

## **Aerospace States Association (ASA)**

**“Understanding the issues surrounding Export Control/ITAR”**

**Hearing held in House Rayburn Building**

**Tuesday, March 11, 2008**

**Testimony by Congressional and Administration:**

**Opening Remarks – Lt Governor Brian Dubie, Vermont\* – Chairman ASA**

**Honorable Donald Manzullo\*, IL** – Ranking Member, House Subcommittee on

**Testimony provided by -**

**Industry:**

**Honorable Marion Blakey \***– President & CEO Aerospace Industry Association (AIA)

**Mr. Peter Bunce\*** – President and CEO, General Aviation Manufacturers Association (GAMA)

**Mr. David Logsdon\*** - Executive Director, Space Enterprise Council, US, Chamber of Commerce (SEC)

**Academia:**

**Professor Bob Twiggs\*** – Stanford University

**Dr. Thomas Zurbuchen\*** – University of Michigan

**Dr. Claude Canizares\***– Massachusetts Institute of Technology (MIT)

**Government:**

**Mr. Joseph Rouge \***– Director, National Security Space Office

**Honorable Matthew Borman** – Deputy Assistant Secretary for Export Administration, U.S. Department of Commerce

**Mr. John Hall \***– Director, Export Controls, NASA

**Mr. Robert Kovac** – Managing Director, Directorate of Defense Trade Controls, U.S. Department of State

**Media:**

**Mr. Tony Velocci\*** – Editor-in-Chief, Aviation Week and Space Technology

**Mr. Lon Rains** – Editor, Space News

Testimony\* available follows:

**Remarks**  
**Lt. Governor Brian Dubie**  
**March 11, 2008**  
**ASA Hearing on Export Controls**

Good afternoon and welcome to the Aerospace States Association Capitol Hill Hearing on Export Controls. My name is Brian Dubie, and I am Lieutenant Governor of the State of Vermont. I am also Chairman of the Aerospace States Association, a non-profit organization comprised of Lieutenant Governors, who are focused on aerospace and how it affects state government interests such as education and employment.

The United States has long been regarded as a leader in technological innovations; and, countries around the world have aspired to achieve our same level of economic prosperity. A large part of our technological and economic prowess can be attributed to the U.S. aerospace industry. From portable GPS units such as the TomTom to Apple's I-phone, America's aerospace industry serves as the catalyst behind these advances. The research and development that went into the Apollo and Space Shuttle programs, for example, yielded a plethora of commercial spin-off applications that contribute to the high standard of living that we enjoy today. The sense of adventure and the entrepreneurial spirit embedded in America's aerospace industry have fueled our competitive advantage over the last century.

Our national security, economic vitality, and the freedom of movement that we have come to take for granted, rely on a strong aerospace sector. The U.S. aerospace industry accounts for 634,000 jobs and contributes \$170 billion to the U.S. economy. In my home state of Vermont, aerospace brings in nearly \$1 billion annually.

As we look toward the future of aerospace, we see both opportunities and challenges. We see opportunities in the greening of the aerospace industry making it more environmentally friendly and more efficient. We see opportunities in the Vision for Space Exploration with the development of the Crew Exploration Vehicle designed to return man to the moon and beyond. We also see challenges—challenges in the form of decreasing investments in research and development, a graying workforce that is eligible to retire, a lack of qualified workers to fill the gap, and growing competition in the global economy. One of the significant challenges to the continued competitiveness of the U.S. aerospace community is U.S. export control policies.

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**Statement of the Honorable Donald A. Manzullo**  
**Aerospace States Association**  
**Capitol Hill Hearing on Export Controls**  
**Tuesday, March 11, 2008, at 1:00PM**  
**Room 2325 Rayburn**

Thank you for inviting me to speak here today on the importance of export control modernization for our national security, defense industrial base, and economic competitiveness. I am delighted that the Aerospace States Association has taken such an active role in raising the level of awareness on this important issue.

Export control modernization is extremely important to the 16<sup>th</sup> District of Illinois which is one of the most heavily industrialized congressional districts in the nation. We make everything from nuts and bolts to the advanced electrical system for the new Boeing 787. Many of the products and technologies produced by these manufacturers are regulated under U.S. export control law.

I first learned about this arcane law after first getting elected to Congress over 15 years ago. A manufacturer from Northern Illinois came to me seeking assistance in getting through the regulatory process to sell their product overseas. The issue was so complex that I had to get a couple of experts to come in and educate me extensively on the process. One of those experts was Christopher Padilla who is now Undersecretary of Commerce for the International Trade Administration (ITA).

Chris Padilla did a good job explaining the nuances of export control law to me. It is unfortunate that we cannot clone him to provide the same level of service for the tens of thousands of manufacturers that need to comply with these complex regulations. Ever since that day, I have been a champion of export control modernization.

About a year ago I, along with Joe Crowley of New York and Earl Blumenauer of Oregon, founded the Congressional Export Control Working Group. I did this to educate Members of Congress and their staff on the importance of export control modernization efforts to U.S. national and economic security. I have been working on policies that will enhance U.S. national security, strengthen our defense industrial base, and increase U.S. competitiveness.

I have coauthored H.R. 4246, the Defense Trade Controls Performance Improvement Act, with Chairman Brad Sherman of California. H.R. 4246 will reduce defense trade license processing times, create a spare part waiver for our closest allies, and make defense trade licensing more transparent and predictable. These non-controversial, good government changes will make U.S. munitions manufacturers in every category, including space, more competitive in the international marketplace.

But we all know that more attention is needed for commercial communication satellites which are controlled as munitions because of a law enacted in 1998 that transferred all satellites and related technology to the United States Munitions List (USML). I have long been active and interested in this issue, including my vote in 1998 against the initial amendment to move the licensing jurisdiction from the Commerce Department to the State Department, treating these commercial products like a gun or a tank. Only 53 other Members understood this issue enough to join me -- including 9 Republicans -- but we were unable to prevail during the hysteria over the lack of enforcement of existing export control laws. In 2000, I was proud to be an original cosponsor of legislation to return the jurisdiction of licensing decisions back to the Commerce Department. But unfortunately, this is still a grave problem.

According to a recent Center for Strategic and International Studies (CSIS) study, “[t]he U.S. is the only country that classifies commercial communication satellites as ‘munitions.’” This has led to a considerable loss in market share for the U.S. commercial communication satellite industry.

The report found that International Traffic in Arms Regulations (ITAR) controls are particularly troubling for second and third tier suppliers – many of which supply common technology and commodities that are globally available. Furthermore, the study found that ITAR controls may be driving foreign satellite development because many countries are unable or unwilling to comply with the ITAR.

I believe that everyone here will agree that space is critically important to U.S. national security interests – that we must do all we can to protect critically sensitive technologies while promoting the defense industrial base. This can only be done if we make a distinction in how the U.S. controls mission critical, national security sensitive technologies that are unique to the United States and commoditized products.

I look forward to discussing the implications of the CSIS report with my colleagues and working on a solution that balances current policies with long-term strategic objectives.

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**Marion C. Blakey  
President and CEO  
Aerospace Industries Association**

**Aerospace States Association  
Hearing on Export Controls  
Rayburn House Office Building**

**March 11, 2008**

- Good afternoon, and thank you for inviting me to take part in this important event today. I'm Marion Blakey, president and CEO of the Aerospace Industries Association.
- It is great to follow Congressman Manzullo in addressing export controls since he has shown such great vision and energy in pushing for modernization of the system in Congress. I would like to thank him publicly for all he has done.
- Let me also thank Lt. Governor Dubie and the other lieutenant governors of the Aerospace States Association for organizing this important hearing.
- I'm glad to be here with Pete Bunce of GAMA and David Logsdon of the Space Enterprise Council -- excellent partners and allies in our Coalition for Security and Competitiveness.
- As you might know, AIA represents the nation's aerospace and defense manufacturers, with members in every high-technology manufacturing segment. These include everything from commercial aviation and avionics; manned, unmanned and network-centric defense systems, to space technologies and satellite communications.
- Our companies represent the cutting edge of high technology, and sustaining it in your states is what brings us here today.
- As we have heard from the congressman, export control modernization is a critical issue for our country that requires the attention of more of our key policymakers.
- I would like to focus on the big picture of why export control modernization matters, and why it is especially important to you at the state level.
- When our industry talks about export controls, we are always mindful of their important role in protecting our most sensitive technology. It is vitally important to our companies that we never do anything that might be detrimental to national security.
- Our defense and economic strength rely more than ever on efficient and effective regulation of the exchange of hardware, technology and technical data between U.S. and our international partners.

- Importantly:
  - Defense trade builds military interoperability, trust, and advanced capabilities with our allies that are vital to keeping our nation secure.
  - It also maintains U.S. influence globally and advances America's interests abroad.
  - U.S. high technology industries employ millions of Americans and account for a \$57 billion positive foreign trade balance – the largest of any U.S. manufacturing sector.
  - The aerospace sector alone employs 642,000 people in high-paying jobs, while it exports up to 40 percent of its production each year.
  
