the most important part of the space station program, and they're not given much [attention] because they're not controversial. Everyone loves them.

EIR: But the program can start even now, in terms of coordinating the data that a number of nations are already accumulating?

Edelson: What the international office will do under the program will be the coordination, control, and accumulation of the data; archiving and distribution of the data, and holding of symposia every year on progress on the IGBP. The actual contributions to the program will be made by national projects. There won't be an international satellite—there will be a U.S., a European, a Japanese, a Russian satellite, and they will all be coordinated and contribute their data. An international team of scientists will work on the data. It requires scientists, from the countries I named, but also from Brazil and India; because they're big players in this, and scientists from China and from the black African nations. We all are concerned about the planet's future and we now have reasons to be concerned, and we hope to benefit from it.

EIR: Can this data also be used for positive economic development for the industrializing nations?

Edelson: Yes, we have a Landsat station supported by NASA in the past and NOAA, but it is mostly supported by AID [Agency for International Development in the Department of State]. It's located in Nairobi and it's used for surveys of resources, the expansion of the desert, the burning of fossil fuels, and even disease agents. They use it to understand and predict the flights of locusts, because they can understand where they would be harbored and borne by the winds, and so on. We've made a multi-spectral image of the entire African continent, and we do it over again each year. You can see the changes in the growth of the desert, in the rainfall, the concerns of land-use changes, and climatic changes. We've even found effects of *El Niño* [cyclical warm-water current off the Pacific Coast of South America] which was first found in the Pacific, but it's got relations in South America and in Africa. The Earth is a big system, and we know little about the transfer of energy from the oceans to the atmosphere and back and forth. Heretofore, these [aspects] have been studied by entirely different people, with very spotty information.

Take oceanography—ten years ago, if you went to an oceanographic conference, the people there would be shipboard people, and they would have information about the ocean that was taken from a dozen ships at various locations, at various times. If you plotted [the data] on the Earth's surface, you'd see very scattered data points. Now, more than 50% of the people at any oceanographic conference are space scientists, and they have information that is very comprehensive that covers the total Earth's oceans, so whatever data they have is synoptic.

Space: the national

by Caspar Weinberger

Excerpts from U.S. Defense Secretary Caspar Weinberger's remarks to the Air Force Association convention in Washington, D.C., on Sept. 14, 1987:

Since the tragic loss of the *Challenger* and its courageous astronauts, our entire space program, both civilian and military, has come under the most intense scrutiny. And this is as it should be. We owe nothing less to the *Challenger* crew and to ourselves than to uncover the reasons for that failure and that tragedy, and in so doing, to map the future of our success. But that scrutiny, for all its benefits, has generated some idle talk about America being lost in space and without a goal and without a mission. And I'd like to just reject that characterization, and I thought you ought to know why.

Today more than at any time in the 30 years now of our space program, it's essential for the American people to appreciate the real challenge of space, the national security challenge. And to do this, we must first understand how space relates to defense. We have to adopt a national security perspective, free from the misperceptions that so frequently infect debate about defense in space. As with any other arena, whether it's land, sea or air, space is a region of political competition. It can be free and open to use by all nations, as are the oceans on Earth, or it can be the sole possession of a single nation or a political ideology. Free access to space does not mean that all nations have equal means of using space.

But again, just as in the case with international open waters, it means that space is not the exclusive domain of any one nation. It means respecting the rights of all nations to use space. And as the leader of the free world, our goal has always been to ensure that no power could stand in the way of unrestricted access to space. And as with politics among the nations on Earth that the purposeful assertion of freedom only means something when and if it is backed by political and military strength, and this realistic view of space is informed by experience, and is consistent with the history of nations.

