



**Testimony of Major General Robert Dickman (USAF, Ret)  
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**“Impacts of U.S. Export Control Policies on Science and Technology Activities and  
Competitiveness”  
Committee on Science and Technology  
United States House of Representatives  
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Chairman Gordon, Representative Hall, members of the Committee, I want to thank you for this opportunity to address this extremely important issue today. This is a timely and necessary discussion, and I applaud your willingness to address the topic.

US trade and visa policies put in place to provide additional layers of national security are having severe and long-term effects on advanced systems technology sectors and the professional workforce that serve them. As a result industries are faltering, innovation is stifled, competencies are withering, and the technology workforce is becoming less competitive in the global marketplace.

As Executive Director of the American Institute of Aeronautics and Astronautics, I represent a constituency of nearly 30,000 aerospace professionals, located in all fifty states and in 80 countries internationally. These are the men and women who are “in the trenches” and see first hand everyday the effects of export controls policies and International Trafficking in Arms Restrictions (ITAR). This is an area of great concern for our members.

I also sit before you as a retired military officer with 37 years of service to our nation and am deeply committed to its security. I have seen the effects that these policies have had from the acquisitions side as well. I understand the need to protect our current advantages in capabilities.

We all understand the reasons why our export control policies were put in place. We have enjoyed technical superiority from decades of investment in education and RDT&E, and from producing and attracting generations of the best intellectual talent pool the world has ever seen. To maintain that superiority, these policies were established to insulate our advantages from the rest of the world, and specifically from regimes that maintain a different and adversarial worldview from our own.

However, we need to make a realistic evaluation of how these policies are being implemented, and what effects they are having. We need to be willing to act if these policies are falling short, if these policies have become detrimental to our goals. Today, the reality is that these policies are counterproductive to their stated objectives.

We need to begin corrective steps so that we do not continue to exacerbate the crisis the current policies have created that are actually harming our national security as key vendors in our technology sectors go out of business due to lack of export opportunities thus denying us the very technology we are trying to protect. We need to make certain that we develop and implement integrated policies and holistic strategies that enable us to remain technologically superior to threats against our national security, embrace participation in the international science community, and regain competitiveness in the global marketplace.

There are things we can begin to do in the current regimen that will reestablish some faith in the system and that will enable us to adapt rather than start from scratch with an entirely new set of policies. At the very least this will enable us to correct some of the more detrimental aspects of the current policy while developing the next generation of export policies.

As a point of departure, we need to reevaluate the technologies and their components listed that we believe provide us with a distinct advantage in the national security arena. This needs to be done on a regular basis so that the list can keep up with changes and advances in technologies and capabilities. One problem with the current lists is that they have not been examined comprehensively since their inception. What we now have are broad lists of components with little rationale for why many of these items were originally restricted and whether that rationale is still correct. There is also a lack of explanation for how a component is evaluated for export release and how decisions are made in the certification process. It is frustrating to both vendors and purchasers to have so many unknowns upfront in the process.

Recommendation 1 in the National Academies' *"Fortress America"* report focuses on balancing interests and objectives. Several of the action items included in the recommendation revolve around this idea of evaluating the components on the lists, individually justifying inclusion both on a basis of what makes the item unique in capability and in what way its export would present a substantial national security risk. In other words, technologies and components would be restricted from export on a "by exemption" basis, rather than the current approval for export on an individual basis. This recommendation also stresses the need to regularly examine these lists, and goes so far as to recommend "sunsetting" the list and starting over as often as every 12 months.

At AIAA, we are performing an independent evaluation of satellite components similar to the suggestions in the "Fortress America" report. We have drawn on subject matter experts for this evaluation, and have created a process to analyze components based on several criteria. Our objective is to produce a survey, and a well-developed process that will be helpful in developing a regular evaluation of listed components.

The first step is to reevaluate whether these components are truly commercial use, dual use, or exclusively military use. This will mean developing a definition of what each of these categories involves, and then providing a compelling national interest for listing components within these categories. I think we would all agree that those components that fall into that last category should remain restricted, and a number of the components that fall into that second category should also remain restricted. A major part of the problem today is that many dual-use items with little or no unique military value are controlled. However, because the state-of-the-art changes, and the evolution of the commercial marketplace, we must continually re-evaluate whether each component remains correctly categorized. This is really a process that should take place within the national security community as an honest discussion, not a protectionist blanket.

