AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

# EFFORTS TO TRANSFER AMERICA'S LEADING EDGE SCIENCE TO CHINA

## HEARING

BEFORE THE

SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS

OF THE

COMMITTEE ON FOREIGN AFFAIRS
HOUSE OF REPRESENTATIVES

ONE HUNDRED TWELFTH CONGRESS

FIRST SESSION

NOVEMBER 2, 2011

**Serial No. 112–74**

Printed for the use of the Committee on Foreign Affairs

Available via the World Wide Web: http://www.foreignaffairs.house.gov/

U.S. GOVERNMENT PRINTING OFFICE

71–037PDF WASHINGTON : 2011

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

## COMMITTEE ON FOREIGN AFFAIRS

ILEANA ROS-LEHTINEN, Florida, *Chairman*

CHRISTOPHER H. SMITH, New Jersey
DAN BURTON, Indiana
ELTON GALLEGLY, California
DANA ROHRABACHER, California
DONALD A. MANZULLO, Illinois
EDWARD R. ROYCE, California
STEVE CHABOT, Ohio
RON PAUL, Texas
MIKE PENCE, Indiana
JOE WILSON, South Carolina
CONNIE MACK, Florida
JEFF FORTENBERRY, Nebraska
MICHAEL T. MCCAUL, Texas
TED POE, Texas
GUS M. BILIRAKIS, Florida
JEAN SCHMIDT, Ohio
BILL JOHNSON, Ohio
DAVID RIVERA, Florida
MIKE KELLY, Pennsylvania
TIM GRIFFIN, Arkansas
TOM MARINO, Pennsylvania
JEFF DUNCAN, South Carolina
ANN MARIE BUERKLE, New York
RENEE ELLMERS, North Carolina
ROBERT TURNER, New York

HOWARD L. BERMAN, California
GARY L. ACKERMAN, New York
ENI F.H. FALEOMAVAEGA, American Samoa
DONALD M. PAYNE, New Jersey
BRAD SHERMAN, California
ELIOT L. ENGEL, New York
GREGORY W. MEEKS, New York
RUSS CARNAHAN, Missouri
ALBIO SIRES, New Jersey
GERALD E. CONNOLLY, Virginia
THEODORE E. DEUTCH, Florida
DENNIS CARDOZA, California
BEN CHANDLER, Kentucky
BRIAN HIGGINS, New York
ALLYSON SCHWARTZ, Pennsylvania
CHRISTOPHER S. MURPHY, Connecticut
FREDERICA WILSON, Florida
KAREN BASS, California
WILLIAM KEATING, Massachusetts
DAVID CICILLINE, Rhode Island

YLEEM D.S. POBLETE, *Staff Director*
RICHARD J. KESSLER, *Democratic Staff Director*

---

## SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS

DANA ROHRABACHER, California, *Chairman*

MIKE KELLY, Pennsylvania
RON PAUL, Texas
TED POE, Texas
DAVID RIVERA, Florida

RUSS CARNAHAN, Missouri
DAVID CICILLINE, Rhode Island
KAREN BASS, California

# CONTENTS

Page

WITNESSES

The Honorable Frank Wolf (R–VA), chairman, Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies ..... 8
Mr. Thomas Armstrong, Managing Associate General Counsel, Government Accountability Office ..... 17
The Honorable John Holdren, Ph.D., Director, Office of Science and Technology Policy ..... 35
The Honorable Charles Bolden, Jr., Administrator, National Aeronautics and Space Administration ..... 44
Mr. Rick Fisher, senior fellow, International Assessment and Strategy Center 60
Adam Segal, Ph.D., senior fellow, Council on Foreign Relations ..... 75

LETTERS, STATEMENTS, ETC., SUBMITTED FOR THE HEARING

The Honorable Dana Rohrabacher, a Representative in Congress from the State of California, and chairman, Subcommittee on Oversight and Investigations: Prepared statement ..... 4
Mr. Thomas Armstrong: Prepared statement ..... 19
The Honorable John Holdren, Ph.D.: Prepared statement ..... 37
The Honorable Charles Bolden, Jr.: Prepared statement ..... 46
Mr. Rick Fisher: Prepared statement ..... 63
Adam Segal, Ph.D.: Prepared statement ..... 77

APPENDIX

Hearing notice ..... 92
Hearing minutes ..... 93
The Honorable Frank Wolf (R–VA), chairman, Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies: Material submitted for the record ..... 94

# EFFORTS TO TRANSFER AMERICA'S LEADING EDGE SCIENCE TO CHINA

**WEDNESDAY, NOVEMBER 2, 2011**

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS,
COMMITTEE ON FOREIGN AFFAIRS,
*Washington, DC.*

The subcommittee met, pursuant to notice, at 3:10 p.m., in room 2172, Rayburn House Office Building, Hon. Dana Rohrabacher (chairman of the subcommittee) presiding.

Mr. ROHRABACHER. This hearing will come to order. This is the Subcommittee on Oversight and Investigations of the Foreign Affairs Committee.

Good afternoon, we are here to discuss the activities of NASA and the White House Office of Science and Technology Policy, OSTP, in regards to international cooperation, particularly in regards to cooperation with communist China.

When personnel from either of these organizations travel to the People's Republic of China, collaborate on projects, share data or attend conferences, yes, there is ample reason for concern.

The transfer of technology know-how is a serious national security problem. The Chinese communist party is aggressively using its military, economic and political power to extend its influence and diminish ours. Its government is the world's single largest human rights abuser, and its assistance to other countries is well-known, but the countries that it is assisting happened to be those countries which are run by governments who are oppressing their own people.

The Chinese also facilitate the proliferation of weapons of mass destruction to our enemies, even as they expand their own offensive capabilities. Our conversation here today must be viewed within that context and any effort on our part to reach out to the communist Chinese, to engage them on matters of technology is, quite frankly, not just naive but dangerous.

Today's hearing was inspired by a legal opinion by the Government Accountability Office released last month which states that, Despite clear legislative language, which passed both Houses of Congress and that President Obama signed, that accordingly, despite all of that, banning the OSTP and NASA from using appropriated funds for meetings with Chinese officials; the OSTP did so anyway.

The GAO opinion states that by doing so the OSTP violated the Antideficiency Act and accordingly, "should report the violation as required to the GAO," which they have done so.

The OSTP cites a Department of Justice legal opinion that Congress has no authority to limit the executive branch from pursuing "diplomacy" in any way as they see fit. They can do whatever they want in terms of diplomacy, with whatever they see fit, with whatever funds that they see fit.

My colleagues and I will fight this overreach, and as we have, in the past, when we have seen such power grabs from whatever administration. And we believe in maintaining the constitutional division of power between the first and second branches of government and the limits of executive privilege, but that is not today's purpose. Today's purpose is to discuss the inherent dangers of transferring America's leading-edge science to China. China is an increasingly hostile and disruptive force in the world.

The idea that we are cooperating with them in any capacity is alarming. China has aggressively sought our technologies through legal and illegal methods for decades. Anything that allows China any access to our technology or planning brings forth some major counterintelligence issues. Let me remind everyone about the Communist Chinese party's 16-character policy, directing China to "combine the civil with the military."

The Chinese Government does not separate civilian and military programs. The People's Liberation Army runs the Chinese space program, and the People's Liberation Army is loyal to the communist party that runs the Government of China.

The Chinese National Space Administration is not like NASA, an independent civilian agency. Their space office is merely a public relations front under the command of the Commission of Science, Technology and Industry for National Defense. Thus China's space facilities are all manned and operated by the People's Liberation Army.

I look forward to hearing from the OSTP exactly what was discussed at the meetings with Chinese officials and what was the purpose of those meetings. I understand that NASA Administrator Bolden, who we have as a witness today, also traveled to China and met with Chinese officials there, but this was prior to the law prohibiting that exchange. I would like to understand the reason for those trips and their meetings and to find out why those risks that we have recognized in Congress are not recognized by the executive branch.

If Administrator Bolden and Director Holdren, if they believe in what the Communist Chinese are talking about in terms of space technology, if they believe that cooperating with these people, with their Communist Chinese counterparts can be beneficial to the United States, I would like to know how we will then, if we are cooperating with the Chinese, avoid a repeat of what happened in the 1990s with the Hughes and Lorall corporations, a scandal that advanced the Chinese missile program and put the entire world at risk.

Now the stakes of technology transfer are even greater today than it was then, as China is now engaged in human space flight and intent on building a space station and a Moon Base in the coming years. Ten years ago we thought we could manage the Chinese Government and limit cooperation to only national, nonnational defense areas, but we were wrong.

What happened in the 1990s and the transfer of technology to the Chinese was a major disaster for the national security of our country. And the fact that the Chinese today are as far ahead in their space program as they are—this is a regime that is the world's worst human rights abuser—the fact that they are so far advanced in their missile and rocket technology can be traced right back to the transfer of technology in the 1990s from American corporations. They did not have to do the tens of billions of dollars of research and development necessary to have this kind of power their hands.

Why are we willing to give to that to them? Why are we willing to take the chance that they will become more powerful based on our investment in technology?

Well, we were wrong then, and the access we gave the Chinese military, not just their space program but their military, was a huge leap forward, whereas they would say a great leap forward. And, of course, it saved them billions of dollars.

So how can cooperating with China now, which is a vicious tyranny and a strategic rival, how can that be a smart policy when our experience tells us just the opposite? That's what this is about today.

Mr. Carnahan, our ranking member, if you have an opening statement, I will get rid of this cough.

[The prepared statement of Mr. Rohrabacher follows:]

OPENING STATEMENT

"Efforts to Transfer America's Leading Edge Science to China"

November 2, 2011

Chairman Dana Rohrabacher
Oversight and Investigations Subcommittee
House Committee on Foreign Affairs

Good Afternoon,

We are here this afternoon to discuss the activities of NASA and of the White House's Office of Science and Technology Policy in regards to international cooperation, particularly in regards to Communist China.

