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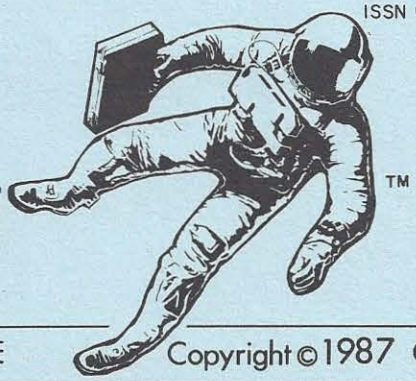
THE COMMERCIAL SPACE REPORT



A MONTHLY NEWSLETTER ON FREE ENTERPRISE IN SPACE

Volume 11, No. 1 January, 1987

McDonnell Douglas Wins MLV Contract

McDonnell Douglas Corp. has won the Air Force's contract to build the Medium Launch Vehicle (MLV), an expendable launch vehicle (ELV) with the primary mission of launching the military's Navstar Global Positioning Satellite system. This contract is the second phase of a competition which the Air Force began last year (C.S.R., July 1986; Aug. 1986). The other participants in the competition (along with their launch vehicles) included General Dynamics (Atlas/Centaur), Martin Marietta (Titan 34D), and a team comprised of Hughes Aircraft and Boeing Aerospace (Jarvis). The Jarvis was later eliminated from the competition.

The initial portion of the new contract is worth $316.5 million, which covers the cost of building and launching seven MLVs. The Air Force also has an option to buy 13 more vehicles, which would bring the total value of the contract to over $669 million. Performance bonuses of up to $3 million per launch could raise this total by yet another $60 million.

McDonnell Douglas' MLV concept involves a series of upgrades to the company's Delta launch vehicle to create the Delta II (see illustration on page 2). The GPS mission requires the MLV/Delta II to place Navstar satellites into a 10,900 nautical mile, 55-degree orbit. The Delta II upgrades required to launch the first nine Navstar satellites include a modified PAM-D upper stage and improved Castor 4A strap-on solid-fueled motors. After these first nine, the remaining Navstars will be heavier, and to launch these the Delta II will need further modifications including graphite filament-wound cases for the Castor motors, and an extension of the Delta's first stage liquid propellant tanks.

The current schedule calls for McDonnell Douglas to launch one Navstar in 1988, six in 1989, seven in 1990, and six in 1991.

The MLV contract is a major boost for McDonnell Douglas' commercial launch activies. The more launch vehicles that a company can produce, the lower the cost per vehicle tends to be. Building the large number of Deltas required by the Air Force contract should make it possible for McDonnell Douglas to lower considerably the price of commercial Deltas produced on the same production lines. This would make a commercial Delta more competitive with the Ariane and other ELVs.

Conversely, increased commercial Delta production would also tend to reduce the per-vehicle costs to the Air Force. Naturally the Air Force wishes to encourage this mutual back-scratching, and has specified as part of the contract that the winner actively market the MLV to commercial customers.

The Air Force cited three major reasons for selecting McDonnell Douglas for the contract:

