

# SPACE INDUSTRIALIZATION – A NATIONAL PERSPECTIVE

by

V. H. Reis  
Science Applications, Inc.  
McLean, Virginia 22102

## ABSTRACT

Space Industrialization (or commercialization) has the potential to be a major player in our nation's space program. If this potential is to be realized, however, industrialization efforts must be considered within the context of the other major portions of the space program: shuttle, space station, civil remote sensing, etc. Further, development efforts must be based upon a sound scientific and technical understanding of the products and processes, and there must be a trained cadre of dedicated individuals willing to devote time and effort to this effort.

There remain considerable risks and uncertainties. Given all this, the best path to follow would seem to be a long term, balanced commitment, emphasizing government, industry and academia partnerships.

## DISCUSSION

When President Reagan announced the new national space policy on July 4, 1982, he could have made space industrialization the major new initiative of our space program; perhaps even setting the goal of the first space industrial part by the end of the century. But he didn't. The space industrialization words in the policy were much, much less dramatic. Let me quote them directly.

“The United States encourages domestic commercial exploitation of space capabilities, technology, and systems for national economic benefit. These activities must be consistent with national security concerns, treaties and international agreements.” And,

“The United States Government will provide a climate conducive to expanded private sector investment and involvement in space activities, with due regard to public safety and national security. These space activities will be authorized and supervised or regulated by the government to the extent required by treaty and national security.”

Neither of these statements would ever be confused for a clarion call for action, yet beneath them lie a challenge that if accepted and fulfilled could someday – maybe – be as significant as President Kennedy's challenge to go to the moon some twenty years earlier.

What I shall do today is describe a perspective on where space industrialization fits into our national policy and programs and what I believe to be the nature of the space industrialization challenge. To do this I will consider several different national views. The first of these is programmatic – where does space industrialization fit in with the other national space programs?

The second is more philosophical in nature — what does space industrialization mean with respect to the historic, national aims of space? Finally, I will briefly comment on substance; what is it, in fact, that is being industrialized?

Our space program can be divided into two parts; military and civilian, and the civilian part in turn can be categorized as public and private. (The latter is almost entirely made up of the communication satellite business.) The separate U.S.-government civil and military programs are about equal in size, around seven billion dollars a years each — and each of these are perhaps twice as large as the Comsat business. (As an enterprise, the total U.S. civil space business is about the same size as the U.S. diet and exercise business.)

Within the U.S. government of course, NASA is the five hundred pound gorilla in civil space, but other agencies and departments also have a strong role in developing space policy and the programs that flow from that policy. Thus, any new initiatives in space industrialization would come under scrutiny of the Department of State, who would be concerned about how such initiatives affect international treaties and foreign relations; the Department of Defense who would be concerned about possible transfers of technology to potential adversaries and so on and so on down through all of the government players.

Within NASA, space industrialization must be viewed against a background of a wide variety of continued and expanding programs. These include the space shuttle and space lab, other launch vehicles, the unmanned space science program, which includes planetary exploration, astronomy and space physics, and of course the space station. This is a full plate and one that is rich with promise. Further, while space advocates are quick to point out that civilian space represents but a small fraction of a \$900 billion federal budget, it represents a much larger fraction of the discretionary deficit. In short, there is a lot of good, stiff competition for the space program dollar.

Next, we come to the issue of how and why industries are created and why and how we have a space program. There is a difference. Listen to business men talk and you hear expressions such as return-on investment, discounted-cash-flow, present value, future value, interest and yes — profit. These terms are not often in the vocabulary of the NASA planner. NASA was put together in large part for the exploration — not exploitation — of space and that exploration is in no way ended. Far from it. Further, with a few notable exceptions, NASA does not have the expertise to do research on commercial products, because commercial products don't really play much of a part in space exploration. It's not that people at NASA are in any way antagonistic toward commercial enterprise, it's just that commercial enterprise really is very different from what NASA does and people know and feel comfortable with what they do best.

Finally, we must look not just at the background, but the substance of the space industrialization. Are there in fact products and processes which can be developed in space which can make a real difference to the U.S. economy? Is there enough so that a market can be created that is fair and competitive? The evidence to-date is, frankly, mixed.