When personnel from either of these organizations travel to the People's Republic of China, collaborate on projects, share data, or attend conferences there it is more than just a matter of concern. It is a serious national security problem. The Chinese Communist Party is aggressively using its military, economic, and political power to extend its influence and diminish ours. Its government is the world's single largest human rights abuser, and it assists other countries in the oppression of their own people. The Chinese also facilitate the proliferation of weapons of mass destruction to our enemies, as they expand their own offensive capabilities. Our conversation here today must be viewed within that context. Any efforts on our part to reach out to the Chinese Communists, to engage them on matters of technology is, quite frankly, not just naïve… it is dangerous.

Today's hearing was inspired by a legal opinion from the Government Accounting Office released last month which states that, despite clear legislative language, which passed both houses of Congress and that President Obama signed, banning the OSTP and NASA from using appropriated funds for meetings with Chinese officials, OSTP did so anyway. The GAO opinion states that by doing so the "OSTP violated the Antideficiency Act" and accordingly "should report the violation as required" to the GAO and they have done so.

The OSTP cites a Department of Justice legal opinion that Congress has no authority to limit the Executive Branch from pursuing "diplomacy" in any way they see fit with whatever funds they see fit. My colleagues and I will fight this overreach, as we have the other power grabs from this administration, and maintain the constitutional division of power between the first and second branches of government and the limits of executive privilege; but that is not today's purpose. Today's purpose is to discuss the inherent dangers of transferring America's leading edge science to China. China is an increasingly hostile and disruptive force in the world. The idea that we are cooperating with them, in any capacity, is alarming. China has aggressively sought our technologies through legal and illegal methods for decades. Anything that allows China any access to our technology or planning raises major counterintelligence issues.

Let me remind everyone about the Communist Party's "16 Character" policy directing China to "combine the civil with the military." The Chinese government does not separate civilian and military programs. The People's Liberation Army runs the Chinese space program, and the PLA is loyal to the Communist Party. The Chinese National Space Administration is not like NASA. It is merely a public relations front, under the command of the Commission of Science, Technology and Industry for National Defense. China's space facilities are all manned and operated by the PLA.

I look forward to hearing from OSTP exactly what was discussed at the meetings with Chinese officials and what was the purpose of those meetings? I understand that NASA Administrator Bolden, who we have as a witness has also travelled to China and met with Chinese officials there, prior to the law prohibiting it. I would like to understand the reason for such trips and meetings, and find out why this administration believes the risks are worth taking..

If Administrator Bolden and Director Holdren believe that talking with the Chinese Communist regime about space technology can be beneficial for the United States I would like to know how we will avoid a repeat of the Hughes and Loral scandals that advanced the Chinese missile program and put the entire world at risk. Now the stakes of technology transfer are much higher, as China is engaged in human spaceflight, and intent on building a space station and a moon base in the coming years. Ten years ago we thought we could manage the Chinese government and limit cooperation to only non-defense areas. We were wrong and that access gave the Chinese military a huge leap forward and saved it years of research and billions of dollars. How can cooperating with China now, a vicious tyranny and strategic rival, be called "smart" policy when experience tells us just the opposite?

Panel I

Congressman Frank Wolf of Virginia is the Chairman of the Appropriations Subcommittee on Commerce, Justice, and Science and is the co-Chairman of the Tom Lantos Human Rights Commission. Congressman Wolf has been deeply involved with the issues and legislation we are going to be hearing about today. He has admirably applied our shared desire for human rights to all areas of Congress' work.

Panel II

Thomas Armstrong is the Managing Associate General Counsel at the U.S. Government Accountability Office leading the attorneys working in the Budget and Appropriations group. He is responsible for the Comptroller General's appropriations law opinions that GAO issues to Congress. Mr. Armstrong joined the GAO's office of General Counsel in 1978 and is a member of the Bar in Virginia.

Panel III

Charles Bolden is the current Administrator of NASA and has served in that post since 2009. Prior to that Administrator Bolden was General Bolden of the US Marine Corps. He graduated from the US Naval Academy and went on to fly over 100 combat missions in

Vietnam. Afterwards he joined NASA and flew on four shuttle missions, two of which he commanded.

Dr. John Holdren is the Director of the White House Office of Science and Technology Policy, and Co-Chair of the President's Council of Advisors on Science and Technology. Dr. Holdren went to the White House from his post at Harvard University where he was a professor. He holds degrees from MIT and Stanford and has a long record serving on distinguished scientific bodies.

Panel IV

It is my pleasure to welcome back to this subcommittee both members of our third and final panel.

Rick Fisher is a Senior Fellow with the International Assessment and Strategy Center and an expert on Chinese military development. He has previously served as a Senior Fellow with the Center for Security Policy, Editor of the Jamestown Foundation's *China Brief*, and as a Senior Fellow with the House Republican Policy Committee.

Adam Segal is the Ira A Lipman senior fellow for counterterrorism and national security studies at the Council on Foreign Relations. Before going to the Council on Foreign Relations Dr. Segal was an arms control analyst for the China Project at the Union of Concerned Scientists and he has recently written a book titled: *Advantage: How American Innovation Can Overcome the Asian Challenge.*

Mr. CARNAHAN. Thank you, Mr. Chairman, for holding this hearing today so we have an opportunity to review the issues that we expect to be raised.

Respectfully, I have a different view on how we can positively engage with China and, at the same time, push aggressively for reforms.

It is important that Congress exercise its oversight responsibilities seriously, over expenditure of U.S. taxpayer dollars. We need to ensure that all appropriations are expended in accordance with U.S. law. Regardless of what the administration may think, or what I may think of a certain provision, the administration should work with Congress to ensure that they are complying with all the requirements set forth in the appropriation bills passed by Congress.

In addition to our oversight responsibilities, we should focus our time working on policies that grow and expand the U.S. economy. A strong engagement policy with China provides economic opportunities for both countries. It is clearly in our economic interest.

Back home, the State of Missouri where I come from, we have worked for several years to establish a Midwest-China air freight hub in St. Louis as an example of the type of partnership that can exist between our two countries that is in both of our economic interests.

As a result of working together, St. Louis is poised to become a major export hub for domestically manufactured products. As of 2010, China was the world's third largest buyer of Missouri products, with nearly 1 billion in sales last year alone Missouri-made products, export to China, are creating jobs here at home. With nearly 20 percent of the world's population, the Chinese market represents an opportunity for American businesses to create jobs here in the U.S. by making American products here at home and exporting them to an ever-growing group of Chinese consumers.

Strong relations and cooperation also create political space for progress in areas of disagreement, such as currency manipulation and intellectual property protection. Science and technology cooperation is an indispensable part of U.S. foreign policy and has been for decades, the growing belief that science diplomacy is a critical part of our tool case for advancing our diplomatic interests.

Mr. Chairman, your former boss, President Reagan, was a great proponent of U.S.-China cooperation. In 1983, in his submission to Congress he stated, "It is in our fundamental interest to advance our relations with China. Science and technology are an essential part of that relationship."

And on his trip to China in 1984, he stated that the U.S. and China needed to "expand our economic and scientific cooperation, strengthen the ties between our peoples and take an important step toward peace and a better life."

Science and technology cooperation is a bipartisan policy that has been effectively used by many different administrations. We absolutely need to advocate for policies that offer the strongest protection for U.S. businesses and the best economic opportunities for our citizens.

But we absolutely need to continue science and tech cooperation between our two countries. I look forward to hearing from our witnesses today as we address this important issue. I yield back.

Mr. ROHRABACHER. Thank you very much, and I think that demonstrates the respectful difference of opinion that people can have on these issues. I do want to note that you quoted me several times, whereas I was the one who worked with President Reagan on those very statements.

What was left out was the little clauses that Ronald Reagan said. Of course, that will all disappear if liberalization of China ceases to happen.

Go back and read the speeches. And I know, because I was assigned to work with President Reagan on those speeches, and it is very clear, very clear from what he said when he went there and before that we should not be sending technology transfers, and all of these—all of these great things that we are doing with trade and investment should not happen unless China continues liberalizing, which it was at that time.

When China murdered and slaughtered the democracy movement at Tiananmen Square, that ended those statements for Ronald Reagan. Reagan would never have gone along with that policy. Unfortunately, his Vice President hadn't learned the lesson because President Herbert Walker Bush was President at the time and let the slaughter of Tiananmen Square go unanswered. We as Americans shouldn't have that type of value system.

We have with us a champion of freedom, and Frank Wolf, who is a Member of Congress from Virginia, chairman of the Appropriations Subcommittee on Commerce, Justice and Science and is the chairman of the Tom Lantos Human Rights Commission.

Congressman Wolf has been deeply involved in the issues of human rights issues and legislation, especially about the legislation that we are going to hear about today. He has admirably applied our shared desire for human rights to all areas of Congress' works, and he is a Member I deeply respect, and frankly appreciate you being with us here today.

Could you shed some light on this particular part of the legislation, what it means and whether you believe the intent of Congress has been violated?

**STATEMENT OF THE HONORABLE FRANK WOLF (R–VA), CHAIRMAN, APPROPRIATIONS SUBCOMMITTEE ON COMMERCE, JUSTICE, SCIENCE, AND RELATED AGENCIES**

Mr. WOLF. Thank you, Mr. Chairman, for calling this hearing, and I think the American people would thank you also for calling this hearing.

I have been very troubled by this administration's apparent eagerness to work with China on its space program, a willingness to share other sensitive technologies. I want to be clear the United States has no business cooperating with the People's Liberation Army to help develop its space program.

We should also be wary of any agreements that involve the transfer of technology or sensitive information to Chinese institutions or companies, many of which are controlled by the government and the PLA.

Space is the ultimate high ground that has provided the U.S. with countless security and economic advantages over the last 40 years. As a victor of the Cold War space race with the Soviet Union, the U.S. has held an enormous advantage in space technology, defense capabilities and advanced sciences generating entirely new sectors of our economy and creating thousands of private sector jobs.

