

Prepared Testimony of
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before the

U.S. House of Representatives Committee on Science
Subcommittee on Space and Aeronautics

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Mr. Chairman and Members of the Subcommittee, I appreciate the opportunity to set before you the views of U.S. aerospace manufacturers on barriers to commercial space launch.

I am going to divide my comments today into short-term and long-term barriers to commercial space launch in the United States. When testifying before you March 11th, I set forth industry's concerns regarding indemnification renewal and launch range upgrades. These are still the major short-term concerns of the U.S. launch industry. But, as they have already been provided prior to this hearing, I will simply refer you to my previous testimony and the details contained in the Attachments.

Another short-term concern relates to the bilateral launch-trade agreements with Russia, China, and the Ukraine. First of all, we have to assure U.S. companies access to foreign launch assets when these agreements expire. While doing so, however, we need to carefully weigh how U.S. launch vehicle producers will be affected. We also have to take a hard look at the possible effects of potentially unlimited access to former Soviet small launch vehicles derived from excess ICBMs. The future viability of our solid rocket booster industry may be at stake. Other short-term concerns include raising the nation's awareness of the importance of the commercial launch industry to our nation's future and spectrum allocation.

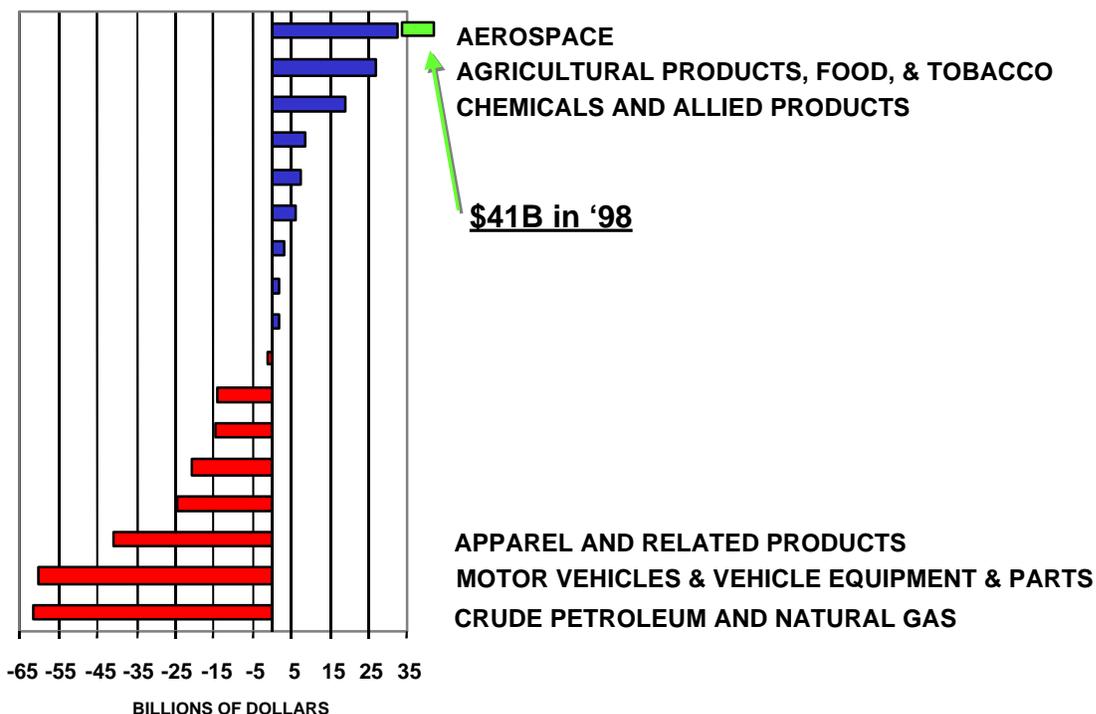
In order to assure rapid and coherent federal decision-making and raise the level of awareness of the importance of the commercial space industry, we strongly advocate reactivation of the National Space Council. Such an interagency forum would go a long way towards keeping space on the national agenda. While both parties in the past have viewed the Space Council as the means to promote an Administration's space agenda, we see its role in more practical terms. We feel that such a high level, visible body, with participation from all affected agencies is essential to coordinate federal policy and rulemaking among the various government space stakeholders to enhance our competitiveness in space and maintain our national security.