Communications has been successful as a commercial enterprise, land remote sensing has not, and the jury is still out on materials processing. Indeed, a better legal analogy for MPS is that court is not even in session! With a few noteworthy exceptions, the private sector has not yet developed the concepts, or will, necessary to transfer enterprise into space. This was expressed best by the distinguished Senator from this state, Senator Heflin, at the recent hearing on the space station where he differentiated between interest, involvement and commitment.

Quoting Senator Heflin,

**“If you are interested, you are willing to spend someone else’s money, if you are involved, you are willing to spend your brother-in-law’s money; and if you are committed, you are willing to spend your own money.”**

Up to now, I think we can conclude, space industrialization has evoked a lot of interest, some degree of involvement and only a little commitment.

Given these three elements; strong programmatic competition for the civilian space dollar in a difficult national budget situation, a civilian space culture that is oriented towards public exploration rather than private economics and a lack of broad based commercial success or private sector financial commitment, it should come as no great surprise that the 1982 space policy toward space industrialization was not more aggressive. Indeed, one could conclude that it took some degree of faith to go as far as it did. Given that statement, however, let’s now take a look and see just how that policy is being implemented.

In the interagency arena, you’re aware, I’m sure, of the Presidential directive last May permitting the use of government launch pads and related facilities available to private firms at nominal cost, and the subsequent directive giving the Department of Transportation lead responsibility in this arena. And you will hear later in this symposium about what’s happening in the attempt to transfer land remote sensing to the private sector.

But the primary government player, of course, is NASA. And what NASA did was put together a task force. To lead that task force, they chose an individual from outside the space community but with considerable experience both within government and the private sector and with a track record of accomplishment. That’s Bud Evans. The members of the Task Force were chosen from both headquarters and the various NASA centers and they were supported by a strong team of contractors and consultants. I’m not going to describe in any detail the output of the task force, but it is important to consider how the task force tackled the problems described above. First the programmatic.

Space industrialization or commercialization has an obvious problem with identity – it means different things to different people. This leads to difficulties in defining specific programs. Budgets, in-turn are allocated to specific programs, so that definitions are not just an academic exercise. The relationships between commercialization efforts and other NASA programs, particularly the Shuttle and Space Station programs, are very important. Maintaining a distinct, high level presence at headquarters will go a long way toward helping to clarify and identify issues with respect to programs, and the task force recommended maintaining such a presence.

Such a headquarters element, with access to the highest levels of NASA decision making can also play a pivotal role in the second major issue, the relationship between industrialization and the exploration philosophy that has driven so much of our space program. Removing legal, regulatory and operational barriers to accessing space will both shorten the time and cost of commercial operations and will also help develop professional relationships between people as they seek to work together. The task force developed specific recommendations in this regard.

Finally, and perhaps most important, we come to the substance issue. Task forces, even the best ones, don’t actually produce anything but paper and viewgraphs and sometimes ideas. One idea that has struck me as particularly fertile is the suggestion to begin several space industrialization “centers of excellence”; institutions based in academia, but with industrial and

government support. The mission of these organizations will be not just to generate research projects, but to produce a generation of young scientists and engineers who think of space as a place to exercise creativity. Such centers have traditionally been a rich source of ideas, experiments and entrepreneurs.

I don't know at this time which, if any of the task force recommendations will be accepted, but I do think they represent a thoughtful approach to the problem, one that is clearly responsive to the national policy.

Well, what does this all mean? Given these perspectives, what is the best way to develop a private space industry that is in the national interest? Did we make a mistake in not pushing space industrialization harder as a national goal? I don't think so. I think that there is a real danger in overselling the economic returns from space commercialization, both in terms of absolute magnitude and (especially) in terms of how long it will take to get that return. Our experience with land remote sensing is a clear and persistent example of this. Further, overselling the economic return is not necessary. It is not exploitation versus exploration that is at issue here. Indeed let me suggest that there is a striking similarity between the entrepreneur who is willing to risk what he holds dear – his capital, and the explorer who is willing to risk what he holds dear – his life – on something that hasn't been done before. To succeed in either field requires that you do the proper homework, calculate your chances as accurately as possible and be brave. When looked upon in that perspective, both the entrepreneur and the explorer can share in the national adventure which we call the space program.