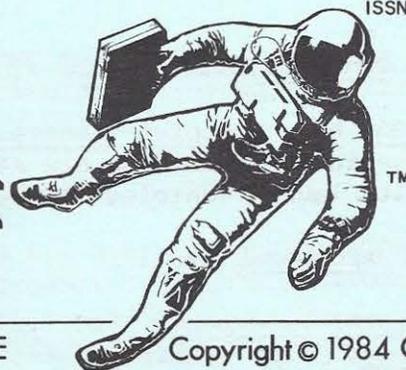


THE COMMERCIAL SPACE REPORT

ISSN 0735-9314



A MONTHLY NEWSLETTER ON FREE ENTERPRISE IN SPACE

Copyright © 1984 C.S.R.

Volume 8, No. 1

January, 1984

Dear Subscriber:

Pages 3 and 4 of this issue contain an updated listing of commercial space transportation companies. Some companies listed are not "private" by strict definition, but are to some extent subsidized by initial government financing, or government materials and services purchased at non-market prices. Still, these companies are listed because of their importance to private space transportation, and/or because they consider themselves commercial operations by their own standards.

* * *

Updates on Space Transportation Companies

Starstruck, Inc.:

Starstruck, Inc., Redwood City, Ca., reported success with its most recent static engine tests, with two 20-second firings of a flight-weight hybrid engine conducted on two consecutive days (Dec. 8th and 9th).

The first firing tested the thrust vector control (TVC) system which will guide the Dolphin rocket in flight. The test was conducted with the liquid oxygen (LOX) tank in a constant-pressure mode, with pressurizing helium gas steadily added to the tank from outside to keep the tank pressure up as LOX was drained.

The second firing took place with the LOX tank in a "blowdown" mode. In this mode, the LOX tank was initially pressurized to about 420 psi. During the firing, no additional pressurizing gas was added, so as the LOX was depleted, the tank pressure and chamber pressure steadily decreased throughout the burn.

The blowdown method will be the one used for the first test launch. It is the simplest way to expel propellants from tanks, but the decrease in chamber pressure as the flight progresses results in steadily decreasing performance. The constant-pressure mode is preferred for most liquid-fueled launch vehicles, and the production Dolphin will incorporate such a pressurization system.

The first flight model of Dolphin is nearly complete, with almost all structural components ready for integration. This vehicle has been designated the D-2 (D-1 was the flight-weight engine used in the two static firings). A second Dolphin (D-3) is also under construction, about a month behind the first.

First flight is scheduled for early February. The vehicle will be launched from the ocean (C.S.R., Nov. 1983, pp. 3-4). The engine will burn for about 20 seconds. The flight will test the Dolphin's ability to fire underwater, and should reach an altitude sufficient to test the guidance and the parachute recovery system (about 2 miles). The avionics package is intended to be reused after a launch, and it is hoped that the engine casings will be able to be reused as well.

General Dynamics:

NASA has accepted General Dynamics' bid to commercialize the Atlas Centaur launch vehicle. Decisions are still pending on the bids by Transpace Carriers, Inc. (for Delta launch vehicles) and Cyprus Corp. (for Delta hardware).

Bristol Aerospace, Ltd.:

Bristol Aerospace, Ltd. is evaluating possible commercialization of its rocket technology. The Winnipeg, Manitoba company manufactures the Black Brant solid-fuel sounding rocket, which has seen extensive use in scientific and materials processing experimentation. Bristol is investigating commercializing the sounding rocket, and possibly an orbital launch system using similar technology. An orbital system would probably be similar in design to the Space Services, Inc. Conestoga rocket (C.S.R., April 1983, p. 1; Aug. 1983, p. 1), but would require development of rocket motors larger than those presently manufactured by Bristol.

* * *

NASA May Be First Customer for Orbital Sciences Corp.

NASA intends to purchase an OSC Transfer Orbital Stage (TOS) for the Mars Geosciences Climatology Orbiter mission according to industry sources, although OSC has not confirmed this. The TOS would be used as upper stage propulsion for the planetary probe (as yet undefined), which would be launched from the Shuttle.

Pacific American Creates Satellite Company

Pacific American Satellite Company has proposed a new type of spacecraft called "GlobeSat." Globesat is an unmanned spacecraft bus designed to be launched by the Space Shuttle, with a primary mission as a geosynchronous communications satellite.

GlobeSat is designed to make maximum use of the Shuttle bay, and is a disc fifteen feet in diameter and from two to five feet in length. This flattened shape allows the GlobeSat to take advantage of Shuttle's costing policy which is partially based on payload length (see last month's C.S.R.) Other spacecraft are also using this approach to lower launch costs, notably the Hughes HS 399 communications satellite, which is nine feet in diameter and three feet in length.

The GlobeSat uses an integral liquid-fuel propulsion system, which, in its standard configuration, can impart a velocity change of 14,500 ft./sec. to the spacecraft. The spacecraft weighs 6000-14,000 lbs. at launch from the Shuttle, and 1500-3300 lbs. on station in orbit, depending on spacecraft configuration.

A unique feature is the phased-array antenna used for the communications satellite version. A thin, flat, rigid plate covering an entire face of the satellite disc, the antenna is larger in diameter than any other presently used in a communications satellite, and can be used at higher power and at higher frequencies.

The spacecraft requires no launch cradle, but is mounted directly to the Shuttle bay's longeron and keel fittings.

GlobeSat spacecraft can be modified for planetary missions, resulting in a model called the "Planetary Observer." Pacific American Satellite has proposed using a Planetary Observer, with its integral propulsion, as a basis for the Mars Geoscience Orbiter mission (mentioned above) rather than using a spacecraft/transfer stage combination. Cost of this mission using a Planetary Observer is estimated at approximately \$300 million.

(TEXT CONTINUED ON PAGE 5)

COMMERCIAL SPACE TRANSPORTATION COMPANIES (JAN. 1984)

NAME	ADDRESS	CONTACT
ARIANESPACE	1, Rue Soljenitsyne 91000 Evry, France Tel.: (33) (6) 077-92-72	
Activities: Marketing of the European Space Agency's Ariane launch vehicle.		
CYPRUS CORPORATION	Two Chatham Center Suite 240 Pittsburgh, PA 15219 (412) 391-1896	Don N. Stitt
Activities: Investment company working with Astrotech International (subsidiary) and McDonnell Douglas Corp. to develop Delta-derived liquid-fuel Shuttle orbital transfer vehicle.		
GENERAL DYNAMICS, CONVAIR DIVISION	Box 85357 San Diego, CA 92138 (619) 573-8000	William F. Rector III Division V. P., Space Programs
Activities: Commercializing of General Dynamics Atlas-Centaur launch vehicle.		
MARTIN MARIETTA, DENVER AEROSPACE	P.O. Box 179 Denver, CO 80201	Walt Cooper, P.R. (303) 977-5364
Activities: Commercializing of Martin Marietta's Titan 34D launch vehicle.		
ORBITAL SCIENCES CORP. (OSC)	1951 Kidwell Dr., Suite 810 Vienna, VA 22180 (703) 790-0340	David W. Thompson President
Activities: Development and marketing of high-energy, solid-fuel Space Shuttle upper stage.		
OTRAG	Sounding Rocket Dept. Schleissheimerstr. 59 D 8046 GARCHING Germany Tel.: 0 89-3 20 10 79	Frank K. Wukasch President
Activities: Development and marketing of low-cost, liquid-fueled sounding rockets.		
PACIFIC AMERICAN LAUNCH SYSTEMS	8 Admiralty Place Redwood City, CA 94065 (415) 593-9297	Gary C. Hudson President
Activities: Development and marketing of reusable, VTOVL launch vehicles under the name Project Phoenix (not related to Phoenix Engineering).		
PHOENIX ENGINEERING	566 Santa Clara Ave. Redwood City, CA 94061	Clifton Horne, President (408) 720-8280
Activities: Development of low-cost, liquid-fueled launch vehicles.		
PROJECT PRIVATE ENTERPRISE	See: Truax Engineering	

NAME	ADDRESS	CONTACT
SPACE ENTERPRISES, INC. (Formerly Space Projects, Inc.; Space Transportation Co./SpaceTran)	22 Chambers Street Princeton, NJ 08540 (609) 924-6755	Jim Hill
Activities: Finance fifth space shuttle orbiter and/or market other Space Shuttle flights.		
SPACE PROJECTS, INC.	See: Space Enterprises, Inc.	
SPACE SERVICES, INC. (SSI)	7015 Gulf Freeway Suite 140 Houston, TX 77087 (713) 649-1716	Charles Chafer (202) 646-1025 Walt Pennino (703) 281-2495
Activities: Development of a low-cost launch system using solid-fuel boosters.		
SPACE TRANSPORT INC.	142 Muerdago Rd. Topanga Canyon, CA 90290 (213) 455-3105	Robert Salkeld
Activities: Development of launch systems utilizing advanced mixed-mode engines.		
SPACE TRANSPORTATION CO./ SPACETRAN	See: Space Enterprises, Inc. Note: "SpaceTran" name was sold to Federal Express Co. subsidiary, FEDEX/SpaceTran (not presently active in space transportation systems)	
STARSTRUCK, INC. (Formerly Arc Techno- logies, Inc.)	837 Second Ave. Redwood City, CA 94063 (415) 367-6800	Roy McDonald
Activities: Development of a launch system using hybrid technology.		
TRANSPACE, INC.	666 11th St. NW, Suite 1110 Washington, DC 20001 (202) 347-5060	Len Cormier President
Activities: Development of air-launched, recoverable, winged launch vehicle.		
TRANSPACE CARRIERS, INC.	P.O. Box 23394 L' Enfant Plaza Station Washington, DC 20026 (202) 646-1289	David W. Grimes President
Activities: Commercialization of McDonnell Douglas Delta launch vehicle.		
TRUAX ENGINEERING	12401 Green Meadow Lane Saratoga, CA 95070 (408) 255-6926	Robert Truax
Activities: Development of heavy-lift, low-cost, liquid-fueled launch vehicles.		

Pacific American Satellite is a sister company to Pacific American Launch Systems, Redwood City, Ca., which is working on development of the Phoenix launch system (C.S.R., Jan. 1983, p. 2-3).

Manned Space Station Efforts

Facilities for space operations are becoming a hot item in the space industry. A number of organizations are developing unmanned free-flying space platforms that are designed to be launched by the Shuttle and later retrieved. Examples include Sparx Corp.'s SPAS project, Fairchild's Leasecraft, and the pharmaceutical factory planned by McDonnell Douglas and the Ortho Pharmaceutical Corp. These systems are usually just large satellites, with no pressurized facilities for human occupation.

However, manned systems are also under consideration. These are designed with pressurized areas to support human occupation (part-time or full-time), and deserve the name "space station," regardless of their size. Efforts in this area include:

NASA:

Reagan has designated \$175 million in space station funding for fiscal 1985 according to Washington sources. This is a personal effort by Reagan, who reportedly stated that he does not wish to be remembered "only for El Salvador." As mentioned last month, expect an announcement on this subject later this month, probably during the State of the Union address.

Europe:

The European Space Agency will be presented with a space station concept which will make extensive use of Spacelab components and experience, and may be included as part of an ongoing ESA study on space stations.

The program, called "Columbus," is being proposed by Italy and West Germany. The study is being led by Messerschmitt-Boelkow-Blohm (MBB) and ERNO, along with Aeritalia. There has also been participation by national research organizations such as Germany's DFVLR and Italy's Consiglio Nazionale delle Ricerche (CNR).

Columbus consists of three major components: A pressurized habitation module, a service module incorporating support systems and solar power arrays, and a transfer module, with propulsion systems, which would bring personnel to and from the habitation module. The modules, based on Spacelab hardware, are cylinders about thirteen feet in diameter and of varying lengths, with universal docking mechanisms.

The habitation module is designed to be docked to a large space station as a component, but, in combination with the other two modules, it can also operate as a free-flying, space station in itself.

Space Industries, Inc.:

Space Industries, Inc. is seeking private funding for their space facility. The Houston company's system would be a free-flying, pressurized, industrial module or modules, which would be deployed into orbit from the Shuttle. It would be unmanned except for a periodic rendezvous with the Shuttle for servicing. The facility would also be capable of connection to a space station.

Booz Allen & Hamilton, Inc.:

Booz Allen, a consulting firm, has been studying commercial space prospects, first for McDonnell Douglas, and now for NASA (C.S.R., June 1983, p. 5). In the process, they have been identifying potential users of space station facilities.

The Bethesda, Md. company hopes to act as a "matchmaker" of sorts, getting these potential customers together with potential investors and operators to develop (in cooperation with NASA) viable commercial space activities.

A "fee-for-service" laboratory is one important market for a manned station which has been identified by Booz Allen. The company has seen a need for a space laboratory, manned for extensive periods, to carry out long-term experiments. Such a system would be considerably more challenging than intermittently manned manufacturing and research stations.

A definite trend is developing in the design of space stations and other space facilities. The concept of an industrial and scientific city in space has generated the image of a single immense structure floating in orbit...a "city in space" consisting of a conglomeration of cylindrical modules, solar panels, and machinery.

Many space activities are mutually incompatible in the same facility. For example, certain microgravity processes can be rendered less efficient, or even impractical, by the vibrations caused by personnel movement or intermittent spacecraft maneuvering. These incompatibilities will become more critical as space science and manufacturing become more refined. Environmental conditions that were acceptable aboard Skylab, Shuttle, and Spacelab may become intolerable. The easiest solution is to isolate delicate operations by physically isolating the modules containing them from modules used for less sensitive operations.

An actual "city in space" may therefore be a "village" instead, comprised of many scattered space stations, separated by several miles, with each one consisting of perhaps no more than a few modules. The only large facilities would probably be things like the space equivalent of "heavy industry" (fuel processing, beam building, etc.), and personnel quarters.

* * *

TMSA Offers Conference on Space

"Space: The Next Five Years" will be held this February in Los Angeles (Feb. 9-10) and San Francisco (Feb. 13-14). The program will feature speakers on space defense, space stations, space science and applications, and other subjects. Registration fees range from \$295.00 to \$495.00 per participant. For information, write the Technical Marketing Society of America (TMSA), Dept. SPACE, 3420 Kashiwa St., P.O. Box 3608, Torrance, CA 90510.

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 and Foreign Surface Mail: 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. Unless otherwise noted, contents are ©1984 by The Commercial Space Report and may not be reproduced in any form without written permission. The opinions contained in the Report are those of the writer or writers, and do not necessarily reflect those of any organization or company.