Our final area of near-term concern relates to the allocation of spectrum for satellite use. Although this strictly relates to the satellite industry, it indirectly affects the launch industry to a large degree. A recent Senate amendment to the Defense Authorization Bill would give DoD complete and final authority over all U.S. spectrum allocations. Although we support DoD and acknowledge legitimate national security needs, this move appears to be a bit draconian. Other forums and procedures exist in

U.S. law for allocation of spectrum. Rather than negating and overriding these legal procedures with the stroke of a pen, we would like to see DoD work within them, perhaps with some sort of priority status.

Switching our focus to the future, the most prominent long-term concern of the U.S. launch industry pertains to the current level of our national investment in research and development. Historically we are near an all time low in the proportional amount of our gross domestic product that is reinvested in aerospace research. I will refer now to several charts to illustrate this point.

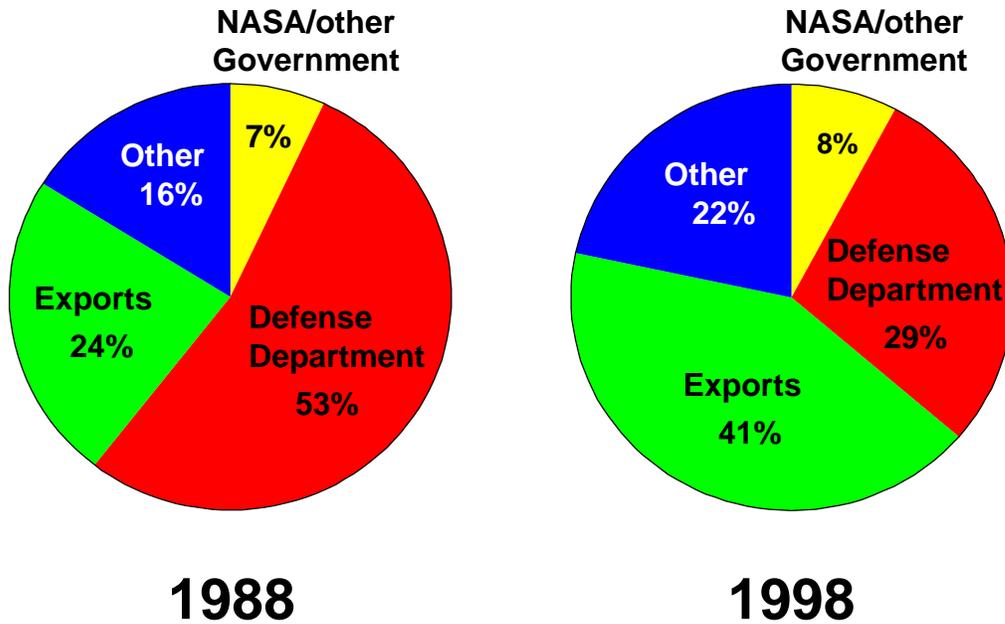
Trade Balance by Industry, 1997



The above chart shows that the aerospace industry has the largest positive trade balance by far, of any U.S. industry sector. In 1997, the aerospace trade balance was over \$30 billion, and in 1998 it was over \$40 billion. We will now look at the research funding, decades ago, which made this possible.

