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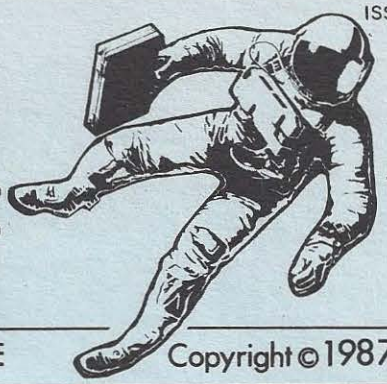

A MONTHLY NEWSLETTER ON FREE ENTERPRISE IN SPACE

Volume 11, No. 2 February, 1987

Investment Firms Express Interest In Private Launchers

Space Services, Inc.:

Space Services Inc. (SSI) of Houston, Texas has succeeded in attracting the interest of a local investment firm.

Development Ventures, Inc., a Houston-based venture capital firm, has purchased warrants from SSI. Development Ventures will, at some future date, be able to convert these warrants into equity in Space Services. Development Ventures, Inc. is a wholly-owned subsidiary of Houston Industries Inc., a holding company which also owns six other subsidiaries in fields such as utilities, cable television, oil, and others.

The amount of money involved in these transactions has not been released, but one source states that conversion of the warrants could result in SSI receiving as much as $30 million in capital.

Development Ventures has also not specified any milestones that SSI must accomplish before the warrants are converted. The investment firm will only say that it will keep a close eye on SSI's progress.

SSI is happy with the deal--it means some cash in the company, and enhances SSI's credibility with potential customers.

American Rocket Company:

An SSI competitor, the American Rocket Company of Menlo Park, Calif., is also seeking capital for its hybrid launch vehicle (C.S.R., Sept. 1986, pp. 2-4). Two investment banking firms, First Boston and McLeod Young Weir, Inc., have expressed interest in working with AMROC as brokers, but apparently no agreements have yet been signed.

AMROC and SSI are both chasing a market for 3,000 lb. payloads in low earth orbit. Unlike the well-known market for geosynchronous communications satellite launches, customers for this category are not as easy to identify. Although the two companies each claim to have a number of potential customers waiting in line, they are (quite naturally) reluctant to divulge any names. It does appear that government and Defense Department payloads figure prominently in early launch plans for both firms.

Soviet Launch Failure

The Soviet Union suffered a major launch vehicle failure last month when the upper stage of an SL-12 Proton booster failed to fire on cue after it had reached low earth orbit. The Soviet communications satellite on board, which was to have

been boosted to geosynchronous orbit, instead fell back into the atmosphere and was destroyed.

The Proton, the Soviet Union's most powerful operational launch vehicle, is capable of placing 44,000 lbs. into low earth orbit or 4,400 lbs. into geosynchronous orbit. The geosynchronous configuration of the Proton has four stages. The first three stages burn storable propellants (nitrogen tetroxide and unsymmetrical dimethylhydrazine). The fourth stage burns liquid oxygen and kerosene, and it is in this stage where the failure apparently took place.

After the recent rash of launch vehicle failures in the West, the U.S.S.R. had begun developing a somewhat smug attitude about its own successful space program--even to the point of televising launches live. This attitude was similar to the one that Arianespace had been developing just after the string of launch failures in the U.S.--and just before Ariane V18 bought the farm (there is an old school of thought claiming that nobody spits in Murphy's eye and gets away with it).

The Proton failure puts a distinct crimp in the Soviet Union's efforts to market the Proton commercially in the West. The Soviets had been touting the excellent 93% success ratio of the Proton (which last failed in 1982).

Aware of this, the Soviets at first attempted to hush up the incident, originally claiming that the failed communications satellite was in fact a payload intended for low earth orbit. Eventually the facts of the matter came out.

Nevertheless, the U.S.S.R. intends to make a quick recovery from this setback, and continue its intense sales efforts. In 1985 the Soviets formed a new space organization, called Glavkosmos, which was put in charge of organizing cooperative space efforts between the Soviet Union and other countries. Glavkosmos was also charged with marketing Soviet space capabilities, including the Proton launch vehicle.

Key to the Soviets' Proton sales pitch is the low price. Glavkosmos has offered to launch the Inmarsat satellite for $24 million, about half the price of an Ariane flight (so far Inmarsat has not taken them up on their offer). In addition, Glavkosmos has offered launch insurance at low rates, and has promised short lead times for satellite launches.

Despite the attractive prices, the Soviets are having difficulty selling their satellite launch services. One major problem is an unwillingness on the part of Western customers to place their high-technology payloads in Soviet hands, even temporarily. The Soviets have gone far out of their way to reassure potential customers in this area, offering guarantees that the satellite could remain sealed until launch, and that customers would be allowed to observe proceedings.

Soviets Continue Development of Mir Space Station

Two cosmonauts were launched into orbit on February 6 to rendezvous with the Soviet "Mir" space station. The goal of the new crew: continue the Soviets' effort to expand their manned presence in space by enlarging the Mir and maintaining it as a full-time, active facility. In the process, the crew will attempt to set a new endurance record of ten months in space. The cosmonauts docked with the Mir, joining an unmanned Progress 27 module (containing provisions, air and propellants) that had been launched and docked to the space station early in January.