China has developed its own space program at a surprising pace, having gone from launching their first manned spacecraft to launching components for an advanced space station in just 10 years. But the Chinese space program is being led, as you said, Mr. Chairman, by the People's Liberation Army, the PLA. And to state the obvious, the PLA is not a friend, as evidenced by their recent military posture and aggressive espionage against U.S. agencies and firms and actually against this Congress and against this committee.

That is why I was troubled to learn from the press last fall about NASA Administrator Charlie Bolden's imminent departure for a week-long visit to China to discuss areas of cooperation between NASA and the PLA space program.

I was more concerned to learn that Dr. John Holdren, head of the White House Office of Science and Technology Policy, had spent 21 days in China on three separate trips in 1 year, 3 weeks, 1 year, one China, one visit, 3 weeks, more than any other country. Very little information about these cooperative agreements with China were being provided to Congress and to the American people.

So I included language in section 1340 of the Fiscal Year 2011 continuing resolution preventing NASA and OSTP from using Federal funds to develop, design, plan, promulgate, implement or execute a bilateral policy program, order or contract of any kind to participate, collaborate or coordinate bilaterally in any way with China or any Chinese-owned company.

The provision in the omnibus appropriation bill was agreed to by Republican and Democratic conferees. It passed both Houses with bipartisan support and was signed into law by the President. The provision was clear, unambiguous and noncontroversial.

However, less than 1 month after its enactment, I learned that Dr. Holden and OSTP had defied the provision. Even more troubling is that he withheld information about his intention to do so during an appearance before the House Commerce, Justice, and Science Appropriations Subcommittee when we discussed, among other things, the implementation of section 1340 and Dr. Holden's participation in the U.S.-China strategic and economic dialogue from May 2010.

It is almost like not telling the truth by omission because if he never said anything there, and then sent a letter up the next day after his hearing.

This is why I asked the Government Accounting Office to investigate this violation and issue an opinion. I also asked GAO to determine whether the Office of Legal Counsel opinion provided by the Justice Department was legitimate. In an October 11 opinion, GAO found,

> "The plain meaning of section 1340 is clear, OSTP may not, may not use as appropriations to participate, collaborate, or co-

> ordinate bilaterally in any way with China or any Chinese-owned company."

Further, GAO found that, "OSTP's participation in innovation, dialogue and S&ED contravened the appropriation restriction" and added, "OSTP does not deny that it engaged in activities prohibited by section 1340."

The GAO finding also rebuts a September 11 memorandum prepared by the Justice Department OLC on the constitutionality of the provision. GAO stated,

> "In our view, legislation that was passed by Congress, signed by the President, thereby satisfying the Constitution's bicameralism and presentment requirement is entitled to a heavy presumption in favor of constitutionality."

Finally, the GAO finding clearly notes,

> "As a consequence of using its appropriation in violation of Section 1340, OSTP violated the Antideficiency Act by using its Fiscal Year 2011 appropriation in a manner specifically prohibited, OSTP violated the Antideficiency Act. Accordingly, they should report the violation as required by law."

I also wrote Attorney General Eric Holder asking him to hold Dr. Holdren to full account for his violation of the Antideficiency Act by ensuring that it complies with all the reporting requirements and provisions of the law.

I take the GAO findings very seriously, following the law is not voluntary for the administration officials. That is why Dr. Holdren should commit today to full compliance with section 1340 and publicly acknowledge his error in participating in the bilateral conference with the Chinese Government.

Now, Mr. Chairman, I would like to take a few minutes to put the administration's posture toward China in the broader context of the Chinese Government, and I say government.

The Chinese people are wonderful people. The Chinese people yearn for freedom. So when I say today, I am talking about the Chinese Government and their grave human rights abuses, espionage efforts and detrimental economic policies.

In June 1989, peaceful prodemocracy demonstrators gathered in Tiananmen Square. They were met with a brutal crackdown. As events unfolded, the world was captivated with the now-famous image of the tank man, a lone, brave, brave student protester who stood his ground in the face of the advancing Chinese tank, and to this day his fate is unknown.

During my first trip to China in 1991 with Congressman Chris Smith, we visited Beijing Prison Number 1 where authorities informed us and we saw them that approximately 30 Tiananmen Square demonstrators were behind bars. They were making these socks for export to the United States. They were making socks, Tiananmen Square demonstrators, and these socks were held up on the floor when we got back by Senator Moynihan at that time. We left with a pair, and they are the socks.

Tellingly, the image of the tank man, while famous around the globe, is virtually unknown within China, thanks to the great firewall, which censures so-called offensive speech. It is estimated that

China employs 30,000 to 50,000 special Internet police. Shockingly, the country has a thriving business of harvesting and selling for transplant kidneys—and we can furnish all the members of all the videos that cover this in detail, corneas and other human organs from executed prisoners.

The image here, and I have the one picture over there, the image here shows the PLA, the same PLA that runs the space program, the PLA offers in preparing to execute prisoners, later footage from the same story shows an unmarked van driving toward the prison to harvest the organs. When you watch the video, it will make you sick.

Like many repressive regimes, the Chinese Government maintains a brutal system of labor camps. The Soviet, the State Department's annual Human Rights Report found "forced labor remained a serious program."

Famed Chinese dissident Harry Wu spent nearly 20 years in a Chinese gulag. In congressional testimony earlier this year he said, "When I finally came to the U.S. in 1985, although I was already 48 years old, that was the first time in my life I felt truly free."

He concluded by urging "President Obama and the U.S. Congress to be bold and take a firm stand against China's human rights abuses, exactly the way that President Reagan did with regard to the Soviet Union." And he did it in a very appropriate way, and I know you were at his funeral—if you will recall, he said tear down the wall, he said. Evil empire. And Gorbachev came to his funeral.

But boldness is hardly the order of day when it comes to U.S. policy. That same could be said of some companies.

Congressman Chris Smith, and the late chairman of this committee, Congressman Tom Lantos—himself a Holocaust survivor—convened a hearing in 2006 in which they publicly challenged Yahoo to look behind the bottom line and consider the moral implications of their complicity, their complicity in imprisoning Chinese dissidents.

New York Times columnist Nicholas Kristof—and I appreciate he is been very good on these issues—authored a piece after the hearing writing, "Suppose that Anne Frank had maintained an email account while in hiding in 1944 and that the Nazis had asked Yahoo for cooperation in tracking her down." It seems," he said, "based on Yahoo's behavior in China that it might have complied."

Yahoo isn't the only U.S. company to come under fire for pursing business interests at the expense of human rights. A May 22 New York Times article reported that Cisco, customized, "customized its technology to help China track down members of the Falun Gong spiritual movement."

There are multiple suits now against Cisco.

These allegations reflect a worrying trend. American companies ought to represent American values. Instead, it seems that time and again major U.S. corporations are embracing the Chinese Government's policies that are completely at odds with what America stands for.

China, in turn, exports its repressive technology to like-minded governments. In October 27, a Wall Street Journal piece reported that the Chinese telecom giant Huawei, now operating in the

United States, Now dominates Iran's Government-controlled mobile phone industry. It plays a role in enabling Iran state security network, the same people that killed all the people in Iran when we watched last year.

It seems that not only is the U.S. failing to change China, but rather China is changing us. Is it any surprise considering what China is spending on high-powered lobbying firms in this town?

According to a January 9 Washington Post story, in recent years China has tripled the amount it spends on lobbying firms. But well-heeled lobbyists can't explain away China's abysmal human rights records.

Thousands of political and religious prisoners languish in prison. According to the Cardinal Kung Foundation, Cardinal Kung was a Catholic cardinal, currently one of approximately 25 underground bishops of the Catholic Church is either under house arrest, in jail or under strict surveillance or in hiding. Congressman Chris Smith took holy communion from Bishop Zhu, he has never been seen since.

According to China in 2010, 2010, 336 Protestant House church leaders were arrested and persecuted.

Since March 10th, 10 Tibetan Buddhist monks and nuns have set themselves aflame, aflame in desperation. I was in Tibet, the desperation. What drives nine Buddhist monks and a Buddhist nun to set themselves aflame? Every monastery in Tibet has a public security police in the monastery. It would be like in your church or your synagogue, the FBI would be in there.

What sets them aflame like that to drive them—and the Buddhist monks and nuns are a very, very peaceful people.

Chinese authorities continue to use Uighur, Muslim activist Rebiya Kadeer, her children and grandchildren as pawns, as pawns and to silence her. And her two sons are serving a length in prison. And the Chinese public security police sent people to Fairfax County to spy on her, Fairfax County.

We have now seen that the Chinese Government is unmoved and, in fact, emboldened in its ongoing repression, while at the same time, experiencing an explosive economic growth. We have seen our own short-sightedness in making the protection of basic liberties and the advancement rule of law secondary to unfettered market access and normal trade relations.

These flawed policies, Mr. Chairman, have strengthened the oppressors. They have strengthened the oppressors and enabled China to advance economically at our expense.

Every member here and every Member in the Congress has constituents whose livelihood have been negatively impacted by China's blatant economic espionage, predatory and protectionist and illegal activity, every single district.

Meanwhile, U.S. companies are increasingly sending American jobs to China. General Electric's health care unit, their health care unit. You have seen their ads almost every Sunday on the Sunday news. Their health care unit recently announced it was moving its headquarters of 115-year-old X-ray business to Beijing.

Ironically, the president of—the head of President Obama's Council on Jobs and Competitiveness, GE Chairman Jeffrey

Immelt, they are leaving the United States and they are creating jobs in China.

According to a March 24 New York Times article—and we will submit it for the record—GE paid zero taxes in the U.S. in 2010. Meanwhile, the Congressional Research Service found that the Chinese State Tax Administration and China Tax Magazine recently jointly released a number of lists of the top taxpayers, taxpayers in 2007 and GE featured prominently. The Beijing subsidiary of GE was number 32. GE pays taxes in China, does not pay tax in America.

There is something wrong with that.

It is noteworthy that GE, which pays no Federal taxes in its home country, is honored, is honored for being a significant source of tax revenue in China.