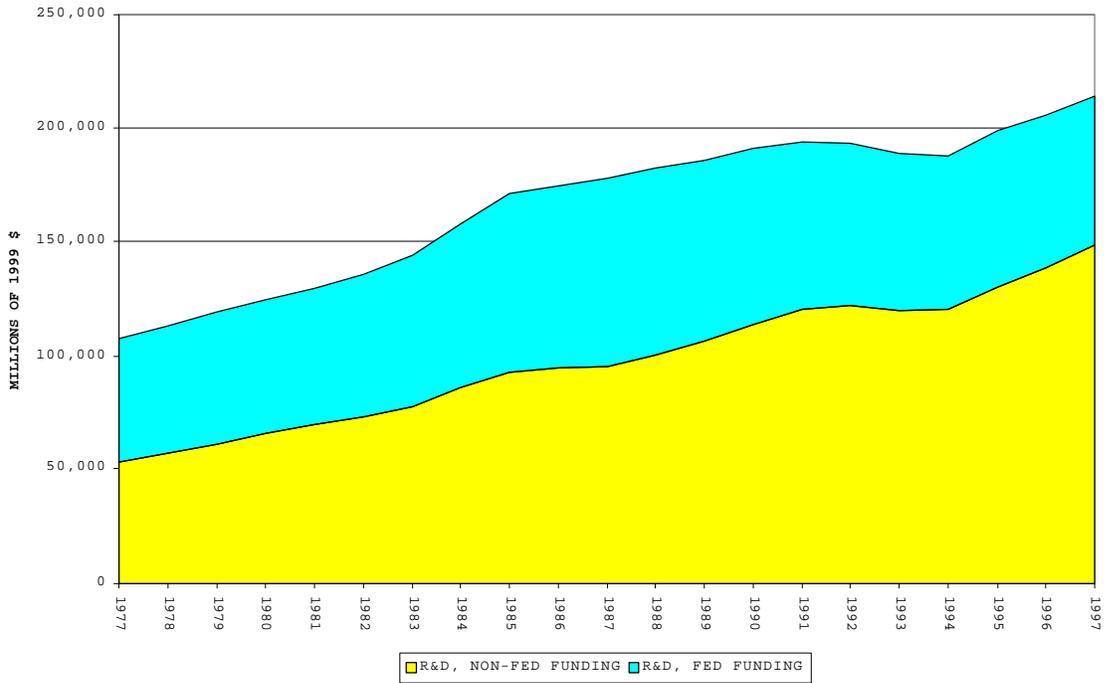
The following chart shows how our industry has changed over the past ten years. In just one decade, aerospace has moved from being dominated by nearly two-thirds government sales to just over one third government sales. In the past, the aerospace industry benefited greatly from government funded R&D which filtered over to commercial programs. With fewer government programs, this is less and less the case, with ominous implications for the future of our industrial base.