Second, we need to examine whether the manufacturing capacity, either domestic or foreign, offers some strategic advantage. By this I mean we should examine whether the ability to produce a component or system provides some military advantage, and then determine which other nations have that capability. This is to provide a criterion for determining whether the ability to produce a particular component merits greater security restrictions than would just the capabilities of that component.

These first two steps should help us to narrow the list of components that are subject to the third step, which is to evaluate the performance of those components on this shortened list, and compare them to the capabilities of foreign manufacturers. In some of the recent reports and studies on this issue some examples have been provided of foreign technology far outpacing its U.S. counterpart and have revealed the absurdity of applying ITAR restrictions unilaterally on all satellite components. These include instances where the performance of multiple foreign designed and manufactured components' performance exceed the capabilities of the U.S. equivalent, and are readily available in the global marketplace. However, while the U.S. product may enjoy some economically competitive advantages such as costs associated with the manufacturing process, the U.S. product is put at a disadvantage in this marketplace because it remains subject to ITAR and the export control licensing process. The "*Fortress America*" report well describes this in the following terms: "(t)he artificial limitations on trade imposed by lists of controlled technologies have had predictable results with respect to the U.S. position in global markets. With U.S. companies prevented by export controls from competing in certain markets, foreign competitors...spring to fill these competitive gaps. As these competitors have proliferated, U.S. companies have suffered challenges in the marketplace that would not have been present but for export controls."

Fourth, we need to evaluate the trends in capabilities of foreign components. While we may still maintain the state-of-the-art capabilities, we need to examine how far equivalent components' capabilities have come and project when we may expect those capabilities to surpass our own.

I understand that there are practical constraints that limit this process. I know that the licensing office within the Department of State has been streamlined, and that they have

become much more efficient in processing licensing applications. However, they are still limited in the human capital available to perform these evaluations, and I understand it would be placing an unrealistic burden upon that staff to complete periodic comprehensive evaluations of the components that they may not possess the expertise to perform, and while still maintaining their workload. To make the problem manageable, the list must be shortened carefully but quickly. I also believe that the Directorate of Defense Trade Controls can be instrumental in working with policymakers to develop a defined standard that is used in the evaluation of applications, and I do think that it would be very helpful for both the vendors and the purchasers to understand the standard when assessing the utility of moving forward with a licensing application.

## CONCLUSION

There are some encouraging signs. Just five years ago nobody was having this conversation in the public forum even though the problem clearly existed. Our policymakers did not seem ready to accept the realities of the effects of current export control policies, and they certainly did not want to open up the possibility of loosening restrictions on sensitive technologies during these uncertain and unsettling times. Industry leaders were concerned with drawing further scrutiny on their applications, were reluctant to be seen as badgering their largest customer, the U.S. government, and were frankly timid on this issue because they did not want to be accused of putting their bottom line before national security. Now, however, there is widespread agreement that the time has come to fully address these issues, and I believe this is in large part attributable to these studies that have been mentioned, as well as other reports that have also discussed the direct decline in national security caused by these and other restrictive national policies on export of technologies.

The effects we are seeing are troubling. It is a multi-faceted issue, and the current state in each of these areas is alarming. Early on, we noticed the economic impacts of ITAR and export controls. The belief at the time was that we should endure the economic costs to preserve national security. Nobody can fault the philosophy of putting national security before economics. However, this is clearly a situation where it was not an either/or dynamic. The policies that we have put in place are having severe impacts on both.

In recent years, this committee has focused on America's ability to compete as the world continues its transformation into the information age. How we approach educating and developing our workforce is just as important as the approach we take to global trade. We need to increase and improve our investments into RDT&E to ensure that these programs continue to attract the best minds, capture the imagination and creativity of the next generation, and provide the technological return on investment that we are enjoying by the foresight put in our investments in these areas 20 to 30 years ago and longer.

While these are not irreversible trends, further inaction will put us dangerously close to the point where it may well be. Our course moving forward must be proactive. We must change the process and the philosophy that we used in restricting technology sales. We should look beyond technology restrictions, and improve the intellectual discourse in

R&D in our universities, our industry programs, and our federal research facilities. We should focus on preparing the next generation workforce to compete in advanced technology industry. This includes loosening visa constraints, and encouraging the world's brightest minds to come to the U.S. We must also be willing to make long-term investments in R&D and the infrastructure that supports it.