- Unfortunately, in recent years there have been serious delays by the State Department in processing military export authorizations. There have also been inconsistencies in decisions granting or denying these requests. Both of these have damaged our relationships with allies and trading partners, and impeded efforts to strengthen military and economic cooperation.
  - Many export licenses take months to secure, even though more than 95 percent of applications that are filed properly are eventually approved.
  - In 2006, the State Department caseload grew to 70,000 licenses, with a backlog of 10,000, according to Acting Undersecretary of State John Rood. In FY 2008 they expect 85,000 licenses worth \$96 billion, and annual growth into the future should be between 8 and 10 percent.
  - Companies in other countries have increasingly “designed out” U.S.-made goods, particularly in the commercial satellite arena. This is done to avoid the processing burdens associated with our export licensing system.
  - These problems particularly hurt small businesses in your states. Your companies not only face delays and unpredictability in the licensing process, but they are also confused by the rules, terrified of making a mistake and paying high costs to get help figuring out the system.
  
- AIA appreciates the administration's daunting responsibility to both protect our country's security and maintain our technological leadership and economic competitiveness through high-technology exports.
  
- We believe these objectives are complementary, and we can achieve both with the right approach to export licensing.

- The administration agreed, releasing just a few weeks ago a series of directives based on industry recommendations to make the U.S. export control system more predictable, efficient, and transparent.
- We believe these directives are significant in their commitment to process all munitions list export licenses within 60 days barring national security or congressional notification requirements. Also important are newly created dispute resolution mechanisms to clarify export control policies and rules that industry needs to follow.
- Congressman Manzullo and his colleague and subcommittee Chairman Brad Sherman are going even further to modernize the U.S. export control system with their Defense Trade Controls Performance Improvement Act.
- We have made progress on other critical, short-term industry priorities, including a soon-to-be-released clarification of controls on civil aircraft components.
  - This is important so civil aircraft component manufacturers in your states will be able to assure their customers they are purchasing only clearly designated commercial components that can't be confused with military parts.
- We also need Senate ratification of the Defense Trade Cooperation Treaties with the United Kingdom and Australia.
  - These treaties will improve our military interoperability and technology cooperation with two of our closest allies, and remove from the backlog a large number of licenses that will ultimately be granted.
- It is our hope that this growing recognition of the need to modernize the export control system will lead to long-needed adjustments to one-size fits all controls.
  - This old approach has been particularly troublesome to our commercial satellite industry in the United States.
  - In 1998, Congress moved control of commercial satellites and related components from Commerce Department to State Department jurisdiction.
  - The goal was to keep sensitive technology out of the hands of our adversaries.
  - According to a recent CSIS report, the change damaged our space industrial base in general, and our commercial satellite components sector in particular.
  - U.S. companies lost market share to foreign competitors that did not exist before the jurisdiction shift.
  - The American military is finding it either more expensive or more difficult to access U.S. sources of critical technologies and R&D that support our national security.

- I hope that the same common-sense approach that is starting to take hold in the administration and Congress on how to control the right technologies the right way will provide relief to our space industrial base.
- I want to thank the members of the Aerospace States Association for familiarizing yourselves with this issue and with the changes that are in progress. That way you can both monitor their impact as well as demand more improvements on behalf of the aerospace companies and employees in your states.
- For too long, we have allowed this issue to remain an inside-the-beltway problem when it affects our aerospace companies and their employees all across the country.

--AIA--

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**The Aerospace States Association (ASA)  
Capitol Hill Hearing on Export Controls  
March 11, 2008**

**Peter J. Bunce  
President and CEO  
General Aviation Manufacturers Association (GAMA)**

The United States leads the world in technological innovation. Our government has both the right and the responsibility to control the export of our most sensitive technology to those who might harm us or our interests around the world. About this there is no debate. The challenge is to do this while remaining engaged and open to the rest of the world in order to maintain that technological edge.

A recent report by the Deemed Export Advisory Committee (DEAC) stated, “*Leadership in science and technology today is a globally-shared and highly interdependent perishable asset.*” The report also noted that a nation that builds “walls” around technological and scientific knowledge “*denies itself the opportunity to fully benefit from the vast body of knowledge being accumulated elsewhere.*” Effectively protecting our national security while ensuring our continued international leadership and competitiveness therefore requires a thoughtful and flexible export control system. We must of course control technology that is only available from U.S. sources. But the debate over the appropriate level of export controls is usually painted as between those who would basically liberalize controls in order to stimulate U.S. exports and those who see liberalization as compromising national security. I believe this is a false dichotomy.

Our export control system today is too cumbersome and rigid and too often harmful to our international competitiveness. It all too often has the effect of harming U.S. competitiveness as it seeks to control the export of technology that is widely available elsewhere. We need to do things differently, smarter. U.S. manufacturing industry unequivocally supports sensitive technology controls. The right export control system need not harm American exports and competitiveness in order to protect our technology.

An effective system should accurately identify and safeguard sensitive military technologies and support U.S. technological leadership and competitiveness through a flexible regulatory system. It should also facilitate, not hinder, technological and industrial cross-fertilization with trusted partners and allies. Needless to say, it should seek allies' cooperation in controlling sensitive technology. An export control system that does these things will help preserve this country's industrial base and technological leadership. This is particularly important in the general aviation manufacturing industry. U.S. general aviation manufacturers lead the way in bringing to the market technology that makes aviation safer, more efficient and more reliable. This in turn preserves and creates solid, high-paying jobs throughout the United States.

The general aviation industry is one of this country's most successful and globally competitive industries. U.S. exports of general aviation airplanes in 2007 came to \$4.59 billion, representing 38.4% of total U.S. GA manufacturers' billings. Obviously, the global market is important to us. And this more so today than it has ever been. U.S.-based GA manufacturers sent 1,142 planes overseas last year. Compare that with just 333 in 2004. Our 2007 export earnings, \$4.59 billion, are up from just \$1.42 billion in 2004. And each one of these airplanes represents the cutting edge for its class, incorporating the latest advanced avionics, materials and other technology.

When a U.S. general aviation manufacturer discovered that deliveries to its first customers of a new model were suddenly held up inexplicably by U.S. export control rules due to a determination that an infra-red camera incorporated in its avionics package should not be exported without a specific license, we have to ask, why? And so the first few planes were delivered with a license that prohibited them from flying to certain destinations, reducing their usefulness to their owners. In the meantime the manufacturer began the arduous "commodity jurisdiction" process of obtaining a determination that this technology should not be subject to defense trade controls under the U.S. Munitions List but to dual-use controls administered by the Commerce Department. The appeal was ultimately successful, so there's a happy ending. But let's dissect this a little deeper. The

component in question was not even of U.S. origin, was not controlled by the nation where it was produced (a close U.S. ally), and was available on commercial terms to anyone.

This highlights some of the unfortunate consequences of our export control system. Modern avionics clearly incorporate a number of individual technologies with potential military applications. But thankfully our system recognizes that when such technologies are incorporated into a civil-certificated airplane they form part of a larger system (the airplane) that is not, and should not, be controlled. I will come back to this point later. However, inconsistent interpretation and perhaps an overabundance of caution on the part of overworked licensing personnel can lead to situations such as the one described above and imperil U.S. exports.

We need not go into the high tech field to discover examples of the counter-productive and rigid nature of some of our export control rules, however. One component supplier discovered and voluntarily disclosed that the same circuit breaker that it supplied civilian airplane manufacturers had been supplied for decades to the B-52 bomber. Another discovered that an antenna coupler it produced was the same for U.S. fighter jets and some civilian applications. In these cases, violations were committed inadvertently, disclosed voluntarily and resolved satisfactorily. The real question is, why should these low-tech, everyday, widely-available products be controlled at all?

However, this makes small components companies where much of the innovation takes place leery of participating in a program that could put them in a position of inadvertently violating export control rules. Additionally, small companies have neither the expertise nor the resources to implement the expensive and complex export control compliance measures, including physical, process, and other changes that must be implemented. This applies to any item that is produced, designed, modified, or developed for military use, including some decidedly low-tech items.

In a global economy where one can obtain anything but the most advanced of today's technology from multiple sources around the world, it is important that our export controls be targeted with laser precision, and adapted regularly. There are technologies that we must protect, and there are governments, institutions, groups and individuals that should have no access to them. But let us concentrate our efforts on controlling those technologies that truly are cutting edge, and rationalize the system so that we do not harm U.S. competitiveness.

A coalition of industries led by the Aerospace Industries Association and including GAMA, last year proposed a series of measures to improve the functioning of the export control system. These measures were designed to require no legislative action, no change in the law. In January, the President issued an export controls modernization package based on those recommendations. We welcome this initiative and urge the government agencies responsible for defense and dual-use export controls, the State, Commerce and Defense Departments, to implement them and apply the necessary resources to bringing them to fruition as soon as possible.