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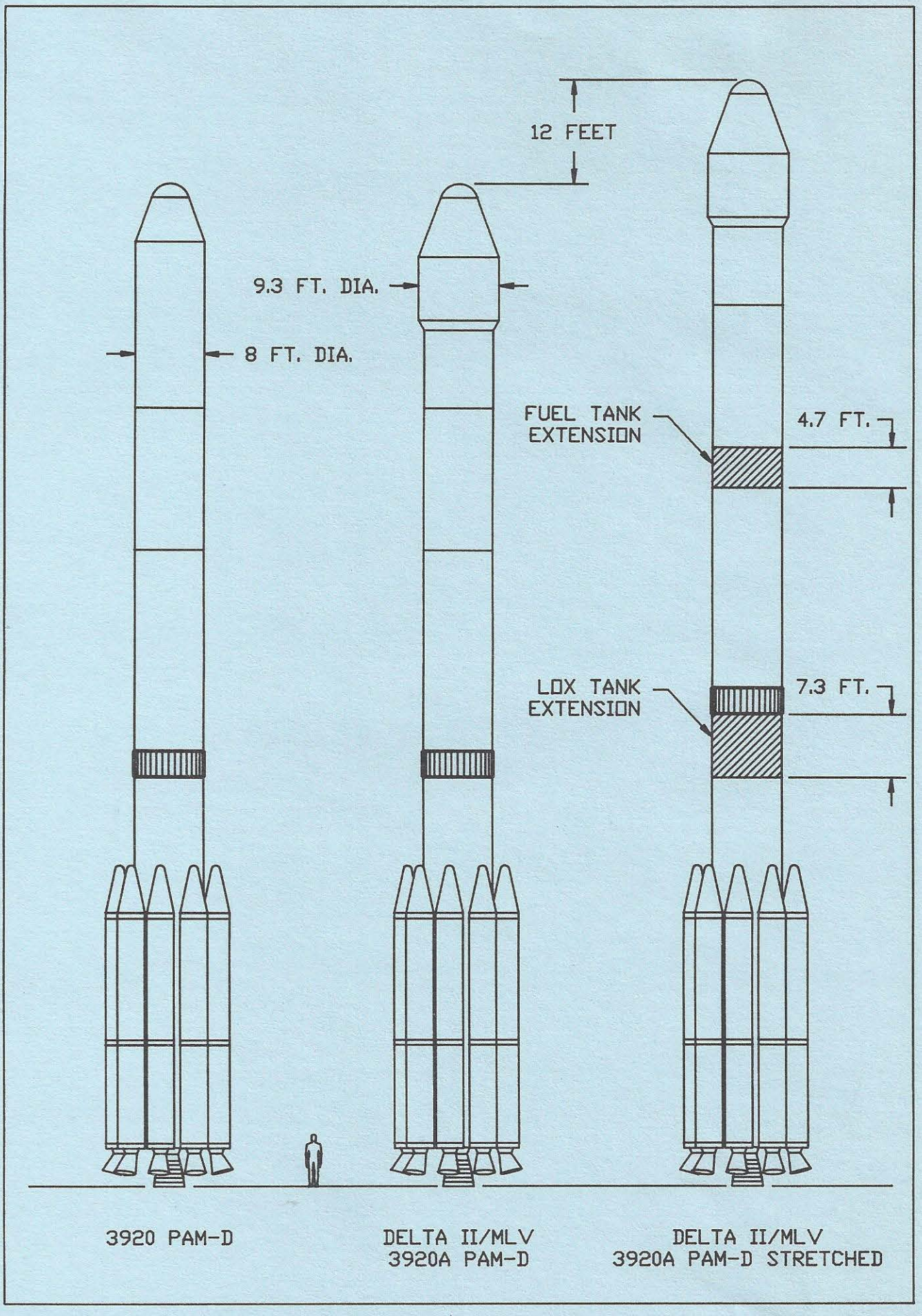

12 FEET
9.3 FT. DIA.
8 FT. DIA.
FUEL TANK EXTENSION
4.7 FT.
LOX TANK EXTENSION
7.3 FT.
3920 PAM-D
DELTA II/MLV 3920A PAM-D
DELTA II/MLV 3920A PAM-D STRETCHED

1. Deltas are inexpensive (relatively speaking, of course). A $669 million contract for 20 vehicles averages out to $33.45 million per rocket. This is a good price on today's launch market--cheaper than both the Atlas and the Titan, and competitive with Europe's Ariane. Although McDonnell Douglas has not publicly discussed the price of commercial Delta II flights, it will no doubt be comparable to what the Air Force is paying for the launch vehicles.

2. Deltas have a high launch rate. The Delta can fly as often as once a month. This high rate permits the Air Force to launch up to seven Navstars a year, yet leave room for at least five commercial launches to help keep costs down.

3. Deltas are reliable. Of the past 45 Delta launches, only one has failed (the GOES satellite launch in May). This adds up to a reliability rating of 97.7%, which is excellent for an expendable launch vehicle.

McDonnell Douglas' commercial launch business has already been improved by the MLV award. Four commercial satellite customers (the International Maritime Satellite Organization, the American Satellite Co., and Comsat, with two satellites) had earlier signed up for Delta launches on the condition that McDonnell Douglas land the Air Force contract.

Transpace Carriers Inc. (TCI), which had such a rough time with NASA trying to commercialize the Delta (C.S.R., Oct. 1986), is having better luck working with McDonnell Douglas.

In December, TCI signed a memorandum of agreement with McDonnell Douglas to work out an arrangement whereby McDonnell Douglas would take care of military and NASA procurement of Delta flights, while TCI handled commercial customers. Naturally, TCI is enthusiatic about the MLV award, and (although final arrangements are still pending) expects to enter a positive and profitable relationship with McDonnell Douglas (go for it, guys!)