This view focuses clearly on our responsibility for deterring any effort to deny free access to space. And further, from this perspective, we can appreciate how really bogus is the Soviet charge that we are militarizing space. Such a charge is nothing more than that transparent propaganda they use so much, and has nothing behind it than the invidious intent to

security challenge

benefit themselves. Clearly, it is not the militarization of space we must fear. That took place 30 years ago. It's the dominance of space by forces hostile to liberty that we have to worry about. The United States, the Soviet Union, and other nations use space to support national strategic goals and scientific inquiry. We know that, and there shouldn't be any question about it. The issue is not the use of space, but the issue is the strategic goals of those nations in space.

From time to time, some of you may have heard me mention the difference in strategic goals between the Western Alliance and the Soviet Union, and I hardly think I need repeat myself to this audience. So today, I'd like to address our requirements for space, and outline the elements of a strategy to guide our space activities in the years ahead.

At the outset, we must appreciate the critical role that space has assumed in the national security efforts of the United States and the Soviet Union, as well as for other nations. Space-based platforms provide a range of capabilities that underpin deterrence, and strengthen defense capabilities during conflict. Our commanders depend on space-based systems for crucial aspects of combat readiness, for communications, surveillance, attack warning assessment, command and control, weather predictions, navigation. Space is really more than just the medium of choice for these missions. It has become the only medium in which some important defense functions can be conducted efficiently. And the fact is that without space-based systems, our military would simply not be the credible and reliable force that it is today, and that is the key to successful deterrence today.

The nature of our forces and our global commitment to the protection of freedom makes us fully dependent on space-based systems, and we should never forget that. Communications with forces deployed in worldwide ways, coordination of those forces, command and control on a daily basis and during conflict, the logistical requirements of readiness, and all these other challenges of defense simply could not be met without space-based resources.

To just consider, for example, the task of maintaining communications with our forces. How could we communication effectively and exercise command and control without space-based communications systems. Even if a reliable terrestrial system could be built, the cost would be—well, if you'll permit me—astronomical. And our historic and successful reliance on the nation's technological leadership to offset the Soviets' numerical advantage, that has sharpened our dependence on space-based assets. The tremendous capabilities of some of our most important weapons systems and forces would be really dangerously reduced if we didn't have access to space-based systems. Such things as very specialized and accurate weather forecasting, which is made possible by meteorological satellites, are essential to the deterrence mission of our strategic forces. And those same strategic forces also need data which is available only from space to accomplish their missions, including communications and navigational devices.

So we must come to recognize how absolutely dependent we are on space resources for the protection of our freedom and our way of life. And we must provide a proper framework to address the future national security needs that will be even more dependent on space. And as we pursue the Strategic Defense Initiative, improve space-based navigational abilities and other space-based programs, and all of these things will mean that our reliance on space will grow in the future.

And so, it's from this perspective that the Department of Defense approaches space, in recognition of our increasing dependence and of the opportunities that space provides for better defense in the future, I signed a new defense space policy earlier this year. And I'd like to tell you a little bit about that. That policy identifies directions that we must pursue in using space for the increased security of the Free World. And then in recent weeks, we have taken another step toward preparing the United States to define how space resources can contribute to future defense. Our Department has initiated a detailed assessment of Soviet and U.S. space activities. And we're contributing to a new national space policy that's being developed by the National Security Council, and being developed very well by them, I might say.

These efforts are really well timed, because they respond to our irrevocable reliance on space-based resources and our current limitations in our launch capability that result from the shuttle tragedy. And they respond to the need to guide our continuing response to the Soviet space effort, which increases all the time.

During the past year, there have been several news stories asserting that the United States has lost its lead in space. Well, this is not so. In terms of operational military capability, now, and so far as we can see in the future, we have a capability which exceeds equivalence of Soviet capability, and in almost every quantifiable measure—we measure operational capability in terms of quality and quantity and accuracy and the timeliness of mission data to the users, not in these ambiguous and less meangingful comparisons of tons of cargo placed in orbit, or number of man-days in space, and so on.