It is significant that, after years of industry recommendations, the above reforms are, let's face it, relatively innocuous. They are the low-hanging fruit. They should be uncontroversial; they essentially seek to make the system work the way it is supposed to work: transparently, fairly and efficiently. This suggests that real reform remains in the future. Real reform involves a top-to-bottom review of both the defense and dual-use control lists and a mechanism for their future, routine updating.

Let me also note another initiative that has particular applicability to the aviation industry. That is the current effort to ensure a consistent interpretation of Section 17 (c) of the Export Administration Act (EAA) of 1979, which is currently implemented through Executive Order 13222. This provision of the law places FAA certified parts and components under the jurisdiction of the Commerce Department for purposes of dual-use export controls. As a letter co-signed by 34 members of the Congress to the President last September stated, the explicit intent of this provision was to transfer civil training

aircraft below 600 horsepower and larger aircraft with certain integral components from the jurisdiction of the Department of State to that of the Department of Commerce. However, the State Department has not recognized this jurisdiction. Failure to resolve the jurisdictional issue has had negative consequences for small businesses as exports are delayed or foregone due to the need for expensive and long commodity jurisdiction cases to be resolved, often over antiquated aircraft parts. It also disrupts supply chains and introduces great uncertainty. Last, but not least, it places additional demands on the resources of an overburdened export control licensing system to focus on low-risk areas.

I understand that a new Federal Register notice is expected soon that should provide some clarity to industry, allowing it to operate in an environment of stability and predictability. This is welcome, and again I thank AIA and our other industry coalition partners for their leadership in moving this forward.

I alluded earlier to the report from the Deemed Export Advisory Committee (DEAC). A “deemed export” refers to the release of dual use technology to a foreign national within the United States. In other words, knowledge transferred to an individual within the U.S. can essentially be exported if that individual chooses to do so. The United States is the only nation that specifically and separately controls this type of export. This increasingly important issue calls for careful analysis and consultation with industry in order to institute an effective and rational system of control. Foreign nationals are an integral part of the workforce of many U.S. high-tech industries, including the aerospace and general aviation industries. The DEAC has proposed a number of new measures that industry believes would be difficult to translate into regulations, burdensome to comply with, and counterproductive to our national interest. I urge the Department of Commerce to work with industry to rethink its approach.

In the end, I am confident that the United States will continue to lead the world in technological innovation. I am also confident that we will find a way to balance our need to remain open to the rest of the world against our right to ensure that we keep the most sensitive technology out of the hands of those who would harm us. I applaud the

Aerospace States' Association for organizing this valuable opportunity to explore these important issues.

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## **Testimony from David Logsdon –**

### **March 11, 2008 ASA Export Control/ITAR Hearing**

Good afternoon, Congressman Sherman, Congressman Manzullo, and Lieutenant Governor Dubie. My name is David Logsdon, and I am the Executive Director of the U.S. Chamber of Commerce Space Enterprise Council. The Space Enterprise Council represents all aspects of the aerospace industry and is comprised of thirty companies. The U.S. Chamber of Commerce is the world's largest business federation, representing more than three million businesses and organizations of every size, sector, and region.

#### **Introduction**

As you may know, the U.S. Chamber of Commerce is a founding member of the Coalition for Security and Competitiveness and the Space Enterprise Council is a member of this important group. The Coalition is committed to advancing a modernized export control system that is efficient, predictable and timely and supports U.S. competitiveness and national security. However, I'm here today to discuss the impact of the current export policy regime on the space industrial base, specifically to small businesses (Tier Two and Tier Three companies) and entrepreneurial companies. As national and economic security have become increasingly intertwined, the economic impact on small business and entrepreneurial companies has national security ramifications. On behalf of the Chamber and its Space Enterprise Council, I would like to thank the Aerospace States Association for holding this hearing and focusing attention on this very important issue.

As I begin my testimony, I would like to make four basic points:

#### **Cost of Compliance and Financial Health**

According to the Air Force Research Lab/Department of Commerce "Defense Industrial Base Assessment- U.S. Space Industry" August 2007 report, export control compliance costs averaged \$49million per year industry-wide. Compliance costs grew 37% during the 2003-2006 period with the burden of compliance significantly higher for companies in the lower tiers.

#### **Unintended Consequences**

Foreign competitors leveraged their countries' more relaxed regulatory climate in marketing their products as "International Traffic in Arms Regulation (ITAR)-free" directly affecting U.S. companies' ability to compete, especially the lower tier suppliers. In effect, our companies are even losing opportunities with our allies who have sought to avoid cumbersome U.S. controls.

#### **Competitiveness on the Foreign Market.**

According to the AFRL/DOC report, Tier Two companies feel that ITAR restrictions and limits are a major impediment to be able to respond to proposal requests and subsequently sell products in foreign markets. Tier three companies are starting to leave the space industry due to a sustained absence of profitability and a refusal of some foreign customers to procure equipment that requires U.S. ITAR licensing.

## Export Controls and the Aerospace Workforce

Though foreign nationals are composing a growing portion of the engineering talent pool, because of the stringent export policy, several companies are starting to phase out the hiring of foreign nationals. This is particularly relevant because there is such a dearth of qualified domestic personnel. Hiring a foreign national requires: an export license, a technology control plan, special training in export control compliance, facility modifications, computer network architecture modifications, and escorting and monitoring the employee.

## Background

The space industrial base is now operating in a global economy. In order to meet the needs of the war fighter, the Department of Defense (DOD) acquires goods and services from an industrial base that includes foreign suppliers. Further, the DOD has an interest in seeing that U.S. allies have access to weapons and equipment that will allow them to fight effectively and efficiently with U.S. forces. On the other hand, the U.S. has an enduring interest in seeing that advanced defense technologies do not fall into the wrong hands and thereby become a threat to both the U.S. and its allies. At the core of the effort to prevent the improper diversion of defense technologies is the arms export control policy of the U.S.

For many years, U.S. arms export control policy was based on preservation of national security and the need for allies to keep weapons technology out of the hands of Eastern Bloc countries. With the end of the Cold War, arms export control has become more complicated and difficult. The post-Cold War global arms market is extremely competitive; defense firms compete for an ever-greater share of a smaller pie. Partly in response to this competition, the defense industry has put tremendous pressure on the U.S. government to modernize and speed up the arms export licensing process, which industry claims is too slow and inefficient and therefore threatens its market share.

At the same time, the need for rigorous export controls has never been greater. Arms traffickers have been trying to secure weapons and defense technologies that they can sell, at a huge profit, to rogue states, terrorists and other dangerous individuals and groups. Preventing these individuals and countries from acquiring U.S. defense technology is the primary objective of the licensing process that industry seeks to streamline. Thus, government agencies responsible for controlling arms exports are confronted with the unenviable task of balancing industry's demands for a system that supports U.S. competitiveness with the need to keep dangerous technologies out of the hands of unauthorized end-users.

To export or re export satellites and most satellite components to a foreign country, or to launch a satellite on a foreign launch vehicle, one must first attain proper authorization from the U.S. Government. Under the ITAR, the Department of State (DOS) is the licensing authority for most commercial communications satellite exports and re exports, although recent interagency reviews of the U.S. Munitions List (USML) have resulted in

the transfer of several categories of space qualified components to the DOC's Commerce Control List (CCL).

The policy surrounding the export of commercial satellites (primarily communications satellites, or comsats) has revolved around giving jurisdiction to export between the DOC and the DOS. Under the DOC, comsats fell under the dual-use controls, while under the DOS they were on the munitions list.

Unhappy with this outcome, DOC appealed to the National Security Council and President Clinton. In March 1996, after many interagency meetings, President Clinton ordered that comsats be transferred to DOC. To accommodate DOS's concerns, he issued an executive order in December 1995 that required DOC to refer all export licenses to the DOS, DOD, Energy, and the Arms Control and Disarmament Agency. A majority vote of these five agencies would decide licensing conditions. By October 1996, all jurisdiction over comsats was transferred to Commerce.

1996–1999

Two launch failures of the China's Long March rocket would once again bring change to U.S. export policy: the January 1995 failed launch of the Long March 2E rocket carrying Hughes built Apstar 2 spacecraft and the February 1996 failed launch of the Long March 3B rocket carrying Space Systems/Loral-built Intelsat 708 spacecraft. The satellite manufacturers and China worked together to create an analysis of the failure of both these launches. This analysis was required to fulfill insurance requirements and was reviewed by the DOC. DOC determined that the export of the analysis to the insurers and China fell under the license DOC issued in February of 1994 and allowed its transfer to China.