Cosmonauts Colonel Yuri Romanenko and Alexander Laveikin flew a new version of the Soyuz, the TM version. Structually the same as the old version, the Soyuz TM incorporates a number of design refinements. A lighter weight escape system allows the new Soyuz to carry 400 more pounds into orbit. In addition, a lighter parachute

system allows the return of up to 300 lbs. more material from orbit back to earth--material such as experiment results or materials processing products. A new propellant tank allows the Soyuz to remain parked on orbit for longer periods of time without degrading the spacecraft's performance--important for the long stays at the station planned for the cosmonauts. Improved docking electronics allows the Soyuz to dock with the Mir without the space station having to use its own precious station-keeping propellants to assist with the docking procedures. This latter feature is important, because the Mir is going to get considerably larger and heavier.

The Soviets plan to launch several large expansion modules over the next few years which will attach to the Mir to create a facility which would eventually weigh as much as 200,000 lbs. (the current Soyuz/Mir/Progress cluster weighs about 72,000 lbs.)

The first such module will be a 40,000 lb. science and astrophysics facility containing a number of X-ray experiments. This module will be launched sometime in late March or early April, probably on a Proton booster (since low earth orbit Proton missions do not use the geosynchronous fourth stage, the vehicle's recent launch failure will probably not affect Proton launches supporting the Mir space station).

This module is significant in that a number of the experiments on board were built by Western European scientists. Glavkosmos is encouraging Western scientists to make use of the Mir facility, putting Mir in direct competition with the proposed U.S. Space Station, and Europe's own Columbus space station module. The Soviets are offering space station services such as electrical power, access to materials processing furnaces, sample return capability, and manual operation of experiments that require it. Prices for these services are not available but are expected to be low.

A second module, similar in size to the first, will contain a large Earth observation camera. This module will be launched sometime in late 1987. Other modules which will be attached to the Mir include power modules with additional solar arrays, and modules containing more living quarters.

The Mir currently has six docking ports. One is located on one end of the main station. The other five ports are located on a ball-shaped docking module on the other end of the station--one port on the end of the docking modules, along the station's axis, and four others equally spaced around the side of the docking module. Standard docking procedure for the new expansion modules will be for the module to be first docked on the end port of the docking module. A remote manipulator arm mounted on the Mir will then be used to move the expansion module to one of the side ports.

Data transmission from the Mir will eventually be relayed through geosynchronous satellites, in much the same way as American space missions will use the Tracking and Data Relay Satellite System (TDRSS). The Soviets had one such satellite, Cosmos 1,700, but it failed, leaving the Soviets to use ground stations and ships to maintain contact with the station.

It is possible that the satellite on board the failed Proton booster was a replacement for the Cosmos 1,700, in which case the Soviets may be using ground stations for some time.

Update: U.S. Expendable Launch Vehicles

While the Soviets are taking their turn under the unwelcome launch failure spotlight, American expendable launch vehicles continue their recovery from their own failures.

Titan:

The Air Force launched a Titan 3B from Vandenberg Air Force Base on Feb. 11, the first Titan launch since the Titan 34D failure last April (C.S.R. May, 1986, pp. 1-2). The nature of the military payload was not released, but it was probably an electronic reconnaissance satellite launched into a polar orbit.

Although this launch was important, the most critical part of the Titan's road to recovery has yet to come. The failure of the last Titan 34D was traced to the solid rocket boosters used on that configuration, and these auxiliary boosters are not used on the Titan 3B. The real test of whether the Titan is fully operational must await the completion of the program which is underway to recertify the Titan solid boosters. After that, when a full Titan 34D flies (no date for this flight has been set), we will know for sure that the Air Force's workhorse is back on line, and Martin Marietta is back in the satellite launch business.

Delta:

On February 26, a Delta launch vehicle successfully launched a $55 million weather satellite, the first successful launch for NASA in 1987.

The GOES-H (Geostationary Operations Environmental Satellite) is a critical addition to the United States' weather forecasting and warning capability. There is currently only a single GOES satellite in orbit. That satellite, GOES-6, was left alone on watch when others of its kind failed on orbit. It has been wearing itself out moving back and forth in its geostationary orbit over the Midwest, trying to keep an eye on the entire United States and the oceans off both coasts. A satellite intended to help out, GOES-G, was lost when Delta 178 went out of control and had to be destroyed last May (C.S.R., May 1986, pp. 1-3).

With a new satellite on the job, the original satellite's geostationary orbit will be adjusted westward and the satellite will be "parked" over the Western United States, where it can watch that portion of the country as well as a much larger area of the storm-generating Pacific Ocean than was visible to it before. The new satellite will be stationed over the East Coast to perform the same service for the Eastern U.S. and the Atlantic Ocean.

The GOES satellites and other weather observation satellites have been instrumental in saving lives and property over the years--one of many benefits from space that receives far less praise than it is due.

Until next time,

Tom Rg

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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