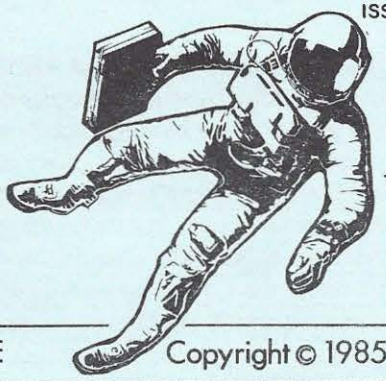
ISSN 0735-9314

THE COMMERCIAL SPACE REPORT



A MONTHLY NEWSLETTER ON FREE ENTERPRISE IN SPACE

Volume 9, No. 6 June, 1985

Starstruck Down, Not Necessarily Out

Starstruck, Inc. seems to have gone into the corporate equivalent of a state of hibernation. The phone is answered by a recorder, and the employees have been cut to a skeleton staff. The large building which housed the assembly facilities for the Dolphin launch vehicle has been put up for lease, although the remnants of the company have reportedly retained a small office in the back of the building.

However, Starstruck plans on getting back into the business within a year or so. The company is seeking about $1.5 million in initial financing to carry it through to the final design of its Constellation multiple-module satellite launcher. More money would be needed for actual development.

Starstruck is negotiating with former company president Michael Scott on the status of the approximately $7 million that Scott invested in the company. Negotiations are apparently proceeding on a cordial basis.

Many former employees, including some of the engineering staff, remain interested in Starstruck, and may be available for rehire should the company get back on its feet.

There may be some technical changes in the vehicle based on the company's experience with the Dolphin test rocket (C.S.R. Aug. 1984, pp. 1-2). The ocean launching idea is definitely up for review--much of the aggravation during the Dolphin test program stemmed from having to haul the rocket over 200 miles offshore in the Pacific Ocean for each test. However, the controversial hybrid engine concept (liquid oxidizer and solid fuel) will remain the centerpiece of Starstruck's rocket designs.

Company Promoting Space Tourism

A company called Society Expeditions has announced preliminary plans for orbital sightseeing tours beginning sometime in the 1990s. "Project Space Voyage" will carry up to thirty passengers at a time into low earth orbit for a three day excursion. Society Expeditions, located in Seattle, Wash., is a travel firm specializing in exotic locations on Earth. The company has sponsored trips to places like Antarctica, Easter Island, and the Northwest Passage, among others.

Initial plans call for development of a pressurized passenger module which would be carried in the cargo bay of the NASA Space Shuttle. When the cargo bay doors open in space, windows in the module would allow passengers a full view of the Earth and space. Passengers would be required to be in good health, and would undergo a certain amount of training before the flight.

Society Expeditions would not handle module development themselves, but would probably lease the module from the builder. One company planning development of

just such a module is Orbital Adventures, also located in Seattle. Orbital Adventures has already been in contact with potential manufacturers, including Italy's Aeritalia, which builds modules for Europe's Spacelab. Society Expeditions is not the only potential customer for any future passenger module--Orbital Adventures has received expressions of interest from other travel agencies such as Lindblad Tours.

A problem with the Shuttle-based tours is cost--prices are presently estimated at about $1 million per passenger. Development costs of the module range from $30 million to over $100 million, depending on who you ask.

With lower prices in mind, Society Expeditions is also investigating some of the launch vehicles proposed by private companies. These include Third Millennium Inc.'s "Space Van" (see article later in this issue) and Pacific American Launch Systems' "Phoenix" (C.S.R. Oct. 1984, pp. 1-5).

Use of low-cost launch systems could bring the price per passenger to $50,000 or less, a sum within the reach of a much larger market. This could increase the number of flights from the presently planned three to five per year to several flights per month.

The development of private space tourism has the potential of allowing many more people access to space than the rather sedate manned spaceflight schedule planned by government space programs.

Society Expeditions is not accepting any deposits as yet, but is assembling a mailing list of seriously interested people. Contact: Coke Mead or David Rosen at Society Expeditions, 723 Broadway East, Seattle, WA 98102 (800) 426-7794.