This analysis created a major controversy, as it was unclear whether DOC had the authority to approve such an export. A congressional review determined that these launch failure reviews were conducted without required Department of State export licenses, and communicated technical information to the People's Republic of China in violation of ITAR. This investigation led to the inclusion of a provision in the Strom Thurmond National Defense Authorization Act in 1998 that returned control of all satellites and related technologies to the DOS. This was accomplished by the removal of said items from the DOC list of dual-use items in the Export Administration Regulations and placing them on the DOS's USML, controlled under section 38 of the Arms Export Control Act. In addition, a provision was added that the President must certify to Congress 15 days in advance that any transfer of satellite technology to China would not harm U.S. launch companies and/or help Chinese missile technology.

The events leading up to the convening of the Cox Committee by the Congress in 1998, and those following the declassification of its report in 1999, have had a significant worldwide impact on the U.S. export licensing process. U.S. laws that were once business-friendly have become more stringent to accommodate national security concerns, but with no differentiation between potential adversaries and allies. Whether the change will actually be able to achieve the intended national security goals is uncertain, especially since many of the new measures taken differ from the actual

recommendations of the Cox report. In the meantime, international aerospace commerce has become encumbered by rules at best ambiguous, at worst counterproductive.

In January of 2002, Space Systems/Loral agreed to pay the U.S. government \$20 million to settle the charges of the illegal technology transfer and in March of 2003, Boeing agreed to pay \$32 million for the role of Hughes (which Boeing had acquired in 2000) in the export violation. In addition to that, the company has had the export of its satellite, Chinasat-8, blocked for launch in China from 1998 to the present day.

#### Cost of Compliance and Financial Health

As stated earlier, according to the AFRL/DOC “Defense Industrial Base Assessment-U.S. Space Industry” August 2007 report, export control compliance costs averaged \$49m/year industry wide. Compliance costs grew 37% during the 2003-2006 period with the burden of compliance significantly higher for companies in the lower tiers. As a percent of foreign sales, the cost burden on Tier Three companies is nearly eight times that of Tier One firms. These compliance costs include insurance costs, consulting services, compliance training costs, and Defense Technology Security Administration monitoring costs. For companies that are operating on tight budgets, these accumulating costs can be devastating to a company’s bottom line.

According to the AFRL/DOC report, margins are thin and below average for the Tier Two and Tier Three suppliers. The average net margins for the Tier Two and Three suppliers are around 5%, compared to 9% in the high technology manufacturing sectors in the general economy. There is a direct correlation between export policy, the cost of compliance, and the financial health of the Tier Two and Tier Three suppliers.

For entrepreneurial companies, because of the cost of compliance, the net margins (if they exist) are even lower. Entrepreneurial companies have had to restrict discussions with several foreign investors because they could not perform due diligence and this has impacted investment capital.

#### Unintended Consequences

Our stringent export policy has, in essence, allowed our global competitors to catch up in the global aerospace marketplace. As our global competitors have narrowed the gap, they have started to develop capabilities that, in many instances, are very similar to ours. In Europe, U.S. components and technology are slowly but surely being designed out. There are six primary examples that clearly show a definite “ITAR-free” trend:

! Creation of a ITAR-free European apogee motor;

! ITAR-free European thruster control valves;

! ITAR-free European star tracker;

! Microwave components from the Astrium Megha-Tropiques mission instruments;

! Alcatel satellite bus; and

! GRACE mission where U.S. systems integrator was replaced by a foreign contractor.

Several other countries have stated that they won’t buy from the U.S. due to export controls.

This, in turn, has led to issues about our competitiveness on the foreign marketplace.

#### Competitiveness on the Foreign Marketplace

Because of our current export policy regime, U.S. companies are finding it increasingly difficult to compete on the foreign marketplace. In a recent study, more than half of all U.S. companies polled stated that they didn't think that they could be competitive on the global marketplace. According to the AFRL/DOC study, Tier Two companies feel that ITAR restrictions and limits are a major impediment to be able to respond to proposal requests and subsequently sell products in foreign markets. Tier three companies are starting to leave the space industry due to a sustained absence of profitability and a refusal of some foreign customers to procure equipment that requires U.S. ITAR licensing.

The Space Enterprise Council represents all the manufacturers of remote sensing satellites (most of which are Tier Two companies) in the industry and their prospective is quite telling. According to the Council's remote sensing companies, over \$1 billion has been allocated to foreign competitors by their respective governments in order to compete internationally. In turn, the opportunities lost to foreign vendors due to U.S. regulatory restraints include:

- ! Spain's abandonment of ISHTAR to participate in the French HELIOS system;
- ! Taiwan's ROCSAT-2 program also built by a French concern;
- ! South Korea's latest KOMPSAT program built by an Israeli company;
- ! Thailand's remote sensing satellite system built by the French;
- ! Turkey's current procurement- where not a single US company bid; and
- ! Singapore's multi-satellite constellation cooperation with Israel.

The Council also represents many of the subcomponent manufacturers. According to recent Aerospace Corporation analysis, the following are areas of concern in the space supplier base (where there is only one domestic supplier left or the supplier is financially weak):

- ! Solar Cells & ! Lithium-Ion Batteries
- ! Traveling Wave Tubes
- ! Visual Imagers
- ! Optical Coatings
- ! Read-out Integrated Circuits
- ! Infrared Focal Plane Arrays
- ! Solar Cell Substrates

#### Export Controls and the Aerospace Workforce

According to the National Academy of Sciences (NAS) report, "Rising Above the Gathering Storm," the United States has a few issues that need to be reformed in terms of international students and scholars. NAS recommends:

- ! That there be a less complex visa processing and extensions process;

- ! New PhDs in S&E: 1-year automatic extension and automatic work permit and expedited residency status;
- ! Skills-based, preferential immigration points system to prioritize U.S. citizenship; and
- ! Reformation of the “deemed exports” policy
  - o Allow access to information and research equipment except those under national security regulations

The Chamber’s Space Enterprise Council backs these recommendations. For small and entrepreneurial companies, the current export restrictions have severely impacted a company’s ability to hire employees with specialized technical expertise. These reforms are needed because the domestic talent pool has shrunk dramatically. Consider the following facts:

- ! In South Korea, 38% of all undergraduates receive their degrees in natural science or engineering. In France, the figure is 47%, in China, 50%, and in Singapore 67%. In the United States, the corresponding figure is 15%.
- ! Some 34% percent of doctoral degrees in natural sciences and 56% of engineering PhDs in the United States are awarded to foreign-born students.
- ! In the U.S. science and technology workforce in 2000, 38% of PhDs were foreign-born
- ! About one-third of U.S. 4th graders and one-fifth of U.S. 8th graders lacked the competence to perform even basic mathematical computations.
- ! U.S. 15 year olds ranked 24th out of 40 countries that participated in a 2003 administration of the Program for International Student Assessment (PISA) examination, which assessed students’ ability to apply mathematical concepts to real world problems.

Finally, the reforms are needed because of the “graying” of the aerospace workforce. The 2002 Presidential Commission on the Health of the Aerospace Industry” stated that 27% of the aerospace workforce could retire by 2008. Fresh blood is needed, especially for those folks in the 30-40 year old range. These folks will make up the next set of aerospace program managers.

#### Conclusion

Congressman Sherman, Congressman Manzullo, and Lieutenant Governor Dubie, thank you for the opportunity to discuss this serious issue. The Chamber and its Space Enterprise Council stand ready to work with Congress to ensure that we have an export policy regime that balances both national security interests and economic security competitiveness. We congratulate you for taking this important step by holding today’s hearing.

In summary, we believe that the recent directives from the White House is a step in the right direction; however, we believe that we need a fundamental change to the export policy regime to ensure both our national and economic security. Small business is the bedrock of the American economy and the small businesses in the aerospace community continue to be adversely affected by our export control policy.

The Chamber and its Space Enterprise Council stand ready to take action on behalf of the

business community to provide viable solutions that benefit business, workers, and our national and economic security.

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**Capitol Hill Hearing on Export Controls  
Rayburn House Office Building  
Washington D.C.  
March 11, 2008**

**Professor Robert Twiggs (Emeritus)  
Stanford University Stanford, California**

I am here this afternoon as a faculty member of Stanford University Aeronautics and Astronautics department and as an educator promoting worldwide student education using student built small satellites called CubeSats.

I have been at Stanford since 1994 working with graduate students in the development of small satellites. To date our students have either completely built or work in collaborative efforts to launch five satellite missions. Three of the missions have been launched on US launchers – two on the Minotaur and one on the Lockheed Martin Athena. The other two were launched on Russian launchers.

At Stanford and the California State Polytechnic University, we developed the CubeSat which I show to you today. We can add these parts which can be purchased at Radio Shack and other educational parts suppliers and build a satellite that will work in space. It is an ITAR controlled device because it is classified as a “space technology”. I can add the same technology here to an RC controlled car that we give to children as presents and it is not ITAR controlled.

**How has the ITAR restrictions affected our educational effort?**

The largest direct effect on our space education work is the added cost and delays that we experience in getting a foreign launch. We have been forced to use foreign launches since we have had no interest from US launch services or prohibitive costs and long delays for our small satellite payloads. We use the California State University Foundation launch services for foreign launches. Only the Cal Poly Foundation has registered as an “Arms Export Dealer” to work with the Department of State for an export license. We have in the past asked the administration at Stanford University to consider being registered as an “Arms Export Dealer”, so that we could work on ITAR related projects.