## **QUESTIONS POSED BY THE HOUSE COMMITTEE ON SCIENCE AND TECHNOLOGY**

### **1. What are the implications and unintended consequences of current export control policies and regulations on U.S. science and technology competitiveness, including its space research activities?**

I believe some of the more obvious include the reverse “brain drain”, the loss of institutional knowledge, the stifling of industrial advantages and entrepreneurial success, and the strengthening of foreign industrial competitors with the direct reduction in our own industrial capacity. For example, I think you are also seeing U.S. industrial space research become even more risk averse because of the reduction of profit margins for U.S. technologies caused by the increased competition and reduction of foreign markets for U.S. products.

In 2008, the Center for Strategic and International Studies released *Health of the U.S. Space Industrial Base and the Impact of Export Controls*, which reported the findings of a study specifically focused on this topic. I know Tom Young co-chaired this study. That working group did an outstanding job of examining the many implications that export controls have had on the space industry. The conclusions of this study were startling. The study also identified seven principles, or truths about the role of space science and technology, and the national space industrial base as they apply to our national security.

This committee, the Congress and the Administration must consider what is happening to the U.S. industrial base and look at it from more than the economic perspective, which in itself have been detrimental. It really needs to be viewed from a more inclusive holistic view of our national security perspective. Do our export control policies help or hinder our ability to design and build the capabilities that we would need to defend ourselves, no matter the adversary?

I think it is important that our national security goals should also ensure a robust and sustainable aerospace sciences, technology, and industrial base. When you examine those principles defined in the CSIS study, you cannot help but to realize how imperative this point is. We must stop looking at these issues from a standpoint of what it will cost, or what we will lose control of. Instead, it must become a matter of what it will cost to not to take bold action, and what will we have left to maintain.

Whether we are talking about creating this change of course in months, or over the next several years, the one thing that is clear is that it serves us no good to do this piecemeal. There has to be some real strategy with a defined intended outcome.

**2. The National Academies recently issued a report, *Beyond “Fortress America”*: *National Security Controls on Science and Technology in a Globalized World*. To what extent would action on the report’s recommendations help mitigate the unintended consequences of export controls on trade, and research and education, including space research?**

I don’t want to go into a long discussion about visa policy since that is not the focus of this hearing. However, that is a conversation this committee needs to continue having. I bring it up because of the influence of these federal policies on foreign technology professionals and the adverse effects these policies have had on our science and engineering research base. I sincerely believe that for changes to either technology or the human capital associated with technology to be successful, you must also make modifications to the both. The 2007 National Academies report, *Rising Above the Gathering Storm*, that study group made several recommendations to improve national visa policy that would increase the flow of intellectual talent coming to and remaining in the US to train, work, and teach. If we are going to regain our role as the recognized leader in research and development then we must reverse the barriers to foreign technology professionals thriving in the U.S. to create the advantage of the international “brain drain” from overseas that we enjoyed from the 1940s through the 1970s.

In Recommendation 3 of the “*Fortress America*” report, the authors specified action items that mirror those earlier recommendations from the *Gathering Storm* report. We need to provide the opportunities for foreign talent to come and stay in the US as part of our R&D strategy, and we must ensure that there is a pathway for them to enter and remain to take advantage of these opportunities.

I believe the recommendations in this report to be sound, and a good foundation for the fundamental changes that we must adopt if the U.S. is to remain competitive. As I mentioned earlier, I believe that the correct approach will consist of adopting changes in several areas of federal policy including trade, RDT&E investment, and visa policies. That approach must be integrated, and we must be willing to make long term investments of time and funding to ensure that these policies bring about those intended objectives for national security and economic stability. I think we have a lot of supporting documentation, and the real task before us is incorporating many of these recommendations into a cohesive comprehensive strategy.

**3. In your view, what are the most critical issues regarding the export control system that the Committee on Science and Technology should consider as part of its oversight responsibilities for the nation’s civil and commercial space programs? What actions, if any, would you expect the Committee to take?**

I realize there are limitations due to oversight jurisdictions placed on this committee and by jurisdiction given to other congressional committees, and that not all of the changes that are needed can originate here. But given the role that this committee fills and comparing that especially to “*Fortress America*”, but also with the *Rising Above the*

*Gathering Storm* report, I would recommend starting in four areas. These are not in order of importance, but more in order with what is practical and can be implemented more rapidly.

First, we need to make certain that we are committed to the ideals of initiatives such as the America COMPETES Act, and really invest in our education system and workforce. We need to create and support programs and facilities that captivate our students at a young age with hands-on instruction and training, so that we are developing a homegrown workforce that is enthusiastic and capable in science, technology, engineering, and mathematics. They will be the foundation for our nation's ability to compete and excel in an evermore-competitive global marketplace. We must ensure that future generations of the U.S. technology workforce are able to sustain and build upon the advances that our nation has achieved.