Aerospace Industry Sales

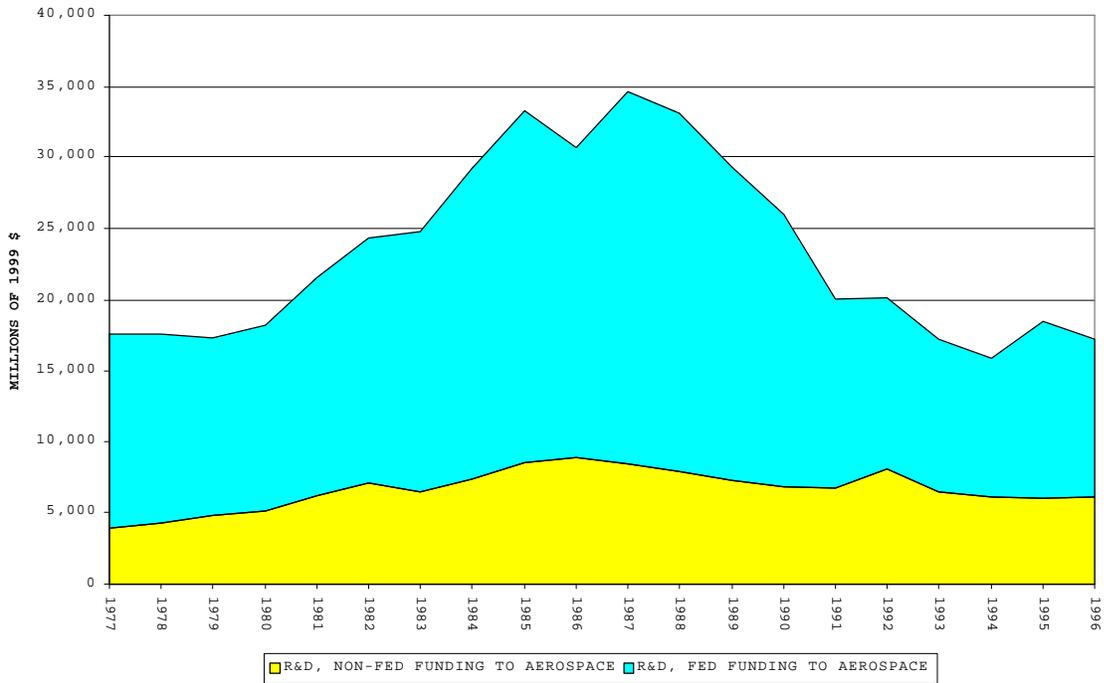


The following chart shows the overall level of our national R&D investment over the past two decades. As the chart shows, the trend has been positive. This is a major reason why our country is enjoying its current long run of prosperity. Please note, though, that federal R&D spending declined \$17 billion (21%) from \$82 billion in 1987 to \$65 billion in 1997. And when we look specifically at the aerospace sector, the trend is not at all encouraging.

NATIONAL R&D FUNDING

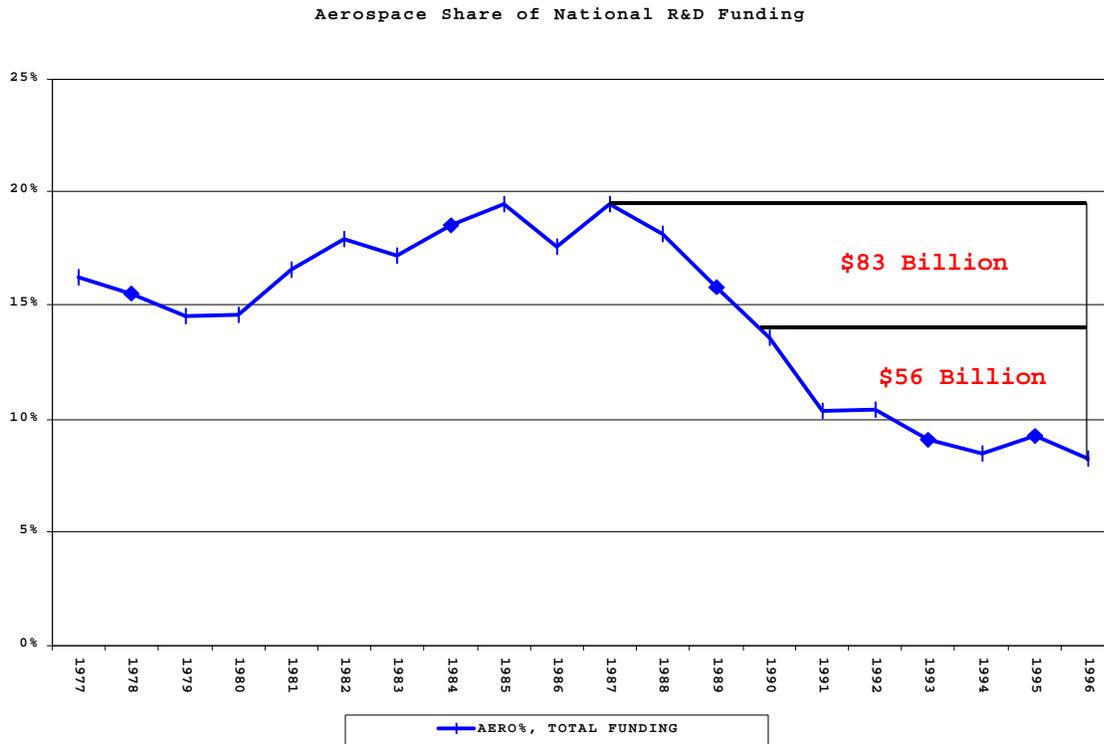


AEROSPACE R&D FUNDING



The above chart shows the aerospace portion of our national R&D investment. Here we see that