Since the antiwar riots at Stanford in the 1960’s they no longer work on any classified military projects or directly working on projects with ITAR restrictions.

We have, however, found that the US Department of State has been very cooperative with Cal Poly’s faculty and students that provide the service through the university foundation.

## **How does ITAR affect foreign technology development?**

The restrictions placed on US business and other barrier that it causes is accelerating technology development in foreign countries. If nations like China want new technology, there are no significant restrictions from getting that outside the US. It also leads to incentives to do more research and development by foreign countries so they are less dependent on US technology.

### **In Summary**

The ITAR restrictions cause delays and increase costs for educating students for the US space business. We have a large portion of foreign students in our research programs. These research programs have made significant contributions to the US technology in many ways. We, however, cannot take advantage of all of the talent from these graduating research students due to ITAR restrictions on hiring foreign nationals in the space business.

### **Recommendations**

We need a continuing dialog and review of the ITAR rules to make sure that the restrictions really do accomplish the goal of restricting the transfer critical military technologies and not impact areas and process which are detrimental to US technical education and foreign trade for the space businesses.

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**The Aerospace States Association  
Capitol Hill Hearing on Export Controls  
March 11, 2008**

**Professor Thomas H. Zurbuchen, University of Michigan**

My name is Thomas Zurbuchen. I am a Professor in Space Science and Aerospace Engineering at the University of Michigan. I run a Masters of Engineering program in Space Engineering. I also ran a PhD Program in Space Science until a couple of years ago. I am now the Director of the Center for Entrepreneurship at the University of Michigan, dedicated to the empowerment of students, faculty, and staff within the University, as well as being an enabler for the entrepreneurial community in Michigan and elsewhere.

In mid-January this year, the MESSENGER spacecraft flew by Mercury and provided the first look at our innermost planet since the mid-seventies. On MESSENGER there is a small instrument – weighing only 3 pounds – that was built at the University of Michigan. The Fast Imaging Plasma Spectrometer (FIPS) provided us with the first measurements of Mercury's thin atmosphere and the first ever plasma ion measurements from measurements from this battered magnetosphere. FIPS almost did not make these historic, exciting, and enlightening measurements because of ITAR>

You can tell from my accent that I did not grow up in the U.S. I was born in the mountains of Switzerland. I have been a proud U.S. citizen for close to four years. But in 1999, I was still on an H1 visa. We had been working on a proposal for a totally new and innovative sensor that would allow us to measure plasmas but weigh only 10-20% as much as traditional sensors. We had some tough electronics to build and I was heading a very small, but fantastic team – almost all of them U.S. citizens. Then, in 1999 the Strom Thurmond National Defense Authorization Act was signed into law. All of a sudden the level of concern about export controls escalated. Now, transfer of knowledge or know-how to a foreign national was defined as export. Because of my citizenship, my status on the project changed, though the actual project did not. Other participants on the project outside of the U.S. felt that, by law, I could no longer work with my engineers, or discuss technical details – details that needed lots of discussion. I was stuck. Wasn't I doing fundamental research? It sure seemed that way: What can you possibly use the ion sensor for? Our ion sensor was clearly and only designed for research use. But, FIPS was specifically designed for use in space and there was therefore no question that we fell under ITAR – and that was serious. I remember two principal impressions from that time: How helpless I felt and how humiliated. There was nothing I could do: we did not know how to get clearance and the University of Michigan was largely confused by export issues and averse to accepting any projects that imposed restrictions on access by foreign nationals. But that did not matter to our suppliers, collaborators, and federal agency project managers who were scared of violating federal export laws. I also could not imagine how I could use FIPS to hurt the U.S., and I felt this was implied by the rule.

Fost-forward ten years. My lab looks very different. I do not have any foreign nationals working there. We now have rooms and servers that are locked off to fulfill contractual conditions. And we still struggle with the same problem: Due to ITAR, foreign nationals are still under a handicap with regard to participating in space research at a university. Although the ITAR problems are much less if a project is solely fundamental research, these days, space projects are overwhelmingly collaborations with organizations that are not U.S. universities and therefore do not have the benefit of the fundamental research exclusions. At a minimum, faculty members at the University must have extensive interactions with the collaborators; and such interactions by foreign faculty members are hindered by the ITAR rules. This hindrance can result in the University not hiring the best faculty for the desired areas of research, or can result in foreign faculty (like I was) from participating in projects for which they are best suited. ITAR thus remains an obstacle to universities and the United States and keeps them from being the leaders in space research.

ITAR also discourages the best students from attending U.S. universities and contributing to and enhancing the excellence of our space research, both at the universities and subsequently in industry.

I run a Masters program in Space Engineering that prepares students for careers in aerospace engineering. This year I have two students out of forty who are not U.S. citizens. Contrast that with an average of 25% of Masters students across the College of Engineering who are foreign born. They have absolutely no hope of finding a job in the U.S. space industry, while their U.S.-born colleagues, many of whom hadn't done nearly as well in class, get multiple job offers. The best student I ever had is not a test pilot for EADS because as a German he could not get a job in the U.S. Another student of mine is running an advanced space communication program in CNES, the French space agency, after he also failed to get a job in the U.S.

Let me assure you that I share a key value that undoubtedly initiated these problems: I do not want to have any crucial technology get into the wrong hands. More importantly, I do want the U.S. to be the dominant country in all the areas that create technological leadership and ultimately enable a better and safer life for my family.

On the other hand, there are many examples of the dire consequences of these overly restrictive rules: The best high-resolution space clocks you can buy right now are built in Europe. They were not built there until a few years ago. The European Galileo program – the European version of GPS – couldn't get U.S. technology, so they started a crash program of their own to develop what they needed. I don't have to tell you that the U.S. has very little influence on the limiting of the exportation of European technology to nations whose space aspirations may worry the U.S.

I would also propose that the premise of ITAR protection is wrong and inconsistent with the basic rules of technology development. As I mentioned, I am the director of the Center for Entrepreneurship at the University of Michigan College of Engineering. In this role I deal with emerging technologies, new innovations, new businesses, much of

this involving students. We are “surfing the wave of innovation.” There is one rule that I see at work every day "Technological leadership comes from aggressive offense not from a defensive posture. The only way for the U.S. to maintain dominance in space engineering is to outperform innovators worldwide. We can't build a wall around progress and lock it up. We have to stay out front of the race for innovation and leadership.

I personally believe in the importance of U.S. research universities in this struggle for leadership. In the end, success will boil down to two key ingredients: the talent that can create the next victory and the environment that encourages our best to excel. This is of course true for all engineering disciplines. But, interestingly, not other disciplines have created methodologies that dramatically differ from aerospace engineering.

In general, at the University of Michigan College of Engineering we are emphasizing three key elements: entrepreneurship, interdisciplinary design, and international cooperation. We have a goal that within 5 years 50% of our students will spend one semester abroad. Our students work around the globe and their engineering products address global needs and opportunities in all sectors: energy, sustainability, health science, computer science, and many more.

Contrary to the general approach for the College, aerospace engineering, especially its elements that relate to the design of space systems, is moving backwards. ITAR is a major obstacle to the participation in space research by international faculty and students and to the desired and needed international cooperation.

In summary, ITAR regulations, designed to guide and protect, have confused us and they have made us vulnerable. But the most important consequence ITAR has had for the University of Michigan Department of Aerospace Engineering is that it has led to loss of quality and to isolation from other disciplines and their progress.

So, how did FIPS make it to Mercury, you might ask. The answer is: We got lucky. Just a few months after getting isolated from my own project, I received my Green Card. Our Canadian-born mechanical engineer, however, lost this job. Still, we managed to pull it off. FIPS was built at the University of Michigan and involved 3 graduate students and well over 40 undergraduates. Many of these students are now turning into leaders in the aerospace industry.

On behalf of my colleagues and myself, I thank the Committee for their attention to this important topic. In my opinion, international, open collaboration is the only way we can assure that space technology continues to be invented at our nation's best universities.

Thank You.

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**Testimony Before the  
Aerospace States Association  
By Claude R. Canizares**

**Vice President for Research & Associate Provost  
Bruno Rossi Professor of Physics  
Massachusetts Institute of Technology  
Washington DC  
March 11, 2008**

Mr. Chairman, distinguished members and guests: Thank you taking up this very important topic and for the opportunity to testify before you.

I am Vice President for Research at MIT and a space scientist. For over 35 years I have designed, built and used space instrumentation, working with NASA, industry and national laboratories. I have had the honor of serving on NASA's Advisory Council, and chairing the Space Studies Board of the National Academy of Sciences. I also have experience with matters of national security, having served on the Scientific Advisory Board of the U.S. Air Force, and I currently oversee MIT's Lincoln Laboratory, a secure facility dedicated to technology for national security. I am also a Director of L-3 Communications, a Fortune 200 aerospace corporation.

