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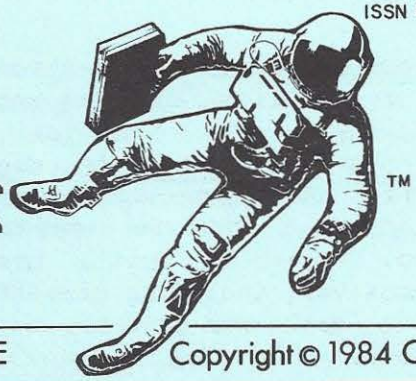

A MONTHLY NEWSLETTER ON FREE ENTERPRISE IN SPACE

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NASA Puts Pressure On Potential Shuttle Competitors

The National Aeronautics and Space Administration (NASA) used "hardball" tactics to try and protect the Shuttle's monopoly on U.S. space transportation according to an investigation by Reason magazine (the results of this investigation appeared as part of an article on space transportation entrepreneurs which appeared in Reason's January issue).

The magazine reported finding "substantial confirmation" that behind-the-scenes pressure was applied to high level executives at the Martin Marietta Corporation, Denver, Colo., and at General Dynamics Convair Division, San Diego, Calif. to prevent the two companies from competing with NASA in the commercial space transportation market.

Martin Marietta is the prime contractor of the Titan expendable launch vehicle (ELV), while General Dynamics is the prime contractor of the Atlas Centaur ELV. Both companies are making their launch vehicles available to commercial customers. Growth versions of these launchers (the Titan 34D 7/C and the Atlas II/C) in particular are major threats to the Shuttle, especially where the Defense Department market is concerned. The Titan, which would require very little modification to launch Shuttle-sized payloads, is already being eyed fondly by the Air Force (more on the military market later).

Both Martin Marietta and General Dynamics also have large contracts with NASA (Martin Marietta manufactures the Space Shuttle External Tank, while General Dynamics is building Centaur upper stages for the Shuttle and hopes to get extensively involved in NASA's Space Station program). According to Reason, executives at these firms were warned by a NASA official in 1983 that if they pursued plans to compete in the launch business against the Space Shuttle, their future as NASA contractors would be jeopardized.

This pressure was apparently applied by high-level NASA personnel. Several of Reason's sources identified Lt. Gen. James Abrahamson (then head of the Space Shuttle program) as one such official.

In 1983, Martin Marietta was proposing the Titan to launch satellites for Intelsat (C.S.R., July 1983, pp. 1-3). According to Reason's sources, an official from NASA (which was proposing the Shuttle for this launch) told Martin Marietta that if the company pursued the Intelsat launch it would be locked out of future NASA contracts.

General Dynamics vice-president William Rector was also reportedly put on notice that General Dynamics' NASA contracts would be reopened to bidding if the company did not drop its plans to commercialize the Atlas.

Reason began its investigation when it heard reports circulating among space

industry observers that NASA tried to forestall competition from several private operators of satellite-launching rockets.

From the beginning, the magazine had difficulty confirming the persistent reports. Officially, representatives from both Martin Marietta and General Dynamics have denied that NASA has ever tried to "squeeze out" commercial launch system competition. Caleb B. Hurtt, president of Martin Marietta, told Reason that no Martin executives, including himself, have been submitted to such tactics. A General Dynamics spokesman told the magazine that William Rector was "unaware" of any NASA pressure.

Yet, unofficially, enough sources were willing to confirm the rumors that Reason felt justified in coming out with its report. These sources included a number of individuals close to the aerospace industry, including several "well-placed government officials." According to Reason, none of them were willing to be identified "because of the confidentiality of their information and because of fear of reprisal from NASA."

Reason found no evidence that any of NASA's attempts to block the emergence of a private launch industry in this way were successful. General Dynamics signed up its first launch customer in the summer of 1984 (Rainbow Satellite, Inc.--see C.S.R., Aug. 1984, p. 4), and Martin Marietta did submit a bid on the Intelsat launch. Reason suggested in its article that the heavily subsidized prices charged by NASA for Shuttle flights are a more important factor in discouraging private space transportation endeavors.