Next, I believe this committee can encourage global engagement in science and technology. We need to once again invest in our research & test facilities to make them attractive to international collaborators and researchers. We need to develop policies that allow and encourage U.S. researchers to talk and share ideas, findings, and recommendations without a fear of violating U.S. trade policy. We need to make certain that the U.S. is once again considered a valued and necessary research partner in international collaborations.

Third, I believe that the committee can support appropriate changes to current visa policies to promote access and inclusion of international students and researchers into U.S. colleges and universities, industry research programs, and federal research programs and facilities. This will help us to insure that the talent pool participating in U.S. research continues to be drawn from among the brightest in the world, so as to reduce the capable talent available to foreign competitors, and challenge the perspectives and paradigms of American-produced scientists and engineers, improving the overall quality of their research.

Finally, and most directly related to the export control system, I think the Committee can be instrumental in prescribing a process by which the Administration can review and update technology and their components lists on a regular basis, streamline the several lists for some uniformity, and standardize licensing considerations and requirements. I agree with the report's recommendation that this needs to be done with a focus on understanding why items should or should not continue to be controlled, rather than on adding components to an increasingly restrictive and misunderstood list.

**4. In the absence of any changes to export control policies and regulations, what is the outlook for the competitiveness of our space industry, our ability to execute U.S. government-funded space programs, and our overall leadership in space over the next five years?**

Without a change of course, we will certainly witness dramatic changes in our competitiveness and level of superiority. We are really talking about generational effects, well beyond five years.

When the European Union brokered an agreement on aerospace R&D, European Vision 2020 was designed with the goal of developing an aerospace sector that would be unrivaled even by the U.S. Their partnerships and collaborative agreements have allowed Europeans access to state-of-the-art facilities where world-class research is being conducted. When this was first brokered, American aerospace executives believed their hold on aerospace markets to be too great to be concerned by the Europeans' aspirations. It took a decade from their original declaration for Airbus to surpass Boeing in annual global sales.

“ITAR-free” marketing is designed specifically to compete with U.S. systems and components with contracts that have much less regulation, and can be completed in a much shorter timeline. These are policies developed specifically to make the European manufacturers a more attractive alternative to U.S. industry and the marketing has been very successful, even for almost purely commercial products. The effect has been a dwindling U.S. industrial base largely dependent on government contracts to keep production lines open.

The policies we have implemented that have sent us on this path were not established for a five-year course. As we have ceded superiority in space technologies, we have seen growth of competencies around the world increase significantly. While it has taken some of these federal policies 20 and in some cases 40 years to take their real toll, now that we are at this point, we are now seeing rapid technology gains around the world and more rapid deterioration within our own industrial base. Nations and companies no longer need to come to the U.S. for our knowledge, facilities, or technology because our restrictions and their own advancing technology. As they continue to institutionalize their education, research, and manufacturing capacity, they will gain a greater edge. To be direct, we will be noticeably less competitive in five years without a change in course and far more so in ten, 15, 20 years and beyond. The issue is whether the U.S. is willing to invest in regaining that superiority or whether we will continue to shield our eyes from this glaring problem, and see our capacity and capabilities continue to whither.



## Biography for Robert S. Dickman

Bob Dickman is the Executive Director of the American Institute of Aeronautics and Astronautics, a professional membership technical society with more than 36,000 members in 80 countries.

Mr. Dickman was born in Brooklyn, N.Y., grew up in New Jersey and entered the Air Force in 1966 as a distinguished graduate of the ROTC program at Union College, Schenectady, N.Y. His military career spans the space business from basic research in particle physics to command of the 45th Space Wing and Director of the Eastern Range at Cape Canaveral, FL. He served as the Air Force's Director of Space Programs, the Department of Defense Space Architect and the senior military officer at the National Reconnaissance Office. He retired from active duty in 2000 as a major general. From 2002 to 2005, he was the Under Secretary of the Air Force's Deputy for Military Space.

Mr. Dickman has graduate degrees in Space Physics and Management and is a distinguished graduate of the Air Command and Staff College and the Naval War College.

He is a member of the Air Force Scientific Advisory Board and the DOT Commercial Space Transportation Advisory Committee. He has been recognized by Union College with its Nott Medal, was the National Space Club's Astronautics Engineer of the Year, was selected as one of *Space News* "100 Who Made a Difference" and is a Fellow of the American Institute of Aeronautics and Astronautics.

Bob, his wife Barbara and their son, Tad, live in Springfield, Virginia.