THE COMMERCIAL SPACE REPORT

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A MONTHLY NEWSLETTER ON FREE ENTERPRISE IN SPACE

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Dear Subscriber:

More on Space Legislation

Hearings on H.R. 1011 are scheduled for late April or early May at the present time. More precise details on The Space Commerce Act (described here last month) will appear here as soon as available.

A space regulation bill is again being introduced in the Senate. Although we have not yet seen a copy, the bill (S. 560) is apparently quite similar to the one Sen. Howard Cannon introduced last year, S. 2448 (C.S.R., June 1982, p. 1).

Arc Technologies Makes Progress

ArcTech successfully tested a subscale hybrid rocket engine last year according to information recently acquired from other industry sources. The twelve-inch diameter test unit generated 20-25,000 lbs. of thrust, and demonstrated the feasibility of throttling a hybrid system. Similar tests of a full scale (approx. 42" dia.) unit (C.S.R. Nov. 1982 p. 2) have not yet, as far as is known, met with similar success.

Much of this information is still sketchy, as ArcTech is understandably reluctant to release technical details. However, sources indicate that the company is still working towards a test launch this summer.

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Space Commercialization Seminar: Part Two

Pharmaceutical Processing in Space

Joseph Coleman (Manager, Program Development and Marketing, Advanced Space Programs, McDonnell Douglas Corp.) gave a presentation showing that experiments on the processing of biological materials in space (a possible marketing target for the Leasecraft system described last month) have resulted in considerable progress in this field.

The Project:

McDonnell Douglas and the Ortho Pharmaceutical Corp. are cooperating with each other and with NASA in what may be the first successful profit-making effort in microgravity processing. Called the Electrophoresis Operations in Space (EOS) Project, the goal is to use continuous-flow electrophoresis in a space factory to produce valuable biological materials in greater quantities and with higher purities than is economically possible on earth.

The project involves three hardware phases. First, there will be initial testing and experiments using a processing unit that fits on the mid-deck of the shuttle flight cabin. Second, there will be testing of a larger prototype production system that will occupy part of the shuttle payload bay. Finally, an automated free-flying facility will be built for full production. The free-flyer would not tie up valuable shuttle space, requiring only that the shuttle service the facility about every six months.

In a joint venture agreement with NASA, the companies will be allowed to fly the first two program phases free of charge, using available extra space in the payload bay for the second phase. These free flights will consist of six flights of the in-cabin unit, and two flights of the payload bay unit. Thereafter, the companies will pay for whatever shuttle use is required.

This allows the companies to save a great deal of money in the start up phases. The government benefits by assisting in creation of a new (taxable) industry, and also will be allowed to run NASA samples in the processing equipment.

The Process:

Continuous-flow electrophoresis is a process that separates biological materials by flowing them through a special fluid-filled chamber and applying an electrical field across the flow. The charged particles in the materials react by moving across the flow towards one of the electrodes. Different particles move at different rates, due to variations in particle size and charge, so the sample tends to separate into distinct streams of purified components. Each separate stream is then collected by one of a row of outlets at the end of the chamber (see Figure 1).

Because of gravity, the method is extremely limited on earth and produces only research quantities of useful substances. Gravity-caused problems include:

- Density differences between the sample fluid and the carrier fluid. A sample concentrated enough to allow processing of significant quantities is denser than the carrier fluid and simply sinks to the bottom of the chamber.

- Convection currents induced by the heat generated by the electric field. This causes the separated sample streams to waver back and forth into each other's outlets. Purity is degraded.

- "Bandspreading", or the widening of a sample stream so that it enters several outlets at once. This is again due to differences in density between sample and carrier fluids, and again the result is degraded purity.

None of these problems occurs in a microgravity environment, so that highly concentrated samples, processed at higher purities, should theoretically bring the rate of production out of the realm of the research sample and into the realm of the marketable pharmaceutical.