My eloquent colleagues have illustrated how universities play two essential, interconnected roles that advance both the economic welfare and national security of the United States: first, the education and training of our future aerospace workforce and second, the creation of new knowledge and new technology through basic and applied research. Universities have been major participants in both national and international space programs since the very dawn of the space age. Indeed, the first U.S. satellite, Explorer I, launched exactly 50 years ago, was built by researchers at Caltech and the University of Iowa.

The open environment of U.S. universities is a major contributor to their excellence and strength. So is their ability to collaborate with international colleagues, who bring unique expertise and outside funding that leverages the investments of the U.S. taxpayers. Universities themselves are international in nature. Fully 1/3 of MIT's 6000 graduate students come from outside the US and each year, approximately 1600 international scholars visit and contribute to MIT's research and education. Many of these stay in the US and contribute directly to our national well-being. For example, roughly 1/3 of MIT's current faculty were, like the previous speaker, born outside the U.S.

ITAR continues to seriously hamper university activities in space research. Issues around the actual export of hardware are sometimes problematic, but less acute. The primary area of concern for universities is the limitation on the sharing of technical data with non-U.S. persons within the U.S. or abroad (referred to as "deemed exports" in some venues). A major difficulty is ITAR's all-encompassing categorization of virtually all spacecraft systems, associated equipment and data as subject to control, regardless of their actual

military utility or their widespread availability outside the U.S. Regarding technical data,

ITAR controls even the most prosaic or obsolete information. Rather than selectively controlling items of significance, ITAR essentially controls everything related to space satellites, instruments and equipment. Beyond the seriously negative effects this has on universities and industry, this over-broad classification surely diminishes the effectiveness of ITAR to protect information of real military significance. A recent Department of Commerce report quoted former National Security Advisor McGeorge Bundy as saying “If you guard your toothbrushes and diamonds with equal zeal, you’ll probably lose fewer toothbrushes and more diamonds.”

A key provision for universities has been the so-called Fundamental Research Exclusion (FRE), which was intended to remove basic research at “institutions of higher learning” from ITAR control. This exclusion derives from President Reagan’s National Security Decision Directive 189 (NSDD 189), which sought to shield fundamental research to the maximum extent possible from government controls other than classification. NSDD 189 was reaffirmed by then National Security Advisor Condoleezza Rice in November 2001. However, it has not really served its intended purpose. There has always been considerable ambiguity in how or when the exclusion applies even within a university. Moreover, the exclusion is of no help in facilitating the necessary and fruitful interactions between universities, industry and national laboratories that occur in nearly all of space research, and that strengthen the technical and scientific posture of the nation.

Despite several laudable attempts by the Departments of State and Commerce, NASA, OSTP and others to improve what has always been ITAR’s chilly climate for space research, many of my colleagues report that the temperatures are falling again. My fellow panelists have described their experiences. I could recite similar stories, including the recent decision by an MIT research group to completely abandon very fruitful opportunity to participate in an exciting international space science mission because of ITAR’s impediments. These foreign partners will proceed with out us, thereby advancing the science and technology on their own. It is we, not they, who are being excluded by ITAR.

What is to be done?

I share the view of many others in universities, industry and national security circles that the entire export control regime is very ill-suited to the realities of the 21st century. Nor is it anywhere near the most effective way to safeguard national security. The long-term economic strength and national security of the U.S. require a major redesign of both ITAR and Commerce Department's Export Administration Regulation (EAR).

Wholesale overhauls of our export control regime will be neither easy nor rapid, but it is time to start. Several recent studies have recommend ways to proceed, and I ask that you also look for the forthcoming report on this issue from the National Research Council’s Committee on Science, Security and Prosperity, on which I serve and which is co-chaired by former National Security Advisor Gen(R) Bent Scowcroft and Stanford President John Hennessy.

In the near term, the university space research community remains committed to continue working with our federal and industry partners to find ways to ameliorate the situation within the context of ITAR. Just a few items for consideration include:

- Restricting the categories of controlled technical data to include only information of military value;
- Clarifying the Fundamental Research Exclusion and its relationship to “defense services” in a way that truly implements the letter and spirit of NSDD 189;
- Finding mechanisms that allow industry and national laboratories to work with universities for the purposes of fundamental research without the need for Technical Assistance Agreements, including limitations on the flow-down of inappropriate clauses; and,
- Permitting re-export of instruments that originated abroad but must be returned for repair or calibration.

One idea recently advanced at a workshop on ITAR is to give NASA, and possibly selected other agencies, authority to issue a well-circumscribed exemption similar to the Foreign Military Sales exemption accorded the Department of Defense. These short-term patches would be of real value, but I want to close by reiterating the compelling need for a full review and overhaul of our export control regime. The future strength of our scientific, technical, economic and national security positions depend on it.

Thank you again for your attention.

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**Remarks for Mr. Joe Rouge (D/NSSO)**  
**ASA Hearing on Export Controls**  
**March 11, 2008**

I'd first like to thank you, Chairman Dubie and ASA delegates, not only for the kind introduction but for the great work that the Aerospace States Association has done.

If you'll indulge me for a minute or two, I'd like to start with a brief description of the National Security Space Office. Borrowing the philosophy from BASF – we don't make space decisions, we make space decisions better. This is our chief mission...to enable decision-making in the National Security Space community. The NSSO facilitates integration and coordination of defense, intelligence, civil, and commercial space activities. We are the only office specifically focused on issues that interconnect our country's space enterprise. We provide direct support to the Department of Defense, National Reconnaissance Office, Joint Staff, Office of the Secretary of Defense, Office of the Director of National Intelligence, – as well as national security space stakeholders.

In the spring of 2005 the former Undersecretary of the Air Force, the Honorable Peter B. Teets – who was also the Director of the National Reconnaissance Office – directed the NSSO to organize a council to keep him better apprised of the US Space Industrial Base. The Space Industrial Base Council (SIBC) was chartered in 2005 to “ensure the effective and continuing leadership, organization, and culture of the domestic industrial base supporting the entire range of U. S. Government space activities.” From its genesis, just three short years ago, the SIBC has grown to include 22 government organizations and has considered a host of issues. Most recently, an effort was undertaken to achieve a quantitative assessment of the health of the US Space Industry and factors impacting the space industrial base.

We conducted a Space Industrial Base assessment in 2006 by way of a detailed survey issued to 274 space companies and business units. Survey responses were returned and analyzed by the Bureau of Industry and Securities in the Department of Commerce and the Air Force Research Laboratory. The findings were reported to the Space Industrial Base Council in June 2007. Although we've seen several Industrial base studies of the US Space segment, this was our first attempt to accomplish a quantitative analysis of the health of the space industry. It is the quantitative element that really differentiates this study from the others.

In addition to the survey element, we assembled a panel of experts with backgrounds in government, industry, and national security. The Center for Strategic and International Studies was contracted to facilitate this panel and produce a report and briefing. CSIS focused the study on analysis of the Global Marketplace and competitiveness, and U. S. Space Industry Health.

The CSIS team reviewed previous studies as well as comments from various government and industry organizations. CSIS also gathered foreign perspectives through attachés at the embassies.

Using the quantitative data from the surveys and the information they gleaned from personal interviews, CSIS issued their findings and recommendations to the Space Industrial Base Council in January of 2008.

Among the findings of the CSIS study is that our Space Industrial Base should be permitted to operate as a viable commercial industry, with protections only where necessary to protect specific products and technologies that the government deems necessary for our national security.

Specifically, the CSIS study indicates a perception among those surveyed that current export control policy may be constricting U.S. engagement and partnership with the rest of the global space community, and potentially fostering an unnecessary separation between the U.S. space community and an emerging non-U.S. space community. CSIS based this view on the National Space Policy goal to “encourage international cooperation with foreign nations on space activities that are of mutual benefit”. NSP further states that, “space-related exports that are currently available or are planned to be available in the global marketplace shall be considered favorably”.

So what is the next step?

The SIBC acknowledges that prudent export control policy is necessary to control sensitive technologies. As such, the SIBC is conducting further DoD internal review of the CSIS findings to be followed by interagency discussions. These discussions will take into account ongoing export control reforms like those recently directed by the President.

I am sure we all agree that US national security is critically dependent upon space capabilities. A robust science, technology and industrial base is fundamental to maintaining our position as a global leader in space.

I'd like to thank the Aerospace States Association for inviting me to speak today, and I think we have some time left to address any questions you may have.

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**Aerospace States Association Capitol Hill Hearing on Export Controls**  
**Rayburn House Office Building, Room 2325**  
**March 11, 2008**  
**Statement of John F. Hall, Jr.**  
**Director for Export Control and Interagency Liaison**  
**National Aeronautics and Space Administration**

Good afternoon. My name is John Hall, and I serve as the Director for Export Control and Interagency Liaison at the National Aeronautics and Space Administration (NASA). It is a pleasure to be here to discuss with you the export control-related challenges to implementation of the United States Space Exploration Policy.