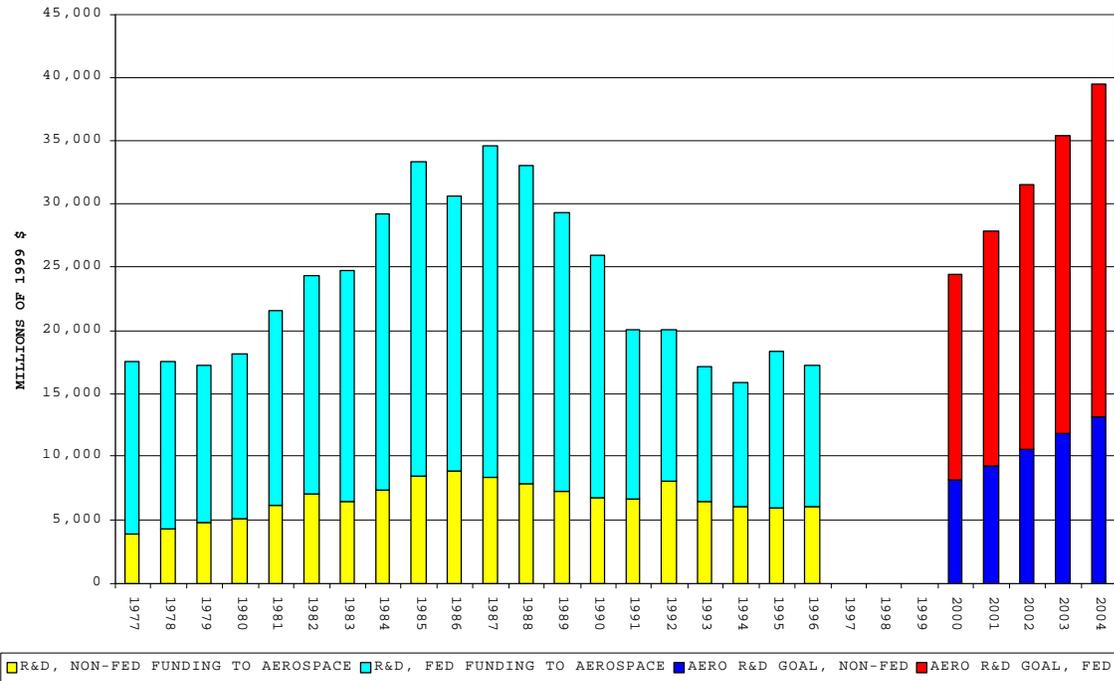
aerospace R&D funding today in absolute dollar figures is about the same as during the Carter era. What is different, however, is the relative strength of the federal government's R&D investment. Under Carter, the government invested about four dollars for every dollar from industry. Today, the federal investment is only two dollars for each industry dollar. The difference is even more dramatic when looked at in terms of aerospace R&D funding as a percentage of total U.S. R&D funding.



During the Carter years, about fifteen percent of our national R&D funding was devoted to the aerospace sector. Under the Reagan defense buildup, this increased to nearly twenty percent. Today, however, less than ten percent of our national R&D funding is devoted to aerospace. We cannot expect to maintain our position of international leadership in aerospace products if this trend continues. Had R&D funding remained at the Reagan level, \$83 billion more would have been spent on aerospace R&D than actually occurred. Had it remained just at the Carter level, \$56 billion more would have been spent.

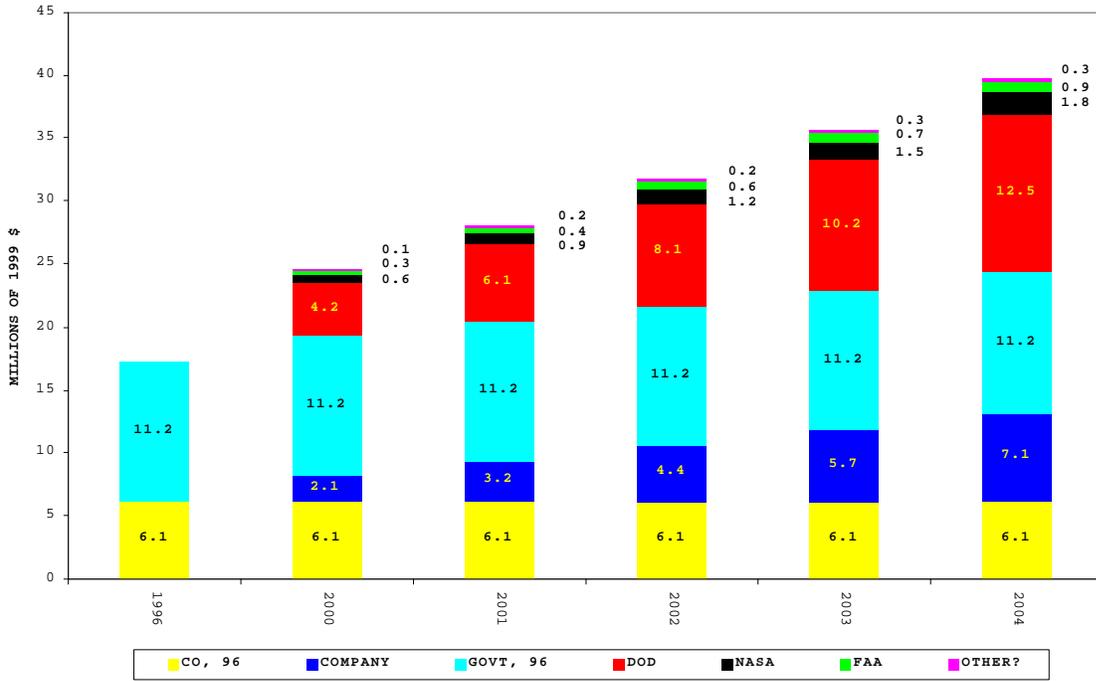
We propose a plan to return U.S. R&D investment not to the Reagan level, but just to the Carter level. Such an increase would look something like the following chart. This proposal would not even expect the government to match industry investment by a factor of four to one, but two to one (the current proportion).