But, we use the operational measure of merit, and when we do that, we feel that we are now, clearly superior. But, we have deficiencies which must be corrected. And I'll try to

address those in a moment. And we also have to maintain this lead. With the dependence on space systems expanding all the time, and severe fiscal constraints continuing, it is essential that we develop a coordinated government-wide response to these challenges in space that clearly are ahead.

Any defense program must begin with an appreciation for the capabilities of our adversaries. We say we are ahead, we believe so, but there is no need here to detail the Soviet space program. Many of you are very familiar with it, and it is very large. I want to emphasize, that their program is far more active than ours, and has an unmistakable military operation. In fact, we think about 90 %, at least, of Soviet space launches and satellites, are dedicated to military or military-related missions. Since that Sputnik launch, which was 30 years ago now, 30 years next month, the Soviets have built a very strong space program, with very robust launch capabilities.

They have an impressive manned effort. They have an operational anti-satellite force. And an expansive research program, with potentially significant application to future military systems. They are also working, and have been for at least 18 years, to secure the very strategic defense system that they claim is such an obstacle to an agreement when we do it.

Impressive Soviet achievements in manned missions are announced with regularity, and our effort now remains confined to the Shuttle. They've demonstrated a unique ability to travel between space platforms, and their space stations are in orbit now. And they're using space access to advance defense technologies. For example, the Earth observation experiments that are conducted from their Salyut space station, suggest that they are evaluating the ability to locate and identify and track targets from outer space. This has an obvious value in an effort to deploy space-based weapons, or to target allied defense forces.

And again, while I say we are ahead in operational capabilities, we have to bear in mind their very impressive accomplishments. One of the most impressive accomplishments, is their massive launch capability. They appear to be building a launch capability that exceeds any projected requirement significantly, and it includes the kind of rapid launch and reload abilities needed to attack our satellites, and to regenerate space assets lost during war. The same kinds of things they're doing with their INF and their ICBMS.

In short, the Kremlin appears to have focused its space effort to support and conduct combat operations, and there must be no doubt about that whatever. In addition, the Kremlin's new medium, and their heavy-lift vehicle—we don't have heavy-lift vehicles yet—provide an increased means to lift huge payloads that are needed to build large space platforms, which, in turn, would be required for space-based strategic defense and supporting systems. We need them; we're trying to get them. We asked for the funds in the Supplemental this year. Congress, of course, turned that down. But we are going to continue to ask, because it is a very essential new development of our space program.

Then, as I said, closely related to the Soviet space program is their work on strategic defense. They've masked this as best they can by propaganda. They talk about what a terrible thing it would be to have this. But their strategic defense program dwarfs ours. They've been working on it many more years. They have the only operational anti-satellite and ABM systems in the world. The CBCRA estimates that Moscow could have prototype space-based anti-satellite laser weapons by the early 1990s. Clearly, the Soviet effort in space and research and in technologies useful for space-based ABMS, strategic defensive systems, and their ability to target allied military assets—their work to achieve that is a matter of the greatest concern to us. That's why it seems to me such blatant hypocrisy for the Soviets to complain about the militarization of space.

Well, we must respond both to the Soviet developments in space, and to the vulnerabilities of our dependence on space for deterrence. But we cannot, and, indeed, we must not merely attempt to mimic the Soviet space program. We need to develop our capabilities to support our operational leads. And so, this was the point at which we asked, in formulating our space policy, "What are the elements that should guide our national defense strategy for space?"

First, our space strategy must acknowledge that deterrence at all levels of potential conflict cannot be accomplished without space-based forces. Military space operations are as essential to deterrence as are our air and land and sea forces. So our strategy must seek to provide and protect the space-based systems that are critical to deterrence. And we must not be diverted from this defensive and vital requirement by any Soviet hypocritical protest that we're militarizing space and that we, therefore, should both stop. Accomplishing our objective will require the speedy recovery of our launch capability. Near-term recovery actions are already under way with the new Delta-type programs, and our strategy must focus further out into future and respond to a variety of evolving military requirements. We simply must secure a launch capability that significantly reduces the cost to place payloads in orbit, is powerful enough to lift the payloads required by SDI and other programs, and is robust enough to protect against catastrophic failures. We must do it soon. And, yes, it's going to cost money. That's an inescapable fact which always seems to astound and appall our Congressmen, but it never disturbs or delays the Soviets for even one week.