Update: Third Millennium, Inc. and Space Van

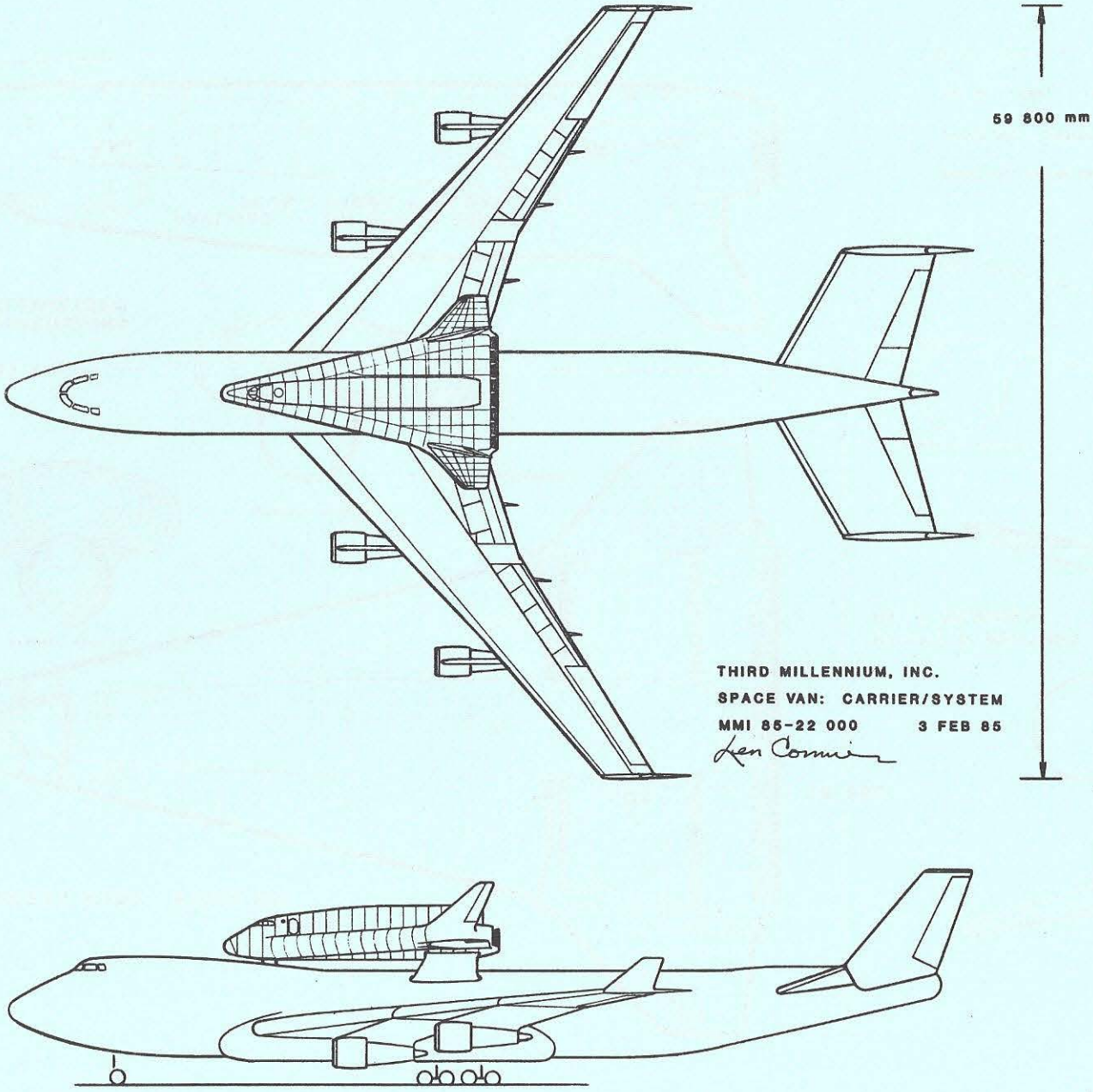
Third Millennium Inc. (MMI) has announced some technical improvements in its proposed "Space Van" launch vehicle. Space Van is a winged orbiter vehicle similar to the Space Shuttle, but much smaller (see illustrations on pages 3 and 4). The vehicle is powered by eight modified General Dynamics RL-10 liquid oxygen/liquid hydrogen engines (the RL-10 has seen a considerable amount of space service on General Dynamics' Centaur upper stage) and is designed to be launched from the back of a modified Boeing 747 jet aircraft.