AEROSPACE R&D FUNDING

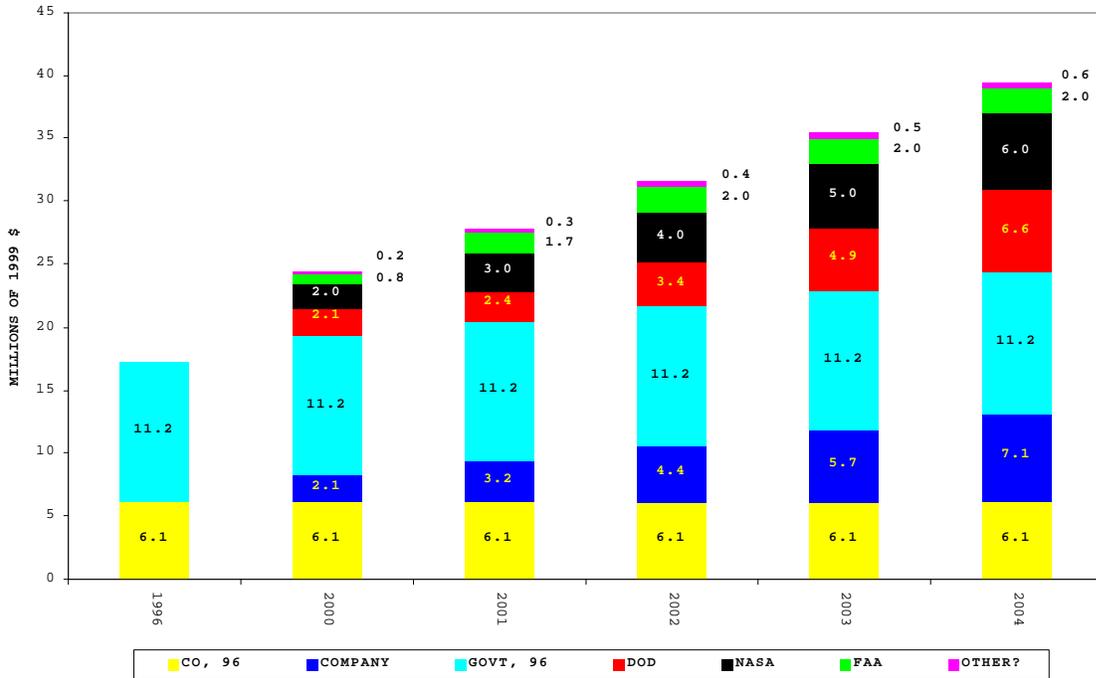


If this proposed federal increase were distributed among federal agencies in the proportion of current R&D funding, the lion's share would understandably go to the Department of Defense (as shown in the following chart). What we propose, however, is a different mix that takes into account the drastic shift towards space and the commercial marketplace that we have seen in the past decade (as shown in the second chart following). This will allow commercial ventures to develop cutting edge technologies which the government can then purchase.