On January 14, 2004, the President announced a new Space Exploration Policy, which provided for completion of the International Space Station and retirement of the Space Shuttle by 2010, development of a new Crew Exploration Vehicle, and the return of crewed missions to the Moon by 2020, along with the exploration of Mars and other destinations with robotic and crewed missions to follow. Importantly, this policy stated that the United States will “[p]ursue opportunities for international participation to support U.S. space exploration goals,” in recognition of the importance and necessity of international cooperation in space exploration. This new national Space Exploration Policy was subsequently codified by the Congress in December 2005, in Public Law 109–155.

As a Government agency on the leading edge of technological development and international cooperation in space, aeronautics, and a variety of scientific endeavors, NASA is dedicated to responsible stewardship of the Nation’s advanced technologies.<sup>1</sup> NASA is unswerving in its commitment to full compliance with the Nation’s export control laws, regulations, and policies. For well over a decade, NASA has administered an effective, comprehensive, Agency-wide export compliance program, known as the NASA Export Control Program, which was established nearly fifteen years ago in close partnership with the Departments of State and Commerce. We continue to work closely with those agencies – on a daily basis – to ensure fastidious compliance with the relevant export control and nonproliferation laws and policies.

Most export control challenges confronting NASA and its contractors lie with the International Traffic in Arms Regulations (ITAR).<sup>2</sup> The ITAR regulates “defense articles” and “technical data” pertaining thereto, as well as the provision of technical assistance or “defense services” regarding those items. Defense articles are items listed on the U.S. Munitions List (USML),<sup>3</sup> and include not only implements of war but also all launch vehicles (including the Space Shuttle) and virtually all spacecraft (including the Hubble Space Telescope, the suite of Mars spacecraft, and the James Webb Space

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<sup>1</sup> NPR 2190.1, *NASA Export Control Program*, April 10, 2003.

<sup>2</sup> 22 CFR §§ 120-130.

<sup>3</sup> *Id.* at Part 121.

Telescope).<sup>4</sup> The parts and components of such items are likewise captured on the USML, as is relevant technical data, which is defined as information required for the design, development, production, manufacture, assembly, operation, repair, testing, maintenance, or modification of such items.<sup>5</sup>

The most common ITAR concerns for NASA and its contractors relate to export license process requirements and certain license restrictions, such as restrictions on foreign governmental employees with dual-nationalities, that are problematic for foreign governments and other partners. We are very pleased that the Department of State has taken steps to address some of these issues, most notably with regard to processing times and certain license conditions, and we are hopeful that additional improvements may be undertaken.

For example, in the International Space Station program, which is governed by Government-to-Government agreements that already include safeguards on transfers of export-controlled goods and data, the Russian Federal Space Agency (Roscosmos) has declined to sign the prime contractor's Technical Assistance Agreement (TAA) for Space Station and Space Shuttle activities, citing the preexisting safeguards to which it has already agreed. As a result, NASA's Space Station contractors cannot participate in necessary technical interchanges with certain International Space Station partners. Roscosmos' refusal to sign the TAA could potentially impact communications, where downlinked data from the Space Station must be routed through the Mission Control Center in Moscow (TSUP) for evaluation and data analysis by U.S. contractor engineers.

The inability of U.S. contractors to adequately engage foreign contractors in anomaly resolution discussions because of restrictive conditions, or "provisos," in their licenses and TAAs is also of concern. Rendezvous and docking of the European Automated Transfer Vehicle (ATV) and Japanese H-II Transfer Vehicle (HTV) with the International Space Station are time-critical operations that require timely exchange of information for effective operations. In the event of an on-orbit problem, for the safety of the Space Station and its crew, ATV and HTV engineers must be able to quickly and easily share technical data – in real-time – with U.S. engineers about command and data architecture, software, environmental control, thermal control, and power issues. This is true for proximity operations as well; the Proximity Communication System (PROX) located in the Japanese Experiment Module (JEM) is used to communicate vehicle health and status data during proximity operations, and quick resolution could be required if a communication failure occurs before docking. Safety concerns such as HTV fire, pressure, and temperature must then be addressed before docking.

Unfortunately, certain provisos requiring separate and specific Government review and approval for any collaborative anomaly resolution activity may impede the ability of

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<sup>4</sup> Id. at § 121.1, Categories IV & XV (June 2007). Note: The International Space Station (ISS) is the only spacecraft under construction that is not captured on the USML; however, technical data required for the design, development, production, or manufacture of ISS components is nonetheless subject to the ITAR.

<sup>5</sup> Id. at § 120.10.

NASA's contractors to expeditiously take action to assure operations safety and mission success, including during real-time operations, where an anomaly could be encountered.

Another proviso which has occasioned concern focuses on employees of the European Space Agency (ESA) and Canadian Space Agency (CSA), and requires that employees of these governmental agencies who are dual-nationals execute Non-Disclosure Agreements (NDAs) prior to receiving technical data or technical assistance under applicable TAAs. I am particularly pleased to note that the State Department has recently published revisions to the ITAR that relieve those who hold security clearances or citizenship exclusively in NATO countries and a few other states from this requirement.<sup>6</sup> We are hopeful for additional developments in this regard, since the effect of the remaining NDA provisos is to require our international partners to discriminate against many of their employees – including those employees who are their citizens – on the basis of national origin in a manner that we would likely not accept ourselves.

Unfortunately, the export control problems encountered by our contractors have become NASA's problems – through schedule delays, cost overruns, and the inability of contractors to perform necessary work with NASA's international partners in the absence of proper export control authorizations. Accordingly, NASA has been working closely with the Department of State since 2001 on proposals to obtain its own export authority and other improvements to address these challenges. The centerpiece of this effort for NASA has been the pursuit of an appropriately-circumscribed ITAR exemption, modeled on the Arms Export Control Act's Foreign Military Sales exemption enjoyed by the Department of Defense and its contractors. This approach is consistent with the recommendations of both the Congressionally-chartered ISS Independent Safety Task Force (IISTF) report of February 21, 2007, which found that ITAR restrictions "are a threat to the safe and successful integration and operations of the [International Space] Station" and recommended that the Department of State "grant immediate relief in the form of an [ITAR] exemption," and the May 18, 2007, NASA Advisory Council endorsement of an exemption "to facilitate NASA's critical tasks in implementing the [United States Space Exploration Policy] and other NASA programs."

Recently, the State Department advised NASA to seek legislative authority as a prerequisite to the Department's promulgation of an exemption to facilitate the implementation of NASA's programs, including the U.S. Space Exploration Policy. Accordingly, we will continue to work closely with the State Department and other agencies of the Government on appropriate avenues to address the ITAR-related concerns of the Agency and its contractors, and are hopeful for a favorable resolution to move forward. With or without changes to the ITAR, however, NASA is committed to full compliance with the Nation's export control and nonproliferation laws and policies.

Thank you. I will be pleased to answer any questions you may have.

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<sup>6</sup> "State Department's Arrangement on Dual Nationals with Three Canadian Agencies," U.S. Department of State Directorate of Defense Trade Controls website; [72 Fed. Reg. 71785](#), Dec. 19, 2007)

**Tony Velocci, Editor-in-Chief**  
**Aviation Week & Space Technology.**  
**Testimony to the Aerospace States Association**  
**March 11, 2008**

I want to express my appreciation to Lt. Gov. Dubie and the Aerospace States Association for the opportunity to share my views on export controls – a topic of vital importance to the aerospace and defense industry, the states where America's A-and-D companies are headquartered, and of course, our country.

To put my testimony on International Traffic in Arm Regulations in the proper context, I want to focus initially on the commercial technology revolution that has profoundly altered the global economy and the role of U.S. aerospace and defense industry in that global economy. The increasing ease and speed of communications internationally and the rapid pace of technological change in general – not to mention rapid advances in manufacturers' agility and the need to remain competitive in what has become a hypercompetitive world – govern the way in which companies must do business. These developments – along with the globalization of financial markets and basic infrastructure – have blurred national economic borders.

By necessity, American aerospace and defense contractors that used to be concerned primarily with domestic markets have had to expand their horizons and are becoming increasingly global. Many of them operate manufacturing as well as research facilities in other countries. Moreover, U.S. aerospace and defense contractors now rely upon suppliers based outside of the U.S. and act as suppliers to large systems integrators headquartered in other regions of the world. This is true for companies selling their products and services in both civil and military markets. As a result, information once considered securely in the hands of a relative few has become available at the click of a mouse around the world.

Further, as a result of the industry's continuing globalization, companies – and by extension, the states in which they are based – sales or aviation, aerospace and military equipment to customers around the world have become nearly as important as sales to end users here in the U.S. . . . all the more so with the need for defense contractors to find commercial applications for products and technologies developed for military applications.

