as 10 percent of its almost 800 employees. Some of the employees had been retained throughout the half year of the GAO's deliberations, in hopes that a recalculation of the costs would produce a ruling in Lockheed's favor.

Thiokol, meanwhile, is at last free to get on with the rocket motors, of which the first flight versions are due to be delivered to NASA in 1978. The space shuttle should carry its first crew into orbit in 1979.



Protested rocket (lower left) is "go."

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