AEROSPACE R&D FUNDING
(BASED ON 1996 MIX)



AEROSPACE R&D FUNDING
BASE YEAR vs TARGET LEVEL



We feel that a major R&D investment of the type proposed here will allow us to maintain our leadership in the global marketplace. This will, in turn, provide us assured access to space, a strong industrial base for our national defense, and increasing numbers of high quality aerospace jobs for American citizens. Federal R&D funding played a major role in helping the U.S. achieve the dominance it now enjoys in the global aerospace market. We cannot expect to maintain that level of dominance without continued federal investment. Let us never forget that our international competitors are not just supported by small percentages of government R&D investment. Rather, they are often government owned or fully supported by government backing.

Without increased federal investment in aerospace R&D, our national leadership may be lost. “Fortress Europe” may become a reality and overtake us. We may suffer a long-term technology deficit. As a result, national security costs will rise, as commercial products do not provide the innovations which the Defense Department would like to purchase “off the shelf”. Our technology maturation rate may not meet security needs, and may be insufficient to provide the technology surge needed to meet unexpected threats. This will further have an economic impact on our positive aerospace trade balance. Worst of all, we may see a “brain drain” in academia as the brightest and best minds in America head for those industry sectors which have stable and increasing levels of research funding.

The approach set forth here is certainly consistent with comments made in recent months by NASA Administrator Dan Goldin. He has continually chided U.S. industry for making what he calls “evolutionary” improvements to launch vehicle systems. Mr. Goldin would like to see “revolutionary” changes in launch technology which drastically improve safety and reliability while reducing complexity and lowering cost. The R&D funding approach we propose here would do just that. It would provide the funding needed to develop radically new propulsion systems, power systems, guidance systems, environmental systems, and materials. In addition, the funding could support modernization of our launch ranges, decreasing the time between launches and increasing safety by orders of magnitude. Basic research to develop breakthrough aerospace technologies has traditionally relied heavily on a partnership of federal dollars and industry dollars. We would like to see this trend increase. We would like to see the government fund industry to perform both basic and applied research. We would then like to see the results of the research turned over to commercial ventures for product development. Finally, as much as possible, we would encourage the U.S. government to purchase these commercial products and services as a commercial customer. This would lead to the greatest economies of scale and the best use of federal dollars. It would truly result in a win-win situation for all U.S. participants.

Mr. Chairman, I thank you for your time and interest in industry’s views on these vital issues. I would now be happy to answer any questions you may have.

Launch Indemnification Renewal

Anyone who has ever made a major purchase such as a house or an automobile knows that the payment does not stop with the purchase price. In addition to financing and licensing, insurance must be considered. The same is true of the commercial launch industry. The U.S. government requires launch providers to insure each launch with private liability insurance, up to levels as high as \$500 million. Although this is a high cost, both the US launch industry and the insurance industry are able to cover it.

What is more difficult however, is insuring the next billion of potential liability (from \$500 million to \$1.5 billion). Since 1988, the U.S. government has provided indemnification for this liability through provisions outlined in Amendments to the Commercial Space Launch Act.

This has been an extremely successful program. It has allowed US launch providers to keep the price of their launches more competitive with foreign launches. And, since the US government has never had to pay out a dime in liability claims under these provisions, the cost to the US taxpayer has been virtually nil. This, in turn, keeps the cost of launches down to the benefit of satellite companies and users of satellite services, maintaining high quality US manufacturing jobs throughout the country.

Outside the US, launch providers are subsidized by their governments and thus obtain similar indemnification coverage. In order to compete and preserve American jobs, the U.S. launch industry needs similar protection. The indemnification provisions of the Commercial Space Launch Act have worked successfully for over ten years, at no cost to the government.

On December 31, 1999, however, these indemnification provisions are set to expire. They were originally established for a five year period and later renewed. It is time they be renewed again. These provisions provide vital indemnification and cross-waiver protection for US launches. When these provisions were enacted originally in 1984, it was to combat similar programs offered by Arianspace, which, being self-insured with the support of the French government, created an uneven playing field for U.S. launch vehicles. Arianspace continues its offerings in this area and therefore the provisions are still needed to allow US industry an opportunity to compete with international launch providers.