Alone, the Space Van orbiter has a payload capacity of 800 kg. (1,764 lbs.) into low earth orbit. Addition of an upper stage called the "space stage," contained in the orbiter's cargo bay, increases the payload to 3000 kg. (6,614 lbs.) Refueling a space stage placed in orbit permits the launching of payloads into geosynchronous orbit and beyond.

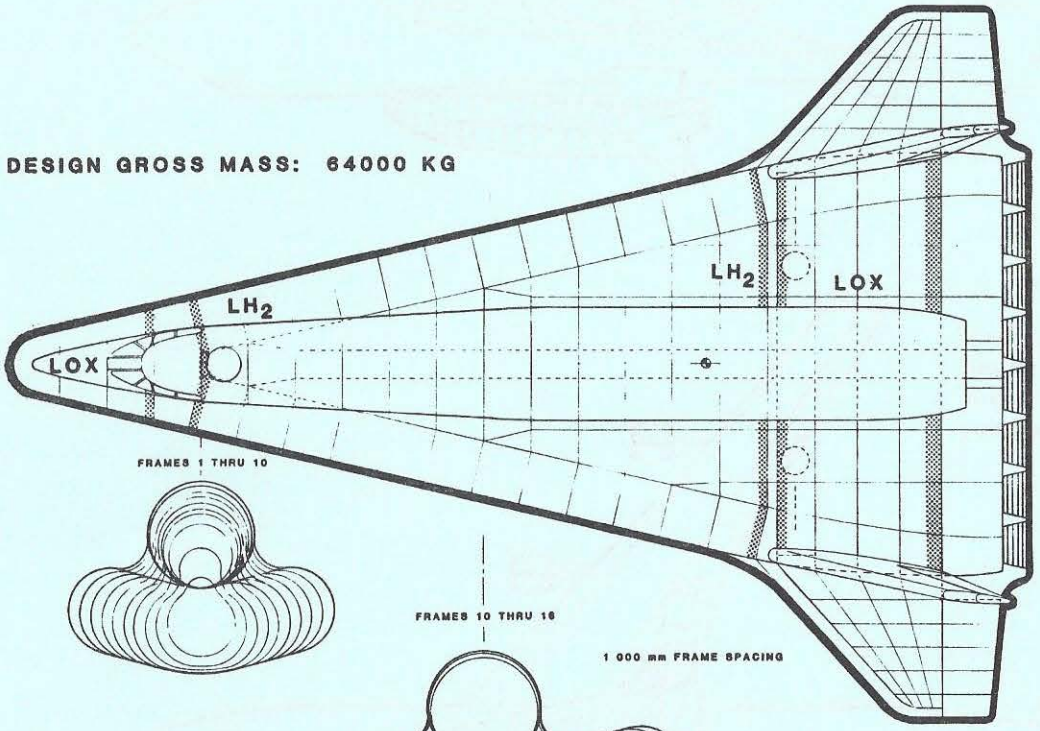
One technical improvement involves the space stage. Originally, the space stage was designed to be mounted partially outside the orbiter's cargo bay in such a way as to permit its two RL-10 engines to be used during launch in a sort of "stage and a half" mode. In the newer version of Space Van, the orbiter's flight operation is separated from that of the space stage and allows the space stage (now with only one engine) to be completely enclosed in a new, larger cargo bay (39 feet long by 7.2 feet in diameter). Other improvements include aerodynamic changes in the 747 used to launch the orbiter, such as twin verticals and enlarged horizontals on the tail.