Reason magazine, published monthly by the Reason Foundation (a non-profit "think tank" located in Santa Barbara, Calif.), explores issues and ideas related to individual liberty. Subscriptions are $24.00/yr. and can be obtained by writing to: Reason, P.O. Box 27977, San Diego, CA 92128. (The magazine is an excellent source of libertarian ideas and information and I highly recommend it.)

I agree that the major present threat to private space transportation is NASA's Shuttle pricing policy, and that the agency's reported pressure tactics have not seemed to be effective based on Reason's investigation. However, Reason mentioned only those cases which are somewhat widely known in the industry. No one knows how many other such incidents may have occurred. For example, this newsletter's sources report that recent pressure from NASA may have assisted in squelching Martin Marietta's early efforts to promote the External Tank as a component of the U.S. Space Station.

It should be pointed out here, for the sake of fairness, that Martin Marietta and General Dynamics are not entirely blameless in this situation. Those industries that have grown dependent on the government trough should not be too surprised when the government presents the bill.

* * *

Air Force to Select Commercial Finalist for Booster Competition

The rules have been further clarified in the contest to designate an expendable launcher to back up the Space Shuttle for military flights. At present, the competition is between Martin Marietta's Titan 34D 7/C, General Dynamics' Atlas II/C, and the SRB-X, NASA's Shuttle-derived booster (C.S.R., July 1984, pp. 1-4).

The Air Force will make an initial choice between the two commercial options, the Titan and the Atlas. The finalist will then go on to compete with the NASA SRB-X. This preliminary decision had not yet been made by press time, but it is expected to be finalized sometime this month. The decision between the winning commercial

ELV and the SRB-X should then be made by February, 1985.

Industry bets are favoring the Titan as the contender against the SRB-X, but which of them will come out on top in the final showdown is still uncertain. If development costs were the major factor, the Titan would win hands down. However, operational costs are expected to be roughly equal for the two systems. Add to this a generous dose of politics and pork barrels, and the final choice is anybody's guess.

Air Force Under Secretary Bemoans Launch Costs

A fundamentally new approach is needed to bring down the cost of launching payloads into space, according to Air Force Under Secretary Edward C. Aldridge. In a speech given in October at a meeting of the American Astronautical Society in Palo Alto, Calif., Aldridge expressed frustration with the current high-cost trend in space flight.

"We're pricing ourselves out of the space business because the launch costs are killing us," he said. Aldridge restated the fact that launch costs dominate the cost of space systems, and that new technology is not being used by the aerospace industry to bring these costs down.

According to Aldridge, the Department of Defense alone eventually plans to carry out up to 100 launches per year...and this does not count possible missions associated with the future Strategic Defense Initiative. Yet, it seems that we are stuck using various versions of the same old flight-proven hardware for the next 10 - 15 years.

Aldridge did not endorse anything specifically as the desired "fundamentally new approach," although on-board guidance systems and "big dumb booster" concepts were mentioned. A central point of the speech was the need for something to bring launch costs down not just by an order of magnitude, but by orders of magnitude, that is, down to tens of dollars per pound into orbit instead of the present thousands of dollars per pound.

A number of "fundamentally new approaches" have appeared in the pages of this newsletter and other similar publications over the years, most of which could easily accomplish what Aldridge is looking for. It is hoped that sooner or later some of these space transportation solutions will begin to come to the official attention of the aerospace establishment.