Although the MLV contract gives the Delta a commercial boost, McDonnell Douglas is nowhere near to monopolizing the ELV market. For one thing, there are many satellites that are too heavy for the Delta, so Titan and Atlas are not by any means out of the commercial launch business, but this is not the only factor.

There are more than enough payloads to go around, according to an article in the January 23, 1987 Wall Street Journal (p. 6). Even assuming that Ariane can fly 16 satellites per year, and the Delta can fly 18 (a very high rate of launch for both), the article states that this would still leave up to 10 commercial satellites per year that would need to make other arrangement.

It sounds like a good time to be in the launch vehicle business.

* * *

Manned Space Flight: Only For The Few?

Twenty years ago, on January 27, 1967, a disastrous spacecraft fire on the Apollo launch pad took the lives of three astronauts, Virgil (Gus) Grisson, Edward White, and Roger Chaffee. Their deaths cast a pall over NASA and America's space program. Yet, only two and one half years after this tragedy, Neil Armstrong took the first steps on the moon in what was arguably NASA's greatest triumph.

One year ago, on January 28, 1986, the Space Shuttle Challenger exploded in flight, ending the lives of seven astronauts and again paralyzing America's space

program. However, NASA will be fortunate if less than two and one half years passes before the next Shuttle even gets off the ground, to say nothing of any major new steps in space.

Despite some progress on the technical front (C.S.R., Nov. 1986), there is no sign that anyone is addressing NASA's real problems: the basic concepts, policies and goals that predated the Shuttle accident and show no signs of being changed.

True, NASA has been forced to give up some of its cherished fictions: that the Space Shuttle can pay for itself with commercial payloads, and that the Shuttle is a safe, routine "bus ride" to space--a fully operational, non-experimental transportation system. Still, the space agency continues to foster other notions.

Chief among the remaining fictions is the one which presents NASA, the Space Shuttle, and the Space Station as the only means by which Americans will ever be able to work and live in space.

A close examination of this vision of America's future in space is not too encouraging: a Space Shuttle orbiter currently costs approximately $2 billion per copy, and takes years to build. There are three such orbiters--eventually there will be a fourth to replace Challenger. There are no plans for a fifth.

The Space Station is not doing well. The design is undergoing a number of changes, and has not yet settled down to a specific price or configuration. Unfortunately, the trend seems to be towards more money (numbers as high as $13 billion have been mentioned) and less space station (configurations supporting as few as four inhabitants have been discussed).

Shuttle support of the Space Station is horribly expensive. Each launch of a Shuttle to the Station--to resupply fuel and other expendables, transfer personnel, pick up or deliver equipment, or just haul up fresh fruit--costs approximately a quarter of a billion dollars. Such a launch may take place (with a great deal of luck) maybe once a month. More likely the immensely complicated vehicle will suffer from a host of problems that will make such trips either less frequent or more risky. Possibly both. (NASA is now investigating ELVs for unmanned delivery missions to help reduce costs, but this is a sensitive subject. Sooner or later someone is bound to ask what the hell the Shuttle and Space Station can do that couldn't be done by Skylab-type space station clusters and ELVs such as the now-defunct Saturn launch vehicles. An embarrassing question for NASA, which may warrant a future article of its own).

These costs and others will raise the price of keeping people working and living in space far beyond reason. Although I can obtain no specific numbers, it is obvious that each of a half-dozen or so Space Station crew members will burn, in the course of a single working day, a quantity of money that would make Louis the Sixteenth look like Jack Benny.

This scenario makes space the playground of an elite few, selected no doubt by the type of criteria that made Senators and Representatives the first "civilians" in space.

It does not represent the type of large-scale human activity in space that I want to see--and see soon, not fifty or one hundred years from now.

To put Americans--and humanity for that matter--into space on the scale that will truly make it a human environment will require tranportation and habitation solutions that are designed to get the job done, not ones that are designed to employ the maximum number of NASA researchers and contractors for the maximum amount of time, mollify thickheaded politicians, protect bureaucratic jobs, and roll pork

barrels hither and yon across the width of the continent.

Other governments have their own solutions for manned space flight. The Soviets plod ahead using expendable launch vehicles, but I am not willing to pay the price the Soviets pay for their efficient long-range space planning. Other countries have proposals for future reusable launch vehicles, including the European Space Agency's Hermes, Britain's HOTOL, Germany's HORUS, and Japan's shuttle (all of which I plan to follow up on in more detail in future issues).