So our dependence on space for deterrence marks the relative vulnerability of space-based assets as a critical issue to be addressed by space strategy. To be effective, these satellites and other systems must be able to survive a variety of existing and potential Soviet threats, from their ASATs to GEM. We must pursue all available means to make our space-based assets invulnerable. Hardening defense against attack, redundancy, reconstitution—all of these have to be employed to protect these absolutely vital resources. Surviv-

ability is best insured, of course, by deterring a Soviet attack on our space systems. Therefore, it's just as simple as the same strategy we use with everything else. We need to be able to hold Soviet space-based assets at risk, as we hold their ground-based assets at risk.

But today we can't do that. The Soviet ASAT is deployed, and ours remains mired in Congressional protests that we must not be provocative or some such thing. It's not only militarily unsound. It is a piece of folly which can only delight the Soviets and—worse—it may invite attacks on exposed, but totally essential United States space bases.

Well, secondly, our strategy must also seek to accomplish the very specific goal of ensuring free access to space for all nations, in the same way that free access to the Earth's oceans is maintained. This goal encompasses our vital national interests and the utility of space for scientific, industrial, and commercial purposes. Thirdly, our strategy must encourage interaction between defense and civilian space programs. Our defense requirements must remain the primary concern of any joint effort. It shouldn't preclude joint ventures where defense assets of the United States can aid scientific investigation in other nations without compromising our first priority, and that cooperation should be considered. But, what must not be considered or ever granted, is any agreement that we cannot use any space platform in which we participate and for which we will pay the great bulk, of course, that we can't use it for security purposes. And yet, some talk about agreements of that kind as necessary to get other countries in.

Military and civilian programs, such as the space station, must be available for defense experiments, or other American national security uses, consistent, of course, with international law.

Finally, our strategy must focus purely on defense in the future. It must provide a foundation for the government or industry and for academia, jointly to pursue our technological superiority that we have in space, and to maintain it. We must capitalize on America's genius as it evaluates and develops concepts for future generations of systems, including the new National Aerospace Plane, in which the President's extremely interested. Space-based radar, new propulsion systems, and beyond, all of these things we have to work on, and we need to be funded.

Our new space policy must aim, of course, to deter war, as all of our policies do. It must aim to protect free access to space, to promote cooperation between civilian and defense space sectors, and focus on the technology of the future.

Lastly, I'd like to mention just one additional requirement for our space strategy. It must be consistent with other elements of our national security strategy. It must recognize the current vulnerabilities of space systems within the context of deterrence. And it must acknowledge how survivable space systems contribute to perceptions of the nation's defense strength, and therefore, encourage and provide an international climate, within which, true and acceptable arms reduction agreements are possible. Now, obviously, this latter point is particularly important today, as we anticipate the beginning of discussions between Secretary Shultz and Foreign Minister Shevardnadze. And I hope these will be very fruitful.

Maintaining the climate of political progress, is an important goal. And our space assets, as an element of perceived United States defensive strength, and an expression of perceived national resolve, these can contribute greatly to that climate. And indeed, we believe that many of the elements of progress that we have seen recently, in arms reduction talks, have come from that correct perception of growing and increased strength.

Furthermore, our space systems provide the essential element of verification, without which, any arms limitation agreements wouldn't even be possible. And so, in closing today in the anniversary week of our nation's Air Force, it is my great privilege to express my sincere hope that in the next 40 years of Air Force history, that you'll be just successful as in the last.

The Air Force has contributed enormously to keeping our peace and to protecting our freedom. And I can think of no more noble accomplishment possible for a military service within a democracy. So, I thank you most heartily for all you have done, and for all you will do.

Thank you very much, indeed.