* * *

Update: Man Vs. Black Box

There are still a number of people out there who feel that including human beings in space missions is at best a luxury, and at worst a waste of resources which could be better used for unmanned systems. I feel that such a position is indefensible based on ever-increasing evidence that there are immeasurable advantages to having adaptable human beings on the scene in space to handle unforeseen situations. Some examples from recent space missions:

Shuttle Mission 51-A (Discovery):

The Space Shuttle's recent satellite recovery mission (discussed from a financial standpoint last month) highlighted the human factor in space flight. During this mission, the astronauts were to follow a complex procedure designed to capture the errant satellites (using a probe mounted on a free-flying astronaut's manned maneuvering unit) and return them to the orbiter's cargo bay. After a satellite was

brought over next to the orbiter, the procedure then called for the use of a tool called the "antenna bridge," which was designed to mount onto the top of the satellite to give the Discovery's remote manipulator arm something to grab hold of (the satellites had not been designed for recovery, and lacked the special pin that the grappler on the end of the arm needs to hold something). During the recovery of the first satellite, Palapa B-2, it was discovered that the antenna bridge had been incorrectly designed and did not fit the satellite. So, instead of using the Shuttle arm, spacesuited astronaut Joseph Allen stood in the cargo bay, grabbed the 1,200 pound satellite in his hands and held it over his head for over an hour (with some discomfort, despite the zero gravity conditions) while fellow astronaut Dale Gardner prepared the cradle that would lock the recovered satellite into the cargo bay.

During the recovery of the second satellite, Westar 6, the astronauts improvised again. Since the remote manipulator arm's grappler couldn't be used, Allen attached himself to the end of the arm with a special fitting and became a "human grappler." Riding the end of the arm, he grabbed the satellite and held it again (this time a little more comfortably) while the cradle was prepared.

Had the recovery mission been performed by an unmanned reusable launcher, and the manipulator arm operated by a robot, or even by a human remote operator on earth, the entire mission would have failed.

Shuttle Mission 41-G (Challenger):

This mission was marred by a number of minor problems that could have added up to mission failure without the presence of astronauts on the scene. For instance:

The drive mechanism for the Challenger's Ku-band antenna failed, causing the antenna to spin wildly and threatening the data from the flight's SIR-B earth resources imaging radar system (an important feature of the mission). The Challenger's crew disassembled a major portion of the orbiter's middeck locker area to reach the electronics box involved. They then pulled the wires controlling the antenna drive, freezing it in one position which would allow continued data flow.

The Ball Aerospace Earth Radiation Budget Satellite (ERBS), which was to be launched into orbit from the Challenger's cargo bay, failed to deploy its solar panels on command. Had they remained undeployed, the $40 million satellite would have been powerless and useless. Astronaut Sally Ride, using the remote manipulator arm, literally shook the satellite until the arrays deployed properly.

The large, flat, scanning antenna of the SIR-B radar would not lock back into its stowed position for reentry. At one point, the crew used the remote manipulator arm to shove it back into its proper position.

Problems were not the only thing that allowed the astronauts to show their stuff. One feature of this mission was to show that astronauts could refuel a satellite in space even though that satellite had not been specifically designed for it. During an extravehicular activity (EVA), astronauts Kathryn Sullivan and David Leestma successfully hooked up pipes which allowed hazardous hydrazine propellant to be transferred to and from a simulated satellite propellant tank.

Shuttle Mission 41-D (Discovery):

This mission included another test of McDonnell Douglas' Electrophoresis Operations in Space (EOS) project (C.S.R., Mar. 1983, pp. 1-3). The EOS unit, located on the middeck of the orbiter Discovery, was to separate out a proprietary biological material. Along on this flight was McDonnell Douglas payload specialist Charles Walker, the first such industry representative to fly on the Space Shuttle.

During the mission, Walker had to make a number of repairs. A failed part (a degasser unit) had to be replaced right at the beginning, during the initial check-out. Later, during processing, the apparatus designed to maintain proper pressures in the system failed. With the help of ground personnel, Walker went to manual control to bring the system back to nearly normal. In an additional fix, Walker corrected a flow misalignment problem in the system by manually adjusting flow deflector vanes at the base of the machine.

Any one of these failures, left unrepaired, could have ruined the experiment and resulted in little or no product being processed (later analysis showed the product to be contaminated, but this was not related to Walker or the mechanical problems of the system). Walker will be adding his expertise to future Shuttle EOS missions.