In point of fact, these companies are being encouraged by customers to incorporate commercial technologies into weapon systems and other military products wherever possible to reduce development and procurement costs – a trend that almost certainly will continue.

In many high tech areas typically associated with weapon systems, the commercial sector is driving technology. And given the increasingly short product cycles of such

commercial products, the Defense Dept. is turning more and more to the commercial sector for its needs. This means that in many cases, products developed for commercial end use will be acquired by non-U.S. governments to perform both defense and civilian functions – which brings us to the subject at hand: export controls. All of the developments I have just described have taxed national systems and processes established during the Cold War that govern the regulation of the U.S. aerospace and defense industry and the transfer of sensitive technologies and information. The most modern U.S. military equipment draws on the full range of technologies and processes available, making it extremely laborious to vet trade that is based on the military potential of the items involved.

The same tools are needed to build modern industrial and consumer gear that are required for military production. The large milling machines sold to the Soviets late in the Cold War, normally used for producing tanker propellers, served equally well for superior submarine propulsion. The problem is compounded if the vetting is to take place in a multinational framework, because the coordination of the scrutiny among possibly dozens of participants is inherently time-consuming. The effect is that the review imposes substantial costs, both in time as well as administrative expense – not to mention the uncertainty it imposes on the entire transaction.

Let me put it another way so there is no ambiguity: the export control system currently employed by the United States is highly dysfunctional and is simply out of step with the realities of today's world. While the current system of export controls does a good job of safeguarding weapons and advanced technologies, the system is proving to be just as effective in undermining relationships with some of America's closest allies in Europe. The near collapse of cooperation on the F-35 Joint Strike Fighter in early 2006 underscored just how serious the problems were at the time. The current system also is costing the U.S. aerospace and defense industry huge amounts of money in the form of missed business opportunities. And for the most part those problems remain.

Under current law, export controls are delegated to the State Dept., whose Office of Defense Trade Controls is responsible for processing export licenses. Unfortunately, the delays associated with obtaining approvals to export defense goods and services are bad and getting worse. In a survey conducted exclusively for Aviation Week & Space Technology, backlogs and processing times for export licenses have grown longer. Reforms in 2000 – called the Defense Trade Security Initiative, or DTSI – offered what initially appeared to be some relief, including a Global Project Authorization that would allow partners on major cooperative defense projects to perform work under only one license. Other measures included expedited licensing review for NATO countries and extension of ITAR exemptions to qualified countries. However, some of those efforts fizzled while others went badly awry.

Today, some federal government officials openly acknowledge that improvements could and should be made, but neither Defense nor State apparently has the motivation or political will to push for them. At State, in particular, one could easily get the impression that export controls is a low priority.

I acknowledge that the Bush Administration earlier this year authorized initiatives to modernize the export control system. But I will remain skeptical that the directives will be implemented and followed in the spirit of what the President intended. That the system for export controls should be updated to better balance economic and national security imperatives should come as no revelation to anyone examining the current export control regime. It has been painfully evident for years such modernization is vital to the competitiveness of the U.S. aerospace and defense industry ... indeed, the country itself.

To its credit, the industry has developed at least a dozen proposals in recent years to improve matters, such as appointing a senior director of export controls at the National Security Council, and developing a unified matrix across government agencies that guides licensing decisions base on technology, destination, administration priorities and other factors.

One of the biggest failings in the current system is the lack of transparency and predictability, which could be corrected by requiring that export license processing follow “reasonable and predictable” metrics. Mandated timelines would be one example of what should be done. Other proposals would establish an industry ombudsman at the State Dept.’s Directorate of Defense Trade Controls and reduce the burden of registration fees on small companies pursuing defense contracts and trying to globalize their businesses.

All of these ideas would seem like no-brainers that would actually help government do a *better* job of monitoring technology exports that could have military applications, while allowing defense cooperation and trade to flourish among allies. As deserving as these ideas are of serious consideration, there may be an even more effective solution to the dysfunctional nature of the current export control regime. Six years ago, the Center for Strategic and International Studies proposed an ideas whose time clearly has come – the creation of an independent agency that would take over the roles and functions now performed by the State Dept.’s understaffed and under funded Directorate of Defense Trade Controls.

There are ample precedents for creating semi-independent agencies. The U.S. patent office is one example. Another is the Federal Energy Regulatory Commission. Such agencies are staffed by dedicated employees who interact with industry through open hearings when new regulations are proposed.

Let there be no misunderstanding: export controls are about national security. National security comes first and everything else – including business – comes second. But keeping America’s military technology from falling into the wrong hands and allowing exports to friendly countries – including sharing technology with close allies – are not mutually exclusive.

It is essential that U.S. aerospace and defense companies be able to access dynamic segments of the new economy while protecting the most vital U.S. technological leads. As it is, the disconnect between the goals and net impact of ITAR is well documented.

ITAR regulations damage America's interests and distress our friends, for no benefit. And they are penalizing America's aerospace and defense industrial base, denying them legitimate business opportunities with some of the U.S.'s closest allies. The State Dept. controls export policy, based on the principle that products intended for sale outside the U.S. should further foreign policy. Yielding day-to-day processing of export licensing powers to an agency that reports directly to the secretary of State would continue to fulfill the spirit of that principle while fixing those parts of the system that are highly counterproductive.

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**Remarks for Mr. Joe Rouge (D/NSSO)**  
**ASA Hearing on Export Controls**  
**March 11, 2008**

I'd first like to thank you, Chairman Dubie and ASA delegates, not only for the kind introduction but for the great work that the Aerospace States Association has done.

If you'll indulge me for a minute or two, I'd like to start with a brief description of the National Security Space Office. Borrowing the philosophy from BASF – we don't make space decisions, we make space decisions better. This is our chief mission...to enable decision-making in the National Security Space community. The NSSO facilitates integration and coordination of defense, intelligence, civil, and commercial space activities. We are the only office specifically focused on issues that interconnect our country's space enterprise. We provide direct support to the Department of Defense, National Reconnaissance Office, Joint Staff, Office of the Secretary of Defense, Office of the Director of National Intelligence, – as well as national security space stakeholders.

In the spring of 2005 the former Undersecretary of the Air Force, the Honorable Peter B. Teets – who was also the Director of the National Reconnaissance Office – directed the NSSO to organize a council to keep him better apprised of the US Space Industrial Base. The Space Industrial Base Council (SIBC) was chartered in 2005 to “ensure the effective and continuing leadership, organization, and culture of the domestic industrial base supporting the entire range of U. S. Government space activities.” From its genesis, just three short years ago, the SIBC has grown to include 22 government organizations and has considered a host of issues. Most recently, an effort was undertaken to achieve a quantitative assessment of the health of the US Space Industry and factors impacting the space industrial base.

We conducted a Space Industrial Base assessment in 2006 by way of a detailed survey issued to 274 space companies and business units. Survey responses were returned and analyzed by the Bureau of Industry and Securities in the Department of Commerce and the Air Force Research Laboratory. The findings were reported to the Space Industrial Base Council in June 2007. Although we've seen several Industrial base studies of the US Space segment, this was our first attempt to accomplish a quantitative analysis of the health of the space industry. It is the quantitative element that really differentiates this study from the others.

In addition to the survey element, we assembled a panel of experts with backgrounds in government, industry, and national security. The Center for Strategic and International Studies was contracted to facilitate this panel and produce a report and briefing. CSIS focused the study on analysis of the Global Marketplace and competitiveness, and U. S. Space Industry Health.

The CSIS team reviewed previous studies as well as comments from various government and industry organizations. CSIS also gathered foreign perspectives through attachés at the embassies.

Using the quantitative data from the surveys and the information they gleaned from personal interviews, CSIS issued their findings and recommendations to the Space Industrial Base Council in January of 2008.

Among the findings of the CSIS study is that our Space Industrial Base should be permitted to operate as a viable commercial industry, with protections only where necessary to protect specific products and technologies that the government deems necessary for our national security.

Specifically, the CSIS study indicates a perception among those surveyed that current export control policy may be constricting U.S. engagement and partnership with the rest of the global space community, and potentially fostering an unnecessary separation between the U.S. space community and an emerging non-U.S. space community. CSIS based this view on the National Space Policy goal to “encourage international cooperation with foreign nations on space activities that are of mutual benefit”. NSP further states that, “space-related exports that are currently available or are planned to be available in the global marketplace shall be considered favorably”.

So what is the next step?

The SIBC acknowledges that prudent export control policy is necessary to control sensitive technologies. As such, the SIBC is conducting further DoD internal review of the CSIS findings to be followed by interagency discussions. These discussions will take into account ongoing export control reforms like those recently directed by the President.

I am sure we all agree that US national security is critically dependent upon space capabilities. A robust science, technology and industrial base is fundamental to maintaining our position as a global leader in space.

I'd like to thank the Aerospace States Association for inviting me to speak today, and I think we have some time left to address any questions you may have.

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