Now engagement with China has not only empowered the government and failed to change their political system, undermine their economic security, it has fueled China's military apparatus. Again the President's job czar is at the center of these concerns.

An October 28 Defense News piece reported that "U.S. air space companies may unknowingly be helping China's military."

Specifically the article wanted to "last January's announcement by General Electric and the Aviation Industry Corporation of China, the government, that they would launch a joint venture for integrated avionics."

And cited the soon-to-be-released report of the Congressional-Executive Commission on China which indicated, that "China has a robust, largely military space program," with all but 13 of its roughly satellites—70 satellites in orbit controlled by the military.

And NASA wants to work with a PLA killing people for their organs, spying against them, doing this and a direct threat to the American military.

And in a May 17 article in Wired.Com, it reported that Chinese troops had begun using a first-person shooter video game called "Glorious Mission" backed by the PLA, which simulates basic training in which the enemy is apparently the U.S. military.

On April 11, Aviation Week reported, "The PLA"—the people who run this space program—"has made great strides toward implementing a strategy to deter or defeat U.S. forces in the western Pacific."

The 2010 annual Pentagon report cited earlier found "In the case of key national security technologies, controlled equipment and other materials not readily obtainable through commercial means or academia, the PRC resorts to a more focused effort, including the use of its intelligence services and other than legal means in violation of U.S. laws and export controls."

Let's be perfectly clear about China and how its advancing militarily. They are using "other than legal means." They are spying. They are stealing.

The FBI has come before our committee approps, they have got the most aggressive spying program of anybody in the history this Nation, much more aggressive than the KGB. The report also highlighted cyber China's espionage efforts.

The U.S. intelligence community notes that China's attempt to penetrate U.S. agencies are the most aggressive of all foreign intel-

ligence organizations. According to a 2008 FBI statement, Chinese intelligence services "pose a significant threat both to the national security and to the compromise of U.S. national assets, i.e., you are losing jobs," you are losing jobs, 9 percent unemployment and you are losing jobs. Their espionage isn't limited to government agencies.

An October 4 Washington Post article, Representative Mike Rogers, chairman of the House Intelligence Committee remarked

> "When you talk to these companies behind closed doors, they describe attacks that originate in China and have a level of sophistication and are clearly supported by a level of resources that can only be a nation state entity."

These breaches in our national security infrastructure are rampant and pose a very real threat. A May 14 Reuters story indicated

> "North Korea and Iran appear to have been regularly exchanging ballistic missile technology in violation of U.S.—U.N. sanctions according to a confidential U.N. report. The report said the illicit technology transfer had transferred shipments through a neighboring third country, China."

China is also a major arms supplier and source of economic strategy to the regime in Sudan, in Khartoum, Sudan. According to Human Rights Watch, first during the years of the worse violence in Darfur, China sold $55 million worth of small arms to Khartoum. I was the first Member of the House to go to Darfur. Sam Brownback was with me.

We heard the stories of rape, and killing and displacement and America gave guns to them, America's giving food to Chinese, the weapons. The Janjui circulate around the camps. And when the women go out in the morning to collect wood—and China is the number one supporter—the largest Embassy in Khartoum is the Chinese Embassy.

And they are aiding them and meanwhile, Beijing, right there, that picture of Beijing, rolled out the red carpet this year for Sudanese President Omar al-Bashir, an internationally indicted war criminal. Bashir's crimes are not just things of the past, Bashir's crimes are going on today.

In the Nuba Mountains, we have reports they are going door to door pulling black people out and killing them. We had a hearing before the Tom Lantos committee, the number one supporter is China. They are blocking the U.N. missions that go there. I mean, they have been—and Bashir is indicted by the International Criminal Court.

Why did we go after and help get Milosevic, which we should have, and get Radic, which we should have, and get Karadzic, which we should have. And yet we close our eyes and do nothing with regard to Bashir who goes to China.

They had an obligation that they wanted to be part of the world nation to arrest Bashir when he landed and to keep him on. He is an indicted war criminal.

Speaking of the red carpet, President Obama, the 2009 Nobel Prize winner, welcomed Chinese President Hu Jintao, who was the author of the crackdown in Tibet, crackdown in Tibet and is push-

ing what is taking place to a Nobel—to a dinner in the White House when the 2010 Nobel Prize winner, Xiaobo was in jail, his wife was under house arrest and nobody could even go to Oslo to pick up the prize.

In closing, and I am closing, there will come a day—I think the Chinese Government has got to hear this—there will come a day when the Chinese Government will fall. Repressive, totalitarian regimes always do because the good efforts of President Reagan, and God bless him, and Pope John Paul and Margaret Thatcher, the Soviet Union collapsed. Many people in 1986 never thought it would collapse.

This Chinese Government, they have taken Ceausescu's playbook. And where it led Ceausescu it will lead this government. They will fall and books will be written about who helped sustain this government in their final days.

Will U.S. companies feature in that narrative? Will U.S. Government officials feature in that narrative?

In 2001, a book was published, every member ought to read it, entitled "IBM and the Holocaust." A New York Times book review describes how IBM had "global control over technology that was enormously helpful, indeed, indispensable to the Nazi machinery of war and annihilation."

The New York Times review quotes the author of the book as saying that many companies did what IBM did. He then said they "refused to walk away from the extraordinary profits obtainable from trading with a pariah state."

Arguably that assessment rings today. Only the pariah has changed. Those in position of leadership, be they in the private sector or in government, do our country a disservice when they gloss over or ignore the actions of the Chinese Government. They put us, quite frankly, squarely on the wrong side of history.

The Chinese Government brutally represses its own people. It persecutes people of faith, Catholic, bishops, protestant pastors, Buddhist monks and Buddhist nuns, Muslims. It censors the Internet. It maintains labor camps. The Chinese Government is actively engaged in a cyber espionage. It steals state secrets. It aligns itself with the countries directly at odds with U.S. interests. It supports genocidal governments and buttresses regimes that should not be in power.

There is a legal term for this: It is called willful blindness, that aptly describes the dealings to date with China.

Faced with these painful truths, blindness is no longer an option. In the words of British abolitionist, William Wilberforce he said, "Having heard all of this, you may choose to look the other way but you can never again say that you did not know."

Mr. ROHRABACHER. Thank you very much, Mr. Wolf, and obviously the chair agrees with everything that you just said, so I would leave it to my ranking member, if you have some questions for Mr. Wolf.

Mr. CARNAHAN. No, just, again, I want to—you raised a number of serious questions, I think that we need to be contemplating. I appreciate your work on the Human Rights Commission, and I do believe we need to—personally, I believe our approach should be

one of engagement but also pushing for reforms in many of these areas that you have brought forth here today.

So—but I think this is a very important conversation that we are having here today, and I appreciate you taking the time to be here.

Mr. ROHRABACHER. Mr. Wolf, let me just note for the record that while—what brought about the change in the world when the Soviet Union collapsed and Democratic Russia was born—and it is not quite totally matured yet and it is still struggling to be a free country—but they have made great strides since the 1980s.

But what brought the Communist party to the point where it collapsed and spared the world, an incredible Holocaust where military exchange between the Soviet Union and the United States would have caused millions of lives, it would have been horrible—what saved us from that was a lack of engagement.

The fact is that we did not give the Soviet Union any of the economic rights that you have just outlined that we have given China. We have permitted China basically a one-way free-trade policy. We have permitted—we have turned our backs and they manipulate the currency. We have turned our backs when they steal technology. We actually have invested huge amounts of our technology and our capital in building up their economy.

We didn't do any of that with the Soviet Union. The people would have been laughed at if they would have said, well, why don't we turn GE loose in Russia when Russia was controlled by the Communist party to work out a good relationship with their industry that produces jet aircraft?

We, I don't believe that by this current strategy that we have permitted our country to move forward with China despite these atrocities that you have outlined, I don't believe that is going to lead to a free China, and I would hope that we, in our lifetime, can see the Chinese people break their chains, and we can be proud that we helped and sided with the Chinese people rather than the dictatorship.

So, thank you, one last question before you go. You are then convinced that the law, as written, as you actually helped put it into the law, was violated by these exchanges with OSTP?

Mr. WOLF. I do believe that we are going to continue this issue and stay with it until the very, very end. But I do believe, and, also, the GAO also believes.

And the comment is, I think you are exactly right. No company or law firm would have ever represented or dealt, represented to the Soviet Union during the days of President Reagan. I remember there was someone talking about doing something for a bus company and Reagan spoke out.

Reagan, President Reagan said the words in the Constitution were our covenant with the rest of the world. The students in Tiananmen knew those words and Reagan, one party called him in 1983, said tear down that wall, and yet he did it in the appropriate way. But our Government, when they would go to Moscow, as you know, George Schultz would—the Embassy was a island of freedom and they would meet with the dissidents and everything else. We are not seeing that today, you are exactly right.

Mr. ROHRABACHER. An amendment to this question, the last question is, if this is a violation of law or not, do you believe that

the executive branch is immune from these types of restrictions that you placed, they helped place in the law and that we all placed in the law when we voted on that piece of legislation? Does the legislative branch have a right to limit what the executive branch does in foreign policy?

Mr. WOLF. Under the Constitution it does, yes, sir.

Mr. ROHRABACHER. Thank you very much, and thank you for your testimony.

On panel number II, we have Thomas Armstrong, who is the managing associate general counsel at the U.S. Government Accountability Office and is one of the leading attorneys working on the budget and appropriations group. He is responsible for the controller general's appropriations law opinions that the GAO issued to Congress.

Mr. Armstrong joined the GAO Office of General Counsel in 1978 and is a member of the bar in Virginia.

Mr. Armstrong, you just heard a long bit of testimony, but we will get now to some of the specifics. I think it is important for us to realize that we aren't talking about some esoteric situation where people's lives are not at stake, that there is just a difference in trade policy or something. No, we are talking about a fundamental historic perception and the laws that go with those perceptions in terms of an adversary of the United States or someone who could be a friend of the United States.

You may proceed with your testimony.