Salyut 7:

Soviet cosmonauts have also spent some time as space mechanics and handymen. Some details appeared in an article in the November 1984 issue of Omni magazine written by James E. Oberg, a noted expert on Soviet space affairs.

In April, major repairs were necessary to the Soviet Salyut 7 space station. Cosmonauts Leonid Kizim and Vladimir Solovyov suited up and left the Salyut 7 to perform what the Soviets called "service" on the station (Soviets do not like to use the word "repair," which implies that a failure has taken place). During an earlier mission in 1983, fuel lines on the Salyut ruptured during a refueling operation from a robot tanker. Fortunately, there was no explosion, but the space station's maneuvering rockets fed by the line were rendered useless until repairs could be made.

Repairs involved many hours of work, heavy equipment, and complex procedures. These procedures included driving pitons into the station's skin where there were no handrails, cutting through the hull to access the failed line, replacing a valve, bypassing the faulty line, and testing the system.

A couple of weeks later, the cosmonauts went out on another EVA to perform a planned task: adding supplementary solar power panels to the existing panel array to increase the space station's power to 6,000 watts from 4,000.

Regardless of the nations involved, or the financial and political merits of launch systems such as the Shuttle, the concept of manned spaceflight stands on its own. The future of humanity in space depends on having humanity itself out there. Not too many years ago, supporters of this position had to defend it largely on faith, and on historical precedents based on analogous earth explorations. With more and more examples of human beings putting space missions back on the scoreboard when the machines drop the ball, this is no longer true.

* * *

Update: Starstruck, Inc.:

Starstruck, Inc. of Redwood City, Calif., continued its reorganization process by holding an auction on December 13th. After the August 3rd test launch, the company began reorganizing. In the process, all but about ten employees were laid off, and the Board of Directors underwent a change of personnel (C.S.R., Oct. 1984, pp. 5-6).

During the reorganization review process, the company concluded that some hard assets of the company needed for the preliminary phases of the Dolphin launch vehicle project were no longer needed. The auction was intended to convert these assets, including machine tools, electronics, test equipment, and office furniture,

into much-needed cash.

After the auction, Starstruck intends to proceed with the development of its Constellation launch vehicle, which will be designed to launch communications satellites into geosynchronous orbit at a lower cost than existing systems. Steps in this process include simplifying the company's existing financial status by converting R & D limited partnerships into equity holdings, and finding a new top executive (Tucker Thompson is presently filling in as company president).

Publications Info

New Book on Missile Defense:

A new book is out on strategic defense systems, space-based and otherwise. The title is Mutual Assured Survival, written by Jerry Pournelle and Dean Ing. Based on a report from the Citizens Advisory Council on National Space Policy, the book emphasizes the need for a defense against ballistic missiles and successfully rebuts arguments against such a system (including the ubiquitous one which insists that a system which is not 100% impenetrable is useless).

The book is scientific and well-written, and includes information submitted by a number of experts in the field who attended the Citizens Council meeting which generated the report (as one example, the Appendix includes Maxwell W. Hunter's famous "Halloween Paper" on laser defense systems. Published October 31, 1977, this paper helped to spark early interest in space-based ballistic missile defenses).

I recommend Mutual Assured Survival to anyone who is looking for ammunition to use against those who oppose any form of defense against nuclear missiles. The book is published by Baen Enterprises, 8-10 W. 36th St., New York, NY 10018, and is available for $6.95 from most bookstores.

Newsletter Sale:

Space Business News, the biweekly newsletter on space commercialization published by Pasha Publications (1401 Wilson Blvd., Suite 910, Arlington, VA 22209, subscriptions: $295.00/yr.) has recently bought out another commercial space newsletter, Space Enterprise Today, which was being published monthly by Phillips Publishing, Inc.

Until next time,

Tom Brosz

The Commercial Space Report (C.S.R.) is published monthly, and endeavors to report and analyze developments in the field of private initiatives in space transportation and exploitation.

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