Unfortunately, these proposed systems will still be prohibitively expensive and inaccessible to most people. Despite attempts to avoid the mistakes made on the Shuttle, they are all still government projects, and will all be developed with the disregard of market forces that is typical of such projects. Much the same can be said of the only other rabbit left in NASA's hat--the proposed U.S. reusable Spaceplane.

The only workable alternatives are going to be those developed by the private sector, with the needs of the space market first in mind. Chief among these needs are low cost and easy access, something which has never been and will never be provided by the Shuttle and its future kin.

The private sector has its own solutions for manned space flight. Although companies have been recently emphasizing expendable launch vehicles (what the market demands at this time), concepts such as Pacific American's vertical-take-off-and-landing Phoenix and Third Millennium's winged Space Van are still alive and well, and there are no doubt many other such ideas waiting in the wings.

Many individuals, including commercial customers, scientific researchers, and those who are simply enthusiastic about space, had little chance of getting aboard the Shuttle even before the Challenger accident. Their chances are almost nonexistent now--NASA's loss of innocence has resulted in reduced schedules and tighter restrictions on those who will be selected to go.

It will be up to the private sector to provide access to space for these people. The government has fallen down on the job.

The Fight To Get Into Space

People ask me why I push so hard for cheap, accessible manned space systems. I hear from, or hear about, so many people who want to go--who have cherished spaceflight as a dream since childhood. These people are characterized by an enthusiasm and determination that has weathered years of disappointments and stood up against numerous calls for an end to a human presence in space. Among this group are those with a special courage: the ones who will fly the Shuttle again in the face of the Challenger's destruction.

Five astronauts have already been selected for the next Shuttle flight (scheduled for February, 1988, although delays will almost certainly result in a later launch date): Commander Frederick H. (Rick) Hauck, Pilot Richard O. Covey, John M. (Mike) Lounge, George D. Nelson, and David C. Hilmers. All are veterans of previous Shuttle flights.

It is worth noting that, despite the horrible fate of the last Shuttle crew, and the recognition by all concerned that the Shuttle is now and will always be a dangerous experimental vehicle, competition to be selected as one of the crew members aboard the first post-Challenger flight was reportedly fierce and eager. Obviously, although a number of modern astronauts no longer have backgrounds as test pilots, there is still no shortage of the Right Stuff.

Some may say such an attitude in the face of danger is just "part of the job" for an astronaut. Those who know astronauts personally (or for that matter soldiers, policemen, firemen, and others who continually endanger themselves as part of what they do) know that bravery in the face of danger is no easier just because it is "part of the job."

In any case, this courage is not restricted to the regular corps of astronauts--there are also civilians such as elementary school teacher Barbara Morgan who seem to have more than their share. Barbara Morgan, selected as part of the group of 10 teachers which had the chance to go aboard the Shuttle, was schoolteacher Christa McAuliffe's backup for the fateful flight of the Challenger. She worked closely with McAuliffe and the other Challenger crew members through months of training, and came to know them as friends. Then she watched as they all were annihilated before her eyes. But for a whim of chance it would have been her.

Yet Barbara Morgan has gone on record as supporting the manned space program, the Shuttle, and NASA. She went on tour to support the space agency (a move that caused some to label her a NASA stooge), and lobbied for continuation of the Teacher In Space program. Despite her admitted fears, she still wants to go, and those who know her say she means it.

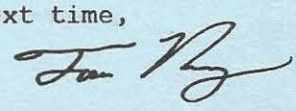
She will not get the opportunity. As mentioned earlier, NASA has become much more restrictive about who will fly on the Shuttle, and, despite Morgan's efforts, the "Civilian In Space" program that put Senators and Congressmen in orbit, and led to the death of Christa McAuliffe, is a casualty of this new policy. NASA Administrator James Fletcher has said that no more civilians will fly on the Space Shuttle, and, despite the disappointment of those involved, the decision is probably a wise one under the circumstances.

The cancelling of the program does not diminish the courage of Morgan and others like her. They wanted to go before they knew the program was defunct, and most still would if given the chance, despite the Shuttle's dangers.

I hope that Barbara Morgan will get her chance someday, along with all the rest of the people--astronauts, teachers, and many, many others--who will never give up until they have touched mankind's last frontier for themselves. I also hope that they will be aboard a vehicle which is safer, cheaper, and more reliable than the Space Shuttle. I get the firm impression though, that these individuals would still be standing in line to go even if the space vehicle were the hollow artillery shell of Jules Verne's great cannon Columbiad.

It is the knowledge that such people are out there that makes the long, hard fight to bring spaceflight within everyone's reach more than worthwhile.

Until next time,



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