**STATEMENT OF MR. THOMAS ARMSTRONG, MANAGING ASSOCIATE GENERAL COUNSEL, GOVERNMENT ACCOUNTABILITY OFFICE**

Mr. ARMSTRONG. Thank you, Mr. Chairman, and I do appreciate this opportunity. I am here to talk about the law. I am here to talk about the prohibition that was enacted to serve the Congress' constitutional power of the purse. I have a short written statement to submit for the record, if I may,

Mr. ROHRABACHER. So ordered.

Mr. ARMSTRONG. Thank you. A copy of our October 11 legal opinion that Mr. Wolf mentioned and that you mentioned in your opening statement is included as an appendix to that written statement.

In the opinion, we determined that OSTP violated a statutory provision prohibiting the agency from using its appropriations for bilateral engagements with China. That provision, enacted on April 15, 2011, in the Full-Year Continuing Appropriations Act for Fiscal Year 2011 prohibited OSTP, as well as NASA, from using appropriations to "develop, design, plan, promulgate, implement or execute a bilateral policy, program, order or contract of any kind to participate, collaborate or coordinate bilaterally in any way with China or any Chinese-owned company."

Because OSTP had no funds available for that purpose, OSTP's actions also violated the Antideficiency Act. The Antideficiency Act is a fiscal statute that is central to Congress' constitutional power of the purse.

Between May 6 and May 10, 2011, OSTP, as they told us, participated in a series of meetings with Chinese officials as part of two

events here in Washington, DC: The U.S.-China Dialogue on Innovation Policy, and the U.S.-China Strategic and Economic Dialogue. OSTP also hosted a dinner for Chinese dignitaries.

OSTP did not deny that it engaged in these prohibited activities. Rather, OSTP asserted that the prohibition, as applied to these activities, is an unconstitutional infringement on the Executive's conduct of foreign affairs.

As we stated in our opinion, it is not GAO's role to adjudicate the constitutionality of legislation that has been enacted into law. That role is properly reserved for the judiciary, not an agency like GAO that is part of the legislative branch.

Legislation like this, which was passed by both Chambers of Congress and signed into law by the President, thereby satisfying the Constitution's requirements of bicameralism and presentment, is entitled, in our view, to a heavy presumption of constitutionality until a court indicates otherwise or until Congress changes that law. In other words, in our opinion, and in opinions like this, we at GAO apply the law as written to the facts before us. By using its appropriations in violation of that prohibition, the OSTP also violated that Antideficiency Act.

In addition to audits and investigations, GAO serves an important function by providing legal opinions to Members of Congress and Federal agencies on matters of appropriations law, that is to say, those laws, including the Antideficiency Act, that governed the proper use of Federal funds, and that help protect Congress' constitutional power of the purse.

The Antideficiency Act is a funds-control statute designed to impose fiscal discipline on Federal agencies. Under the Act, an officer or an employee of the United States Government may not make or authorize an obligation or an expenditure exceeding the amount of an available appropriation. Simply put, agencies may not spend more than Congress gives them.

When OSTP used Federal funds to engage in the Innovation Dialogue, the Strategic and Economic Dialogue, and the dinner to host Chinese dignitaries, OSTP spent funds in excess of the amounts available, in excess of the amount Congress gave them for this purpose. Congress, with the prohibition, had made clear that OSTP had no funds available for this purpose. OSTP, therefore, violated the Antideficiency Act.

In order to emphasize sound funds control and to advance oversight of agencies' fiscal activity, the Antideficiency Act requires that executive agencies report violations to the President and Congress and transmit copies of their reports to GAO. In the opinion, we advised OSTP to report its violation as required by law. Late Monday afternoon, OSTP provided us with its Antideficiency Act report. In the report OSTP disagreed with GAO's conclusion.

Thank you, Mr. Chairman. Thank you, Mr. Carnahan. I am happy to answer any questions you may have.

[The prepared statement of Mr. Armstrong follows:]

United States Government Accountability Office

GAO

Testimony

Before the Subcommittee on Oversight and Investigations, Committee on Foreign Affairs, House of Representatives

For Release on Delivery
Expected at 3:00 p.m. EDT
Wednesday, November 2, 2011

# OFFICE OF SCIENCE AND TECHNOLOGY POLICY

## Violation of the Antideficiency Act

Statement of Thomas H. Armstrong,
Managing Associate General Counsel
Office of General Counsel

U.S. Government Accountability Office
GAO 90 YEARS 1921-2011
ACCOUNTABILITY ★ INTEGRITY ★ RELIABILITY

GAO-12-200T

Chairman Rohrabacher, Ranking Member Carnahan, and Members of the Subcommittee:

I am GAO's Managing Associate General Counsel responsible for GAO's appropriations law decisions and opinions. I am pleased to be here today to discuss our October 11 opinion concerning the Office of Science and Technology Policy's (OSTP) use of appropriations for bilateral activities with the government of the People's Republic of China.[1] A copy of the opinion can be found in the appendix to this statement.

In the opinion, we determined that OSTP violated a statutory provision prohibiting the agency from using its appropriations for bilateral engagements with China or any Chinese-owned company. Because no funds were available for such purpose, OSTP's actions also violated the Antideficiency Act, a fiscal statute central to Congress's constitutional power of the purse.

As you may know, GAO provides legal decisions and opinions to Congress, its committees and Members, and federal agency officials.[2] This function is different from GAO's more widely-known audits and investigations.[3] In addition to GAO audits and investigations, Congress authorizes the Comptroller General to settle the accounts of the United States.[4] Our authority to issue appropriations law decisions and opinions is drawn from this authority and a statutory direction to issue decisions upon the request of certain federal officials in advance of a payment of appropriated funds.[5] Our opinions are informed by facts and views that we solicit from the agency whose appropriation is at issue in the opinion.

[1] B-321982, Oct. 11, 2011. *Reprinted in* Appendix I.

[2] GAO, *Principles of Federal Appropriations Law*, Vol. I, 3rd ed., ch. 1, § C.2, GAO-04-261SP (Washington, D.C.: Jan. 2004). GAO, *Procedures and Practices for Legal Decisions and Opinions*, GAO-06-1064SP (Washington, D.C.: Sept. 2006), *available at* www.gao.gov/legal/resources.html.

[3] *See* 31 U.S.C. § 712. Congress provides GAO with general authority to investigate the receipt, disbursement, and use of public funds, as well as other, more specific audit authorities. *Id.*

[4] 31 U.S.C. § 3526.

[5] 31 U.S.C. §§ 3527–3529. GAO is authorized to provide advance decisions to the heads of agencies and agency components, as well as accountable officers.

All of our opinions are publicly available on our Web site, www.gao.gov/legal.

In this instance, we received a request for an opinion from the Chairman of the Subcommittee on Commerce, Justice, Science, and Related Agencies, House Committee on Appropriations. The Chairman expressed concern about OSTP's participation in meetings with representatives of the Chinese government. He asked GAO whether OSTP's use of its appropriation to participate in the meetings violated a prohibition enacted in the Full-Year Continuing Appropriations Act, 2011. The Act prohibited OSTP and the National Aeronautics and Space Administration (NASA) from engaging in bilateral activities with China.

The Full-Year Continuing Appropriations Act was enacted on April 15, 2011.[6] The specific prohibition at issue states as follows:

"None of the funds made available by this division may be used for the National Aeronautics and Space Administration or the Office of Science and Technology Policy to develop, design, plan, promulgate, implement, or execute a bilateral policy, program, order, or contract of any kind to participate, collaborate, or coordinate bilaterally in any way with China or any Chinese-owned company unless such activities are specifically authorized by a law enacted after the date of enactment of this division."[7]

OSTP advised us that between May 6 and 10, 2011, after the enactment of this provision, OSTP led and participated in a series of meetings with Chinese officials as part of the U.S.-China Dialogue on Innovation Policy (Innovation Dialogue) and the U.S.-China Strategic and Economic Dialogue held in Washington, D.C. During the Innovation Dialogue, the OSTP Director met with the Chinese Minister of Science and Technology to discuss, among other things, Chinese procurement and intellectual property policies. The Director opened and closed the Innovation Dialogue and served on discussion panels. OSTP staff helped the Director prepare for and participate in the meetings. The Strategic and Economic Dialogue was convened by the Department of the Treasury and the State Department. The Director spoke many times during various sessions, including on U.S.-China cooperation on climate science. OSTP

[6]Pub. L. No. 112-10, div. B, 125 Stat. 38 (Apr. 15, 2011).

[7]*Id.*, title III, § 1340, 125 Stat. at 123.

also hosted a dinner to honor Chinese dignitaries. OSTP calculated that, in total, it incurred costs of $3,500 to participate in these events.

We concluded that OSTP violated the appropriations restriction. The plain meaning of the prohibition is clear. It prevents OSTP's use of funds to participate, collaborate, or coordinate bilaterally in any way with China or Chinese-owned companies. Here, the Director and OSTP staff had direct, substantive involvement in the Innovation Dialogue and the Strategic and Economic Dialogue; OSTP also hosted a dinner for Chinese government officials.

OSTP did not deny that it engaged in prohibited activities. OSTP asserted that the prohibition, as applied to these activities, is an unconstitutional infringement on the Executive's constitutional prerogatives in foreign affairs. As we stated in our opinion, we did not opine on the constitutionality of the prohibition. It is not GAO's role nor within our province to opine upon or adjudicate the constitutionality of duly enacted legislation; that role is properly reserved for the courts. Legislation such as this, which was passed by Congress and signed by the President, is entitled to a heavy presumption in favor of constitutionality. Therefore, absent a judicial opinion from a federal court of jurisdiction that a particular provision is unconstitutional, we apply laws as written to the facts presented.

By using its appropriated funds in violation of the prohibition, OSTP also violated the Antideficiency Act. The Antideficiency Act is one of the major fiscal laws by which Congress enforces its constitutional control of the public purse. The Antideficiency Act is a funds control statute designed to implement agency fiscal discipline. Under the Act, an officer or employee of the U.S. Government may not make or authorize an obligation[8] or expenditure exceeding the amount of an available appropriation.[9] The legal effect of the OSTP prohibition is to make no funds available to OSTP for bilateral activities with China or any Chinese-owned company.

