Interview: Joseph P. Allen

Private industry moves into space; firm prepares orbiting factory

On Aug. 20, the National Aeronautics and Space Administration and the private Houston-based firm, Space Industries, Inc. (SII) signed an agreement to facilitate the involvement of private industr
and build an Industrial Space Facility (ISF), which will be the first man-tended factory in Earth orbit. It will be compatible with the Space Shuttle and with the space station that is planned for initial operation in the early 1990s.

The factory will operate automatically most of the time, and will be visited by Shuttle crews periodically.

The ISF will be launched as early as 1989, and will provide a generic manufacturing capability for many of the promising unique space products, such as new pharmaceuticals, crystals, and metal alloys, that are planned for commercial development.

Joseph P. Allen, the Executive Vice-President of SII, was a NASA astronaut for 18 years, from 1967-85. While with NASA, he was also an assistant administrator, with responsibility for legislative affairs.

EIR: The Industrial Space Facility that you are planning to build and deploy, you do not plan to use yourself. Will industry rent space from you in the ISF?
Allen: That's correct. We see ourselves in the same role as a builder of a small, modern automated factory facility, which is leased or sold to a company that has manufacturing to be done.

EIR: Developing countries have also been invited by NASA to participate in the Space Station. Could your facility be an avenue for them to do experiments in space, or even commercial processing?
Allen: It may be an avenue. We have not done that yet. It's just much too early to do that. But, yes, there's nothing about this facility that precludes that being done, if it were not in conflict with the federal government regulations involving the transfer of technology, and other things. We have no control over that and would be bound by it, and would abide by restrictions, but quite possibly, there would be none.

EIR: Is the industrial process inside your facility proprietary for the company paying to lease it?
Allen: Yes.

EIR: Your facility is approximately the same size as the pressurized Spacelab module, but Spacelab remains in the Shuttle payload bay at all times. Your factory orbits independently. How does the ISF get into orbit, and how is it serviced by the Shuttle?
Allen: The ISF is taken up aboard the Shuttle. It is docked with the facility, and the people in the Shuttle go into the factory, get it all set up—and by in it, I mean literally just float into it in shirtsleeves, through a tunnel that connects the two. Then, when it's all set up, the people go back into the Shuttle, close the door behind them, and then it is uncoupled. It's left to operate on its own, in space, and the next time the Shuttle is in the neighborhood, so to speak, it docks to the facility again, and people can go in, check it, harvest the product that's there, resupply it with raw materials, and then once again go aboard the mother ship and leave the facility to operate on its own. We envision people going into it only when the Shuttle is right there by it—we think approximately once every two to three months.

When our facility is operating in space without people there, it will be pressurized; we will not dump the atmosphere to the vacuum, and later re-pressurize it when people visit, although it would be possible to do that if there were a manufacturing need to do that—if we wanted to use the vacuum to manufacture in a vacuum. It stays pressurized all the time. When the Shuttle comes up to it, and docks with it, the air revitalization system of the Shuttle is what is used to make sure that the atmosphere is correct in the facility. This is exactly the way the Spacelab is used today.

EIR: Factories on Earth require repair crews on-call all the time. It will certainly be more expensive and inconvenient to

repair your factory in space. What kind of advances in automating and robotic technology are necessary to have an industrial facility in Earth orbit?

Allen: Your question is quite a good one. It turns out that the answer to that really has nothing to do with the space environment, but more with the complexity of the manufacturing process itself. There are numbers of products manufactured down here by automatic processes that are pretty well developed now. With careful planning, there are facilities that will operate for weeks on end without breaking down or needing human attention. To be sure, those are processes that involve fairly simple manipulation of materials that may be just a chemical process, that kind of goes on. A good part of the petrochemical processing industry is like that, right now—large chemical processors where raw materials come in at one end, finished material comes out the other end, together with waste materials. These things all do operate very automatically and for long periods of time before they need maintenance and cleaning. Probably some of the first users of this facility will be manufacturers that use fairly simple techniques and not complicated robots in the science fiction sense, that must continue to work without breaking for long periods of time.

However, we envision this as a facility that would begin to operate as early as 1990, but could continue operating for several decades, for the foreseeable future after that, and as manufacturing processes become more and more automated, ours is a facility that could be used for more and more complicated manufacturing processes. The space facility itself is inherently very simple and it will certainly tend itself over long periods of time, we're confident, without breaking down. Exactly what manufacturing is done internal to it, though, once again, is more the business of the user of it than the business of us, who will maintain the facility.

EIR: You would see starting off with a liquid or fluid process, then, before going to crystals or metal alloy manufacturing?

Allen: Probably so. I'm guessing, but it appears to be the easiest, to begin with.

EIR: Have you made any use of technology the Japanese have developed, in advanced robotics?

Allen: Not to my knowledge, but if we were to come across some, believe me we would try to adapt them.

EIR: Do you see the possibility of spin-offs from your technology to basic industry here on Earth?

Allen: First of all, the location is out on the frontiers, so the very fact that we're there suggests that new things should be learned, all of which is good, and may be useful in many other phases of American industry. That has been one of the strong selling points of the space program. If there is anything unique in what we're doing, it is that we have very, very optimistic hopes of doing it using privately invested dollars, not to be confused with the investment of tax dollars through the appropriations and authorizations of the Congress. That is really probably the only unique thing that we're bringing to this, but that in itself is significant. It is some proof that American investors recognize that this is important and want to put some of their own private money in this effort.

EIR: The memorandum of understanding you signed with NASA indicated that the work that you are doing may have some value for the Space Station planning group.

Allen: No question. In that sense, they can view us as a precursor-type of space station to their much larger and more difficult assignment. They should be able to learn from what it is we're going to do, partly because we're much smaller than what they're doing. Also, we will do it before they do it. They can watch us and we will share approaches, ideas, and data, and we're confident, as are they, that they will learn from our efforts. We hope that we don't make some bad mistakes and they learn from our bad mistakes, but even if we did, they would save themselves from making the same mistakes later. It should be a very complementary effort that we're setting out upon here, and that fact is recognized by the memorandum of understanding.

EIR: Are there any specific problems that you have to solve that will benefit Space Station planning?

Allen: Many. I'll give two. In order for our system to work, we must be able to dock the Space Shuttle to it. The same thing is true for the Space Station. The Shuttle is a versatile and remarkable machine, and there's no doubt that it will be possible to dock it to orbiting facilities; but it's never been done yet. The precise technique to do that has to be worked out, and we will have to work that out. Space Station people will be able to use every bit of that information.

Another example: The Space Station will be the first time that America has had a large permanently orbiting body that is going to be changing its size and shape as it grows. When engineers see that, they realize that they must understand the modes of vibration of that body. That's not going to be easy to do, because it is going to change its size and shape as it gets larger and larger. We are going to develop a technique, that is state-of-the-art, of measuring the various modes of possible vibration in a fairly large orbiting body, and we have a new idea of how that can be done. It's not very expensive and does not require construction of much test gear on the ground. We're going to do the testing itself in orbit. We are quite hopeful that this techique will work, and if it does work, it's going to save NASA major, major problems in what they have ahead—if they can use our idea.

EIR: So, you will be transferring technology back to the government!

Allen: Exactly so.