MMI emphasizes the flexibility which results from a low-cost reusable vehicle capable of rapid turnaround (less than 10 days) and frequent flights. Such systems are less vulnerable to scheduling problems, and result in short lead times for payload customers (less than a month), and, of course, lower launch costs.

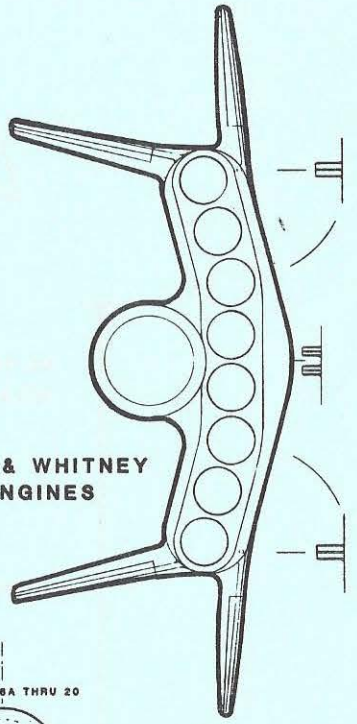
(TEXT CONTINUED ON PAGE 5)


59 800 mm
THIRD MILLENNIUM, INC.
SPACE VAN: CARRIER/SYSTEM
MMI 85-22 000 3 FEB 85
Ken Conmin

DESIGN GROSS MASS: 64000 KG



15 000

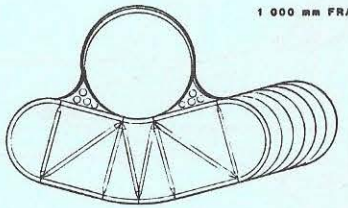


PRATT & WHITNEY
RL10 ENGINES

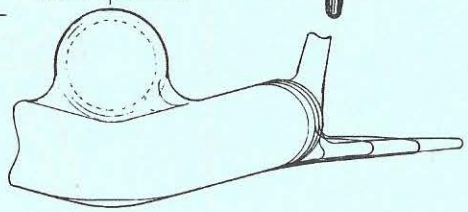
FRAMES 1 THRU 10

FRAMES 10 THRU 16

1 000 mm FRAME SPACING

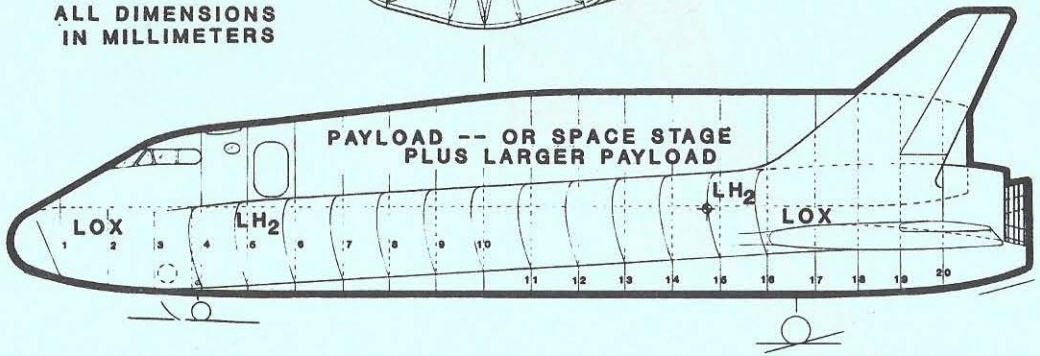


FRAMES 16A THRU 20



21 500

ALL DIMENSIONS
IN MILLIMETERS



THIRD MILLENNIUM, INC.

SPACE VAN -- ORBITER STAGE

MMI 85-21 000 13 JAN 85

Len Cormier

Estimated launch prices for a 3,000 kg. payload into low earth orbit should range from $1.9 million to $10.3 million depending on traffic levels. Prices for similarly sized geosynchronous payloads should range from $7.5 to $40 million.

Development costs of the Space Van are estimated at approximately $600 million for construction of a three-orbiter fleet (the actual cost of only three NASA Space Shuttle flights!) Development money is expected to come from sales of stock.

Update: Geostar, Other Private Satellite Navigation Companies

Geostar, Inc. is ahead of schedule on its plans to place satellites in orbit for navigation and limited message services. The Princeton, N.J. company originally intended to launch its first satellite in 1987, but the first GSTAR satellite should enter geosynchronous orbit in early 1986. The system will eventually use three satellites, which are being built by RCA Astro-Electronics and will be launched by GTE Spacenet on either the Shuttle or Ariane.

Using a mobile transceiver, Geostar customers will be able to ascertain their positions in the United States within a few feet. Additional planned services include transmission of messages up to 32 characters, paging services, limited remote data transmission, alarm services, and emergency location.

Geostar recently filed a proposal with the Federal Communications Commission (FCC) for their system. Also filing were three other companies developing similar systems: Omninet Corp., Los Angeles, Ca.; MCCA American Radiodetermination Corp., Jackson, Miss.; and McCaw Space Technologies, Inc., Bellevue, Wash.

Despite certain technical and operational differences, all of these companies use the same basic concept: an operator, using a portable transciever, transmits a signal to several satellites in orbit which relay the signal to a central processing station located elsewhere in the U.S. Comparision of the signal transmission times from the widely spaced satellites can be used by the central processing station to calculate the transceiver's position, which is then relayed back to the operator.

An existing government system called Navstar also uses satellites, but its mobile stations operate in a receive-only mode, with each of them containing all the necessary equipment to do the position calculations (this is important in the military situations for which Navstar was designed--a signal broadcast from a user could reveal his position). However, Navstar signals are available for civilian navigation purposes at no cost to the user except for the receiver. (One of the private companies, Omninet, uses a combination of its own satellites and Navstar signals.)

Private radiopositioning companies hope that their simpler transceivers will be inexpensive enough to make up for the satellite usage fees they will charge (planned transceiver prices range around $500.00) Still, Navstar may be heavy competition. Advances in microcircuitry are making Navstar receivers cheaper all the time, and it is estimated that by the time the private systems come into operation (the late 1980's) such receivers may cost less than $1500. But, in the face of such subsidized competition, the private companies can still succeed by emphasizing those previously-mentioned message and data services which depend on the ability to transmit information from users to a central processor and back.

A detailed technical discussion of these proposed systems appears in Aviation Week and Space Technology (June 3, 1985, pp. 371-379).

NASA and Hughes Planning Rescue of Leasat

NASA, along with the Hughes Aircraft Co. plans an in-orbit repair of the Navy Leasat which failed to activate after being launched from the Space Shuttle

Discovery last April. An ingenious attempt to activate the satellite during that Shuttle mission failed (C.S.R., April 1985, pp. 5-6).

Plans call for the repairs to be carried out during Shuttle mission 51-I, scheduled for launch sometime in August. Upon rendezvous with the satellite, space-suited astronaut James D. Van Hoften will station himself at the end of the Shuttle's remote manipulator arm and attach a grabber bar to the 7.5-ton satellite, which is rotating at about 1 rpm. He will then manually stop the rotation of the satellite by grabbing the bar intermittently as it spins past. Once this is done, the Shuttle arm can grab the bar and move the satellite to a position over the cargo bay where astronaut William F. Fisher will assist in the repairs.

Unlike other satellite rescue attempts in the past, this one involves a fully-fueled spacecraft: a loaded solid-fueled orbital transfer motor, and a liquid-fueled apogee engine. Although the satellite is assumed safe, it still makes things a bit tricky. Top priority at this point in the repair sequence will be to make sure the Leasat propulsion systems are completely disarmed. First, the astronauts will throw the arming lever (the one that the Mission 51-D astronauts attempted to activate) back into the "safe" position. In addition, Fisher will open an electrical access panel on the satellite and insert plugs which will further insure against accidental firing.

Next, the astronauts will "hot wire" the satellite by opening more access panels and attaching electronic devices and wiring intended to bypass the failed sequencer and permit ground controllers to once again command the satellite.

The astronauts will then release the satellite, and actually spin it up by hand to about 2 rpm to stabilize it. The Shuttle will then leave the vicinity, and ground controllers will make some corrective maneuvers and command the satellite to fire its rockets to take it to its correct geosynchronous orbit.

It is interesting that NASA has become more daring in its methods of satellite repairs in space. This is a positive sign indicating the willingness to assign a more flexible role to man in space--giving astronauts greater freedom to handle situations on the scene without continuously resorting to the obsessive step-by-step choreography which characterizes many NASA missions. Obviously, experience gained on such rescue missions in the past has much to do with this. There has been an improvement as well in the positions taken by satellite manufacturers on satellite rescue missions. It was not so long ago that satellite builders became upset at the very thought of an astronaut manhandling their precious spacecraft. It is likely that a few multi-million dollar losses did much to put a dent in that attitude.

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.

Subscription rates are: U.S., Mexico, Canada: 1 year–$15.00, 2 years–$28.00, 3 years–$39.00. Foreign Air Mail: 1 year–$20.00, 2 years–$38.00, 3 years–$54.00. Back issues are available at $1.50 each from September, 1977. Xerographic copies may be substituted as stocks are depleted.

Address all correspondence to: *Commercial Space Report, P.O. Box 60547, Sunnyvale, CA 94088.* Editor: Tom A. Brosz. Tel: (415) 965-8666. Comments, ideas, or requests for information are welcomed, as are any items which may be of interest to our readers.

LATE BULLETIN

Volume 9, No. 6B June 24, 1985

Third Millennium Reveals New Space Van Booster Concept

Third Millennium Inc. (MMI) president Len Cormier has updated the Space Van design once more by replacing the 747-based booster aircraft with a supersonic boost aircraft designed from scratch.

The boost vehicle would be a winged, reusable aircraft with a length and wingspan of about 115 feet, powered by a combination of two liquid-fueled rocket engines and four air-breathing turbojets with afterburners. Both engine sets would use off-the-shelf hardware. Rocket engines under consideration include the Rocketdyne H-1, originally used in the first stage of the Saturn IB launch vehicle, and the Rocketdyne RS-27, currently used in the first stage of the Delta launch vehicle. A turbojet currently in production will be used for the airbreathers, but possible manufacturers were not disclosed.

In operation, the Space Van orbiter, which has not undergone any further changes, would again be mounted on the back of the boost vehicle. The mated vehicles would be launched vertically, using both the airbreathing and rocket propulsion systems of the booster. Immediately, the vehicles would nose down into a horizontal boost trajectory to take advantage of the lift characteristics of the booster. At about Mach 2.2, the turbojets would cease operation. Soon thereafter, at Mach 2.4, the Space Van orbiter leaves the back of the booster and continues under its own power into orbit. The space stage needed by the original Space Van for larger payloads is no longer necessary.

Current plans call for launch from the deck of a specially designed ship located in the ocean near American Samoa. The ability to move the launch site about 200 miles in any direction allows Space Van considerable flexibility in rendezvousing with objects already in orbit without having to wait for a favorable launch window or make fuel-consuming orbital changes (originally, this launch site mobility was provided by the cruise capability of the 747 launch plane).

The major advantage to this new booster is an increased payload capacity: 2,800 kg. (6,173 lbs.) to low earth orbit. In addition, Space Van now has a usable payload into polar orbit of 1,750 kg. (3,858 lbs.) Launch prices should be about the same as they are now.

Also important: the increased payload without a space stage occupying the payload bay makes the Space Van a viable vehicle for the tourism market, which MMI is actively pursuing. Approximately 14 tourists could be flown into orbit profitably for about $100,000 per person.

According to Cormier, implausible as it sounds, the new supersonic booster should not cost more to develop than it would cost to both modify the 747 and develop the space stage. This remains to be seen, as does the practicality of launching such a vehicle at sea.

* * *