[8]In federal fiscal law, an obligation is a "definite commitment that creates a legal liability of the government for the payment of goods [or] services ordered or received, or a legal duty on the part of the United States that could mature into a legal liability by virtue of actions on the part of [another] party beyond the control of the United States." GAO, *A Glossary of Terms Used in the Federal Budget Process*, GAO-05-734SP (Washington, D.C.: Sept. 2005), at 70.

[9]31 U.S.C. § 1341.

By spending funds on the Innovation Dialogue, the Strategic and Economic Dialogue, and the dinner to host Chinese dignitaries, OSTP spent funds in excess of those available, therefore violating the Antideficiency Act. Executive agencies must report Antideficiency Act violations to the President and Congress, and transmit copies of their reports to GAO.[10] The Office of Management and Budget provides guidance to executive agencies on reporting violations.[11]

If you or your staff have any questions about this testimony, please contact me at (202) 512-8257 or armstrongt@gao.gov. Contact points for our Office of Congressional Relations and Office of Public Affairs may be found on the last page of this statement. Julia Matta, Assistant General Counsel, and Faisal Amin, Senior Attorney, made key contributions to this statement.

Thank you, Mr. Chairman. This concludes my prepared statement. I would be happy to answer any questions that you or other members of the Subcommittee have at this time.

[10] 31 U.S.C. § 1351.

[11] OMB Circular No. A-11, *Preparation, Submission, and Execution of the Budget*, §§ 145, 145.8, *available at* www.whitehouse.gov/omb/circulars_a11_current_year_a11_toc (last visited Oct. 25, 2011).

# Appendix I: GAO Opinion to the Chairman of the House Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies

United States Government Accountability Office
Washington, DC 20548

B-321982

October 11, 2011

The Honorable Frank R. Wolf
Chairman, Subcommittee on Commerce
Justice, Science, and Related Agencies
Committee on Appropriations
House of Representatives

Subject: *Office of Science and Technology Policy—Bilateral Activities with China*

This responds to your request for our opinion on the propriety of activities undertaken in May 2011 by the Office of Science and Technology Policy (OSTP) with representatives of the government of the People's Republic of China. Letter from Representative Wolf to the Comptroller General (May 11, 2011) (Request Letter). Specifically, you point to meetings with Chinese representatives during the U.S.-China Dialogue on Innovation Policy (Innovation Dialogue) and the U.S.-China Strategic and Economic Dialogue (S&ED) held in Washington, D.C., in May 2011. You ask whether OSTP violated section 1340 of the Department of Defense and Full-Year Continuing Appropriations Act, 2011. Section 1340 prohibits the use of OSTP appropriations for bilateral activities between OSTP and China, or Chinese-owned companies, unless specifically authorized by laws enacted after the date of the appropriations act. Pub. L. No. 112-10, div. B, title III, 125 Stat. 38, 123 (Apr. 15, 2011).

As explained below, we conclude that OSTP's use of appropriations to fund its participation in the Innovation Dialogue and the S&ED violated the prohibition in section 1340. In addition, because section 1340 prohibited the use of OSTP's appropriations for this purpose, OSTP's involvement in the Innovation Dialogue and the S&ED resulted in obligations in excess of appropriated funds available to OSTP; as such, OSTP violated the Antideficiency Act, 31 U.S.C. § 1341(a)(1)(A).

Our practice when rendering legal opinions is to obtain the views of the relevant agency to establish a factual record and to elicit the agency's legal position on the subject matter of the request. GAO, *Procedures and Practices for Legal Decisions and Opinions*, GAO-06-1064SP (Washington, D.C., Sept. 2006), *available at* www.gao.gov/legal/resources.html. In this case, OSTP provided us with its legal views and relevant supporting materials. Letter from General Counsel, OSTP to Assistant General Counsel, GAO, *Re: B-321982, Office of Science and Technology Policy – Bilateral Activities with China* (June 23, 2011) (OSTP Response). We also

spoke by telephone with OSTP's General Counsel to ask questions about OSTP's June letter. Telephone Conversation with General Counsel, OSTP (Aug. 4, 2011) (August Conversation). *See also* Letter from General Counsel, OSTP to Senior Attorney, GAO, *Re: Follow-up to August 4, 2011, Telephone Call* (Aug. 29, 2011) (OSTP August Letter).

BACKGROUND

The Presidential Science and Technology Advisory Organization Act of 1976[1] established OSTP to "serve as a source of scientific and technological analysis and judgment for the President with respect to major policies, plans, and programs of the Federal Government." 42 U.S.C. § 6614(a). Part of the agency's mission is to "advise the President of scientific and technological considerations involved in areas of national concern including . . . foreign relations. . . ." 42 U.S.C. § 6613(b)(1).

Between May 6 and 10, 2011, OSTP "led and participated in a series of meetings with Chinese officials" as part of the Innovation Dialogue and the S&ED. OSTP Response, at 3. On May 6, 2011, the OSTP Director and Chinese Minister of Science and Technology participated in the Innovation Dialogue. According to OSTP, a goal of the Innovation Dialogue was to "serve as a forum for persuading the rollback of discriminatory, counterproductive Chinese procurement and intellectual property policies. . . ." OSTP Response, at 3. Among the topics discussed were "market access and technology transfer; innovation funding and incentives; standards and intellectual property; and government intervention." OSTP Response, at 4. OSTP informed our office that the OSTP Director opened and closed the Innovation Dialogue and served on discussion panels. OSTP August Letter, at 1. OSTP staff helped the Director prepare for and participate during the meetings. *Id. See* OSTP Response, at 5.

On May 8, 2011, OSTP hosted a dinner to honor Chinese dignitaries. Six U.S. participants attended the dinner, along with an unidentified number of "staff-level employees from other federal agencies." OSTP Response, at 4, n.13. The Director is the only listed dinner attendee from OSTP. There were six Chinese invitees. *Id.*

On May 9 and 10, 2011, OSTP participated in the S&ED. The purpose of the S&ED was to bring together various U.S. and Chinese government officials to "discuss a broad range of issues between the two nations," including on matters regarding trade and economic cooperation. U.S. Department of the Treasury, *U.S. –China Strategic and Economic Dialogue*, *available at* www.treasury.gov/initiatives/Pages/china.aspx (last visited Oct. 4, 2011). The Secretary of the Treasury and the Secretary of State co-chaired the S&ED along with the Vice Premier and State Councilor of the People's Republic of China. *Id.* Topics of discussion included "enhancement of trade and investment cooperation;

[1] Pub. L. No. 94-282, title II, 90 Stat. 459, 463-68 (May 11, 1976), 42 U.S.C. §§ 6611–6624

an overview of bilateral relations; military-to-military relationships; cooperation on clean energy, energy security, climate change, and environment; customs cooperation; and energy security." OSTP Response, at 4. The OSTP Director spoke many times during the various sessions, including on U.S.-China cooperation on climate science. August Conversation. OSTP also had at least one staff member attend the S&ED in addition to the Director. *Id.*

The Full-Year Continuing Appropriations Act, 2011, enacted into law on April 15, 2011, included appropriations for OSTP for fiscal year 2011 in title III of division B. Pub. L. No. 112-10, div. B. Section 1340 of title III provides:

> "None of the funds made available by this division may be used for the National Aeronautics and Space Administration or the Office of Science and Technology Policy to develop, design, plan, promulgate, implement, or execute a bilateral policy, program, order, or contract of any kind to participate, collaborate, or coordinate bilaterally in any way with China or any Chinese-owned company unless such activities are specifically authorized by a law enacted after the date of enactment of this division."

Pub. L. No. 112-10, § 1340.

OSTP informed us that it incurred costs of approximately $3,500 to participate in the week's activities, including the cost of staff time for nine employees preparing for and participating in the discussions, as well as the cost of the dinner OSTP hosted on May 8. OSTP Response, at 5.

DISCUSSION

At issue in this opinion is whether OSTP violated section 1340's proscription, and, if so, whether the agency violated the Antideficiency Act.

As with any question involving the interpretation of statutes, our analysis begins with the plain language of the statute. *Jimenez v. Quarterman*, 555 U.S.113 (2009). When the language of a statute is "clear and unambiguous on its face, it is the plain meaning of that language that controls." B-307720, Sept. 27, 2007; B-306975, Feb. 27, 2006; *see also Lynch v. Alworth-Stephens Co.*, 267 U.S. 364, 370 (1925).

The plain meaning of section 1340 is clear. OSTP may not use its appropriations to participate, collaborate, or coordinate bilaterally in any way with China or any Chinese-owned companies. Here, OSTP's participation in the Innovation Dialogue and S&ED contravened the appropriations restriction. The Director opened the Innovation Dialogue and moderated discussions therein. OSTP staff prepared materials for and attended the discussions. OSTP then invited U.S. and Chinese officials to a dinner that it paid for using its appropriation. Finally, OSTP participated in the S&ED, during which the Director spoke on multiple occasions, including on

climate science. OSTP did not identify, nor are we aware of, any specific authority to do so that was enacted after the date of the Continuing Appropriations Act, 2011.