Transferring jurisdiction of commercial satellite licensing to the State Department's Munitions List last year has added another dimension to this situation. Since commercial satellites are now treated as munitions, it will be difficult to obtain permission to share technical information with foreign insurers pertaining to launch criteria. This will make it even harder and more expensive to obtain insurance and is yet another reason for renewal of indemnification.

The House Science and Senate Commerce Committees will both be considering launch vehicle issues in the 106th Congress. Although there are other launch issues to be considered this year, it is critical that renewal of the indemnification provisions be a top priority for any legislative vehicle. On this issue, all of US industry is in agreement.

**Space Launch Range Modernization
and American Space Leadership
An Industry Perspective**

While America's commercial space industry is growing rapidly, commercial space sales have increased by 170% over the past five years, our nation's leadership is reevaluating its traditional roles in technology development, investment and infrastructure. Although this review is both necessary and appropriate, modernization of the existing launch range infrastructure at both Cape Canaveral, Florida and Vandenberg Air Force Base in California is essential to assuring that the emerging commercial space boom is not constrained by an inability to launch the growing volume of spacecraft that are making the benefits of the new space age economy a reality.

Currently, the U. S. Air Force and various other stakeholders are working to define the future of these national spaceports. The Air Force, faced with shrinking budgets, increasing overseas commitments and a reduced requirement for space launch due to more capable and robust spacecraft is seriously considering turning over most of the launch complexes to another operator - either the FAA, state spaceports or a combination of public and private stakeholders. Unfortunately, these reviews threaten to exacerbate an ongoing trend - the failure to invest in maintaining the nations' launch range infrastructure. From its inception in 1991, the goal of the spacelift range modernization and automation of the nations' space ranges was to:

- Assure and enhance launch safety;
- Improve reliability and responsiveness;
- Standardize East and West coast ranges;
- Enable new users by increasing throughput;
- Reduce life cycle costs;
- Reduce range staffing manpower requirements;
- Assure that national security launch requirement can be met without impacting commercial operations.

Sadly, despite these laudable goals, our nation's follow-through has been lacking. The U.S. Air Force implementation effort, the Range Standardization and Automation IIA (RSA-IIA) program has suffered from delays due to insufficient funding and reprogramming by DoD. It has been estimated that to date nearly \$95M has been cut from the program's budget from FY96 - FY00 deferring some improvements indefinitely and slipping RSA-IIA completion from 2003 to 2006.

At the same time, the volume of space launch activity in the U.S. has increased from 18 in 1988 to 36 in 1998. This situation has now gotten to the point where retiring CINCSPACE General Estes, in August of 1998 said:

The long pole in the tent - in terms of this nation's ability to gain access to space-may not be the (launch) platforms. It may be the ranges. In 1999, for the first time, we have more launches scheduled on the East Coast than we have capacity. That's everybody -military, civil and commercial.

Gen. Howell Estes

Improved range automation will enable increased commercial space launch activity, increasing throughput for launch providers and their suppliers and giving satellite operators and manufacturers more flexibility and potentially lower prices. At the same time, efforts now underway to improve U.S. launch capabilities and lower costs (e.g. such as the Evolved Expendable Launch Vehicle program) may be unable to succeed if launch ranges cannot accommodate increased activity. Moreover, if U.S. launch capabilities are limited by range constraints, there will be more pressure to launch on foreign competitors' systems.

On behalf of our member companies from both the satellite manufacturing sector and launch service providers, the Aerospace Industries Association calls upon the Administration and Congress to cease further reprogramming of appropriated funds for RSA-IIA and recommends that funding be increased in FY2000 by \$40M for RSA-IIA Range Delivery Increment #3 - the portion of the program aimed at automating range equipment (radars, computer networks and communications). This will reduce costs and personnel requirements while cutting the time required to prepare for the next launch.

While AIA agrees that the existing range ownership and operations need review and revision, this should not become a cause of "analysis paralysis" that could choke off the growth in commercial launch activities. At a minimum, the range should strive to improve capabilities sufficient to support two launch operations per day versus the current standard of one operation every two days. Failure to achieve this level of launch operability risks driving satellite launch customers to use foreign providers. The already planned Air Force investments are needed to support a robust commercial space industry, national security launch requirements and to assure that whomever eventually runs the launch range does not inherit an insurmountable burden of deferred investment.