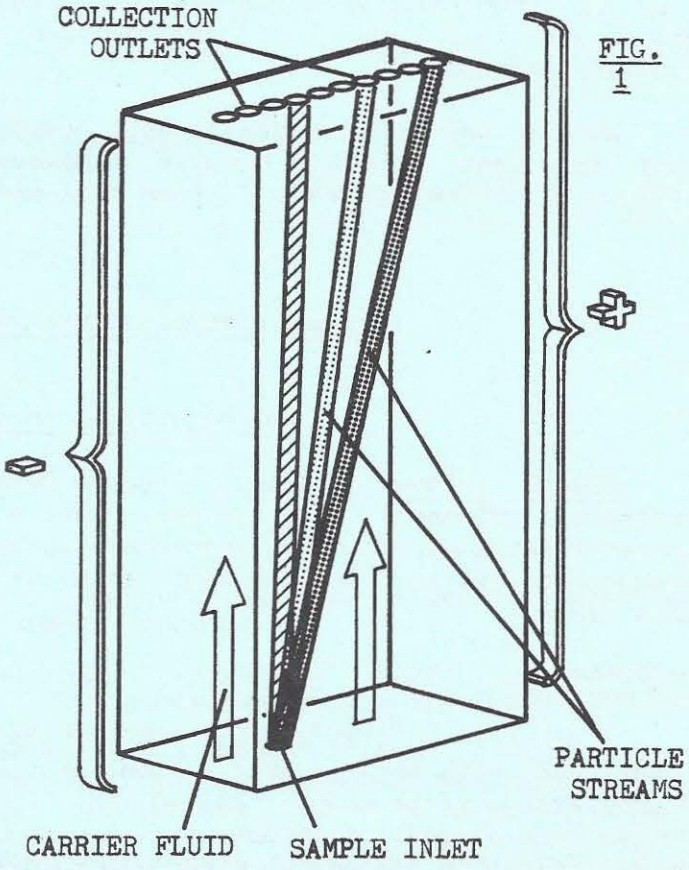

FIG. 1

The Products:

Potential candidates for EOS production include:

Beta cells, with the potential for a single injection cure for diabetes;

Interferon, with its potential to fight viral diseases and possibly cancer;

Growth hormone products, to promote bone growth and healing of ulcers;

Epidermal growth factor products that help in treating burns and wounds.

These materials alone could assist an estimated 25 million patients annually, and they are only a few of the 30 or 40 biological materials targeted by the EOS project for study.

The Progress:

An initial test on the fourth shuttle flight was highly successful. In the first of six planned test flights of the mid-deck unit, two materials were separated. One was a standard test protein while the other material was proprietary. The results showed that the test unit could separate nearly 500 times the amount of material than is possible on earth.

The next step, scheduled for STS-6, is to try for higher purity. This will be done by utilizing a modified unit that will apply nearly 3 times more voltage than the present unit. It is anticipated that purity levels will be 4 to 5 times higher than those possible on earth. Later tests will be done on four more flights, including STS-7 and STS-8.

The progress made by the EOS project is encouraging to those companies involved. The materials they are producing, however, are valued at thousands of dollars per gram, so profit potential is easy to show. Other projects mentioned at the seminar are having more difficulty because the profit potential of their products is not as obvious. One example follows:

Materials Processing: Furnaces

E. K. Davis, (General Manager, Space Services Division, GTI Corporation), presented a proposal for an experimental furnace that would test-process metals or other materials on board the shuttle.

GTI signed a joint venture agreement with NASA very similar to that entered by the EOS principals, providing four "free" flights for their project in return for NASA getting 10% of the furnace space. GTI would then rent furnace space to customers for research.

GTI's marketing research showed few products that would be cost-effective; these few include pharmaceuticals and certain crystals. According to Davis, "If you had a plan to convert aluminum to gold in space, you couldn't make a business out of it...you can't sell gold at a high enough price to pay for space processing." So, in spite of skilled and aggressive marketing, only 3 or 4 furnace customers have signed up instead of the anticipated 30 to 40.

Again, we see a market being chained by the cost of access to space. One obvious conclusion to be drawn from the preceding presentations is that the present costs of space transportation are far too high. Only materials or services commanding incredible prices per pound delivered to orbit are considered to have any profit potential. (Incidentally, this category includes commmunication satellites.)

Amazingly, this situation still exists even when initial shuttle flights are free of charge, and the ones thereafter are heavily subsidized by the taxpayer.

Still, markets are being exploited under even these conditions. The chains are under an enormous strain. Given a source of low cost space transportation, a geometric expansion of the space processing market (among others) seems inevitable.

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Symposium: Space Industrialization--the Growing Community

The Wester' Shore R & D Centre of Toronto, Canada, in cooperation with the American Association for the Advancement of Science, is presenting a symposium on space industrialization on Friday, May 27, 1983 at the Westin Hotel in Detroit, MI. Speakers will cover communications, space processing, space station requirements, and other subjects relating to space industries. (A representative from the EOS project will also be speaking.)

For information contact: Morrie Schneiderman, Dir. Wester' Shore R & D Centre, Suite 4650, Toronto Dominion Centre, Toronto, Canada M5K 1E7, (416) 862-8562.

Conference on New Free and Independent Countries

A conference examining possibilities for creating areas free of coercive governments is scheduled for Saturday, April 23 at the Long Beach Hyatt House, Long Beach, CA. Along with libertarian ideas on island nations and other subjects, there should be discussions on the freedom potential of space colonies and other extraterrestrial communities. The conference will feature a number of important speakers, as well as a luncheon address by Robert LeFevre.

For information, contact: The Rampart Institute, P.O. Box 4, Fullerton, CA 92632, (714) 979-5737.

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Notice To Subscribers

Last month's newsletter was slightly late due to computer problems. Next month's will also be published later than usual due to the L-5 Conference on Space Development to be held April 1-3.

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 the exploration and exploitation of space.

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