OSTP does not deny that it engaged in activities prohibited by section 1340. OSTP Response, August Conversation. OSTP argues, instead, that section 1340, as applied to the events at issue here, is an unconstitutional infringement on the President's constitutional prerogatives in foreign affairs.[2] OSTP Response, at 1; August Conversation; Letter from Director, OSTP, to the Speaker of the House of Representatives, *Re: Section 1340 of the Department of Defense and Full-Year Continuing Appropriations Act of 2011* (May 16, 2011) (OSTP May 16 Letter). OSTP claims that section 1340 is "unconstitutional to the extent its restrictions on OSTP's use of funds would bar the President from employing his chosen agents for the conduct of international diplomacy." OSTP Response, at 1. OSTP asserts that the President has "exclusive constitutional authority to determine the time, place, manner, and content of diplomatic communications and to select the agents who will represent the President in diplomatic interactions with foreign nations." OSTP May 16 Letter. OSTP argues that, for this reason, Congress may not "use its appropriations power to infringe upon the President's exclusive constitutional authority in this area." *Id.*

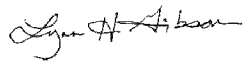
It is not our role nor within our province to opine upon or adjudicate the constitutionality of duly enacted statutes such as section 1340. *See* B-300192, Nov. 13, 2002; *see also* B-306475, Jan. 30, 2006. In our view, legislation that was passed by Congress and signed by the President, thereby satisfying the Constitution's bicameralism and presentment requirements, is entitled to a heavy presumption in favor of constitutionality. B-302911, Sept. 7, 2004. *See Bowen v. Kendrick*, 487 U.S. 589, 617 (1988). Determining the constitutionality of legislation is a province of the courts. U.S. Const. art. III, § 2. *Cf. Fairbank v. United States*, 181 U.S. 283, 285 (1901). Therefore, absent a judicial opinion from a federal court

[2] The Department of Justice characterizes section 1340 as a "valid limitation on OSTP's use of appropriated funds only to the extent that its restrictions do not infringe upon the President's exclusive constitutional authority over international diplomacy." Letter from Assistant Attorney General, Office of Legislative Affairs to Representative Wolf (June 28, 2011). Justice advised OSTP that OSTP was "permitted to engage in diplomatic activities with Chinese representatives to the extent that it would be doing so as an agent of the President for diplomacy with China, notwithstanding Section 1340." *Id. See* Memorandum Opinion for the General Counsel, OSTP, *Unconstitutional Restrictions on Activities of the Office of Science and Technology Policy in Section 1340(a) of the Department of Defense and Full-Year Continuing Appropriations Act, 2011*, OLC Opinion, Sept. 19, 2011, *available at* www.justice.gov/olc/memoranda-opinions.html (last visited Oct. 4, 2011). OSTP asserts that the U.S.-China Agreement on Cooperation in Science and Technology designates OSTP as the executive branch authority charged with "collaboration and coordination with China in support of U.S.-China science and technology policy cooperation." OSTP Response, at 3.

of jurisdiction that a particular provision is unconstitutional, we apply laws as written to the facts presented. *See* B-114578, Nov. 9, 1973. In 1955, for example, we stated that we "accord full effect to the clear meaning of an enactment by the Congress so long as it remains unchanged by legislative action and unimpaired by judicial determination." B-124985, Aug. 17, 1955. We see no reason to deviate here. Indeed, we are unaware of any court that has had occasion to review the provision, let alone adjudicate its constitutionality, nor did OSTP advise of any judicial determination or ongoing litigation.

As a consequence of using its appropriations in violation of section 1340, OSTP violated the Antideficiency Act. Under the Antideficiency Act, an officer or employee of the U.S. Government may not make or authorize an expenditure or obligation exceeding an amount available in an appropriation. 31 U.S.C. § 1341. *See* B-300192, Nov. 13, 2002. If Congress specifically prohibits a particular use of appropriated funds, any obligation for that purpose is in excess of the amount available. 71 Comp. Gen. 402 (1992); 62 Comp. Gen. 692 (1983); 60 Comp. Gen. 440 (1981). By using its fiscal year 2011 appropriation in a manner specifically prohibited, OSTP violated the Antideficiency Act. Accordingly, OSTP should report the violation as required by the act.[3]

Sincerely,



Lynn H. Gibson
General Counsel

[3] *See* 31 U.S.C. § 1351. The Office of Management and Budget has published requirements for executive agencies for reporting violations. OMB Circular No. A-11, *Preparation, Submission, and Execution of the Budget*, §§ 145, 145.8, *available at* www.whitehouse.gov/omb/circulars_a11_current_year_a11_toc (last visited Oct. 4, 2011).

This is a work of the U.S. government and is not subject to copyright protection in the United States. The published product may be reproduced and distributed in its entirety without further permission from GAO. However, because this work may contain copyrighted images or other material, permission from the copyright holder may be necessary if you wish to reproduce this material separately.

| | |
|---|---|
| GAO's Mission | The Government Accountability Office, the audit, evaluation, and investigative arm of Congress, exists to support Congress in meeting its constitutional responsibilities and to help improve the performance and accountability of the federal government for the American people. GAO examines the use of public funds; evaluates federal programs and policies; and provides analyses, recommendations, and other assistance to help Congress make informed oversight, policy, and funding decisions. GAO's commitment to good government is reflected in its core values of accountability, integrity, and reliability. |
| Obtaining Copies of GAO Reports and Testimony | The fastest and easiest way to obtain copies of GAO documents at no cost is through GAO's website (www.gao.gov). Each weekday afternoon, GAO posts on its website newly released reports, testimony, and correspondence. To have GAO e-mail you a list of newly posted products, go to www.gao.gov and select "E-mail Updates." |
| Order by Phone | The price of each GAO publication reflects GAO's actual cost of production and distribution and depends on the number of pages in the publication and whether the publication is printed in color or black and white. Pricing and ordering information is posted on GAO's website, http://www.gao.gov/ordering.htm.<br><br>Place orders by calling (202) 512-6000, toll free (866) 801-7077, or TDD (202) 512-2537.<br><br>Orders may be paid for using American Express, Discover Card, MasterCard, Visa, check, or money order. Call for additional information. |
| Connect with GAO | Connect with GAO on Facebook, Flickr, Twitter, and YouTube. Subscribe to our RSS Feeds or E-mail Updates. Listen to our Podcasts. Visit GAO on the web at www.gao.gov. |
| To Report Fraud, Waste, and Abuse in Federal Programs | Contact:<br><br>Website: www.gao.gov/fraudnet/fraudnet.htm<br>E-mail: fraudnet@gao.gov<br>Automated answering system: (800) 424-5454 or (202) 512-7470 |
| Congressional Relations | Ralph Dawn, Managing Director, dawnr@gao.gov, (202) 512-4400<br>U.S. Government Accountability Office, 441 G Street NW, Room 7125<br>Washington, DC 20548 |
| Public Affairs | Chuck Young, Managing Director, youngc1@gao.gov, (202) 512-4800<br>U.S. Government Accountability Office, 441 G Street NW, Room 7149<br>Washington, DC 20548 |

Please Print on Recycled Paper

Mr. ROHRABACHER. Thank you very much for that succinct testimony, and you stated then that there is, when something is put, wording is put into legislation, that is very clear, specific wording, that your—that you have a heavy presumption of constitutionality. Maybe you could tell me is there a difference between what is legal and is constitutional?

Mr. ARMSTRONG. No, not really because all of our laws are derived the Constitution.

We have a long history at GAO in serving Congress' constitutional power of the purse to presume, accept the constitutionality of any law that is enacted via the constitutional legislative process, any law that is passed by both Houses of Congress and signed by the President, which is what happened in this case.

Mr. ROHRABACHER. Okay. Is there a constitutional restriction on the legislative branch from putting limits to which money can be spent concerning American foreign policy?

Mr. ARMSTRONG. The Supreme Court and other Federal courts, lower Federal courts, have long recognized that Congress does have the right to impose restrictions on the Executive's use of public funds. It all relates to Congress' constitutional prerogatives of the purse.

Mr. ROHRABACHER. So this is, the power of the purse is a supreme constitutional prerogative of the legislative branch, and that if the restrictions that we put on the power of the purse affects foreign policy, that is within the jurisdiction of the legislative branch?

Mr. ARMSTRONG. We didn't look specifically at OLC's, Office of Legal Counsel over at the Department of Justice, at the arguments that they presented to OSTP. We felt we didn't need to go beyond the fact that this law was enacted via the constitutional legislative process.

Mr. ROHRABACHER. Okay, so it was a constitutional legislative process, but they were actually asking about the constitutionality of the outcome of the process and not necessarily the process itself, which is interesting.

You have stated very clearly that the OSTP spent funds in excess to what the government, meaning what the legislative branch had declared was legal for them to spend. Thus it was in violation of that particular law.

And, again, I guess I am looking for and I will discuss with the administration later on this theory that they can do whatever they damn well want to do if it has to do with foreign policy, and dealing with China has some—is by its nature dealing with foreign policy.

All right, you have given us some insights.

Mr. Carnahan.

Mr. CARNAHAN. Thank you, Mr. Chairman. Welcome, Mr. Armstrong.

Mr. ARMSTRONG. Thank you.

Mr. CARNAHAN. I want to jump right into this question that you have raised and what I understand your earlier testimony in that GAO did not make an assessment of constitutional claims put forth by the Justice Department, has GAO made determinations in other instances where an administration has made constitutional claims and, if so, how did GAO handle that?

Mr. ARMSTRONG. We have—we do steer clear of addressing constitutional issues. We do have a long history since our role here in the appropriations law decision writing function is to serve Congress and Congress' oversight of the Executive's use of public money.

Mr. CARNAHAN. So just to be clear, steer clear, you mean they never have addressed any constitutional issues or they generally don't, and that is what I am trying to get down to.

Mr. ARMSTRONG. I have been at GAO for 33 years now, and I have been involved in the appropriations law function for about 20, 21 of those years, and I have never been involved in addressing a constitutional issue in the context of Congress' power of the purse.

Mr. CARNAHAN. And again, just to be specific, you have never been involved with that. Has GAO ever been involved in addressing a constitutional issue to your knowledge?

Mr. ARMSTRONG. I am not aware of it, no.

Mr. CARNAHAN. So——

Mr. ARMSTRONG. In the context of appropriations law.

Mr. CARNAHAN. So in other context you are aware, but not with regard to appropriations?

Mr. ARMSTRONG. I can tell you that I am not aware of it, but I am not necessarily in a position to have been aware of it because of my focus on appropriations law and my responsibility with regard to the appropriations law decision writing function.

Mr. CARNAHAN. I think I understand that, Mr. Armstrong. Let me move on. Since the administration submitted its report to GAO, has it fully complied with the requirements pursuant to the Antideficiency Act?

Mr. ARMSTRONG. We do consider that report to be satisfying the reporting requirement of the Antideficiency Act.

Mr. CARNAHAN. And describe that for the committee, please.

Mr. ARMSTRONG. When an agency violates the Antideficiency Act, as it did here, the Act requires that the agency report it to Congress, the President and to GAO.

Mr. CARNAHAN. And that was done?

Mr. ARMSTRONG. And that was done, yes.

Mr. CARNAHAN. And can you describe that report just in brief?

Mr. ARMSTRONG. Yes, I can. They did acknowledge GAO's conclusion. OSTP reported its disagreement with GAO's conclusion. OSTP summarized Justice Department's advice to OSTP. The report fairly short, about four or five pages, didn't go further than that. But it did serve to put the matter before the Congress in Congress' oversight capacity, which is the point of the Act.

Mr. CARNAHAN. In bottom line dollars, how much money are we talking about?

Mr. ARMSTRONG. OSTP told us that they spent about $3,500.

Mr. CARNAHAN. Okay. Well, with regard to an Antideficiency Act issue such as this, what is the enforcement mechanism once the reporting requirements are met and what is the typical resolution in a case like this?

Mr. ARMSTRONG. The enforcement mechanism is really Congress' enforcement in how Congress wants to respond, react, to the Antideficiency Act report. The Act is there to serve Congress in Congress' oversight of agency activities. So it really is up to the dis-

cretion of this committee, of the appropriations committees, of the Congress.

Mr. CARNAHAN. Very good. Thank you.

Mr. ROHRABACHER. When did the OSTP actually provide you a report to this violation?

Mr. ARMSTRONG. It was late Monday afternoon this week.

Mr. ROHRABACHER. Are you talking about this Monday?

Mr. ARMSTRONG. Yes. Today is Wednesday. The day before yesterday, yes.

Mr. ROHRABACHER. So this Monday after this hearing had already been scheduled was when they saw fit to comply with this request. I think that has to be taken into consideration. And we just—the ranking member just asked several questions I thought were important. And you suggest that if there are any penalties, Congress must be the one to provide some reaction to this violation. But you are suggesting that the money we spent that was illegally spent and now it is up to Congress to act, is that it?

Mr. ARMSTRONG. Yes. That is the way the mechanism is designed under the Antideficiency Act.

Mr. ROHRABACHER. Okay. And there is no criminal penalty to this?

Mr. ARMSTRONG. Well, the Act does include criminal penalties for knowing and willful violation of the Act. That is in the Justice Department's discretion. My understanding is that the Justice Department has never prosecuted anyone for a knowing and willful violation, so we don't have any clue from their case law and their activity what Justice would consider to be a knowing and willful violation.

Mr. ROHRABACHER. Okay. And one last question about, if a piece of legislation like this is signed into law, which it was by the President of the United States, President Obama signed the bill, do we then presume that President Obama agrees with the constitutionality of the restriction that has been placed upon him by the bill?

Mr. ARMSTRONG. I am really reluctant to make a presumption about what the President might think.

Mr. ROHRABACHER. Well, are we presuming if a President signs a bill into law and there is a restriction in that law, the executive branch, that the President is signing that bill into law and thus any President that does that is reaffirming a constitutional acceptance of the law?

Mr. ARMSTRONG. There are occasions when a President, in signing a bill into law, might question the constitutionality of provisions. In the President's signing statement, the, President may make a point about his concerns about the constitutionality of a provision. We did look at the signing statement for this law and there was nothing in this signing statement that raised any concerns about this provision.

Mr. ROHRABACHER. So in the past, if the President did have a concern about constitutionality of any restriction to law and he wanted to sign it anyway because of other provisions, that would be in his statement upon signing the bill?

Mr. ARMSTRONG. There is a tradition there. That doesn't mean that we can presume, I think, that because the President did not

make a point in his signing statement, that he accepts the constitutionality of it. But I can tell you that there was no point made in the signing statement for this law about this provision.

Mr. ROHRABACHER. Mr. Carnahan.

Mr. CARNAHAN. Just one more question. I am going to put this in context. Has in your experience, and you have been doing this for a number of years over a number of administrations, has this issue come up with prior administrations?

Mr. ARMSTRONG. Not with GAO. But I can tell you, although I am not a constitutional law scholar, as a lawyer, I am well aware that there has been tension over the years between Presidents and Congress over the conduct of foreign affairs. But that is not something that we have looked at, it is not really in GAO's purview.

Mr. CARNAHAN. I appreciate that. Thank you.

Mr. ROHRABACHER. Thank you for joining us today. And our third panel will be Charles Bolden, Administrator of NASA.

Mr. ARMSTRONG. Thanks very much.

Mr. ROHRABACHER. We have our next panel seated. And I guess we are going to have Holdren and Bolden together. I was noticing that their names, there is a similarity there between the names of all the witnesses today. That is interesting.

So we have—our first witness will be Charles Bolden who is currently Administrator of NASA and has served at post since 2009. So we can say the Honorable Charles Bolden, but I would prefer to call him General Bolden. My father was a pilot in the U.S. Marine Corps, and as I have said many times would be very proud to know that we have a Marine pilot now heading up NASA. And I think he has done a great job since he has been there under very, very strenuous circumstances. He graduated from the U.S. Naval Academy and went on to fly over 100 combat missions in Vietnam. Afterwards he joined NASA and flew four space shuttle missions, two of which he commanded.

And we also have with us Dr. John Holdren who is director of the White House Office of Science and Technology Policy and co-chairman of the President's Council of Advisors on Science and Technology. Dr. Holdren went to the White House from his post at Harvard University where he was a professor. And he holds a degree from MIT and Stanford and has a long and distinguished record of service in scientific bodies and is one of the more respected scientists in the United States of America. And we appreciate the service that both of you are providing to our country. That doesn't mean we don't have our disagreements, which is what this is all about today, but that does not diminish the gratitude that we should have toward people like yourselves who are willing to take on these kind of responsibilities. You both may proceed with your opening statements and then we will go into questions and answers.

Mr. HOLDREN. Mr. Chairman, do you have a preferred order for those statements?

Mr. ROHRABACHER. Yes. I can see that the General is giving us a direction over there. You go first.

**STATEMENT OF THE HONORABLE JOHN HOLDREN, PH.D., DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY POLICY**

Mr. HOLDREN. I will proceed. Thank you very much. Chairman Rohrabacher and Ranking Member Carnahan, I do appreciate the opportunity to testify today on U.S.-China Cooperation in Science and Technology.

Mr. ROHRABACHER. Put the microphone a little closer. There you go.

Mr. HOLDREN. In general, the United States benefits from science and technology cooperation with other countries when the sharing of facilities or expertise and costs speeds up discoveries that can be applied in this country to address economic and other challenges that we face. We also benefit from such cooperation when it enhances the understanding of and access to foreign markets by U.S. firms enabling them to sell more abroad. We benefit as well when such cooperation accelerates innovation in other countries in ways helpful to U.S. interests, such as by reducing their pressure on world oil supplies and their emissions of greenhouse gases.

And we benefit when science and technology cooperation provides a set of positive interactions and incentives with countries with which we have difficult relations. Those general benefits of cooperating with other countries in science and technology all apply with particular force to the case of China, as my written statement explains. Of course the benefits of cooperating with other countries in science and technology have to be weighed against the costs and the risks. Those risks include theft of intellectual property and classified information and loss of economic or military advantage. And just as the benefits of science and technology cooperation apply with particular force in the case of cooperation with China, so do the risks.

The relations of the United States with China are complex overall. The two countries behave as partners in some arenas, as competitors in some and as potential adversaries in some. This administration strongly objects to China's human rights abuses, its theft of intellectual property and much else that goes on there. But we in this administration do not believe that the solution to these challenges is to cut off our science and technology cooperation with China.

On the contrary, we believe that U.S.-China science and technology cooperation benefits both countries and strengthens our hand in the effort to get China to change the aspects of its conduct that we oppose. And we believe that the overall benefits to our country of properly focused and managed science and technology cooperation with China outweigh the costs and risks. That proposition was the reason that the Carter administration concluded the U.S.-China science and technology cooperation agreement within weeks of the normalization of relations with China in January 1979. And it is the reason that that agreement has been renewed by every administration since, Republican and Democratic alike.

My written statement describes some of the ways that U.S.-China science and technology cooperation under this framework has benefited United States interests. The only one I will mention here is how the ongoing U.S.-China dialogue on innovation policy,

which I co-chair on the U.S. side, has led to the Chinese Government's rolling back aspects of Chinese innovation policy that discriminate against U.S. businesses active in Chinese markets. As has already been pointed out by earlier witnesses, section 1340(a) of the Continuing Appropriations Act of 2011 contains language intended to bar OSTP from continuing to engage in bilateral interactions with China.

I am a scientist and not a lawyer, so I am only going to state here very briefly why OSTP has not complied with that prohibition. For the details I refer you to the formal opinion issued on September 19th of 2011 by the Office of the Legal Counsel in the Department of Justice, and I ask that that be added to the hearing record as an addendum to my testimony.

Mr. ROHRABACHER. Without objection.

[NOTE: The information referred to is not reprinted here but is available in committee records.]

Mr. HOLDREN. OSTP sought the Department of Justice's guidance on Section 1314(a)'s legal effect because of the extent and the importance of OSTP's role in bilateral diplomacy with China on science and technology issues. The Department of Justice advised us that the activities that OSTP has been carrying out in connection with that role fall under the President's exclusive constitutional authority to conduct foreign diplomacy, and thus are not precluded by the statute.

Let me conclude by referring once more to President Reagan. As Congressman Wolf pointed out, President Reagan did call the Soviet Union an evil empire. He also continued, throughout his two terms, the extensive U.S. cooperation on science and technology with the Soviet Union that had begun in 1958 under President Eisenhower and that continued until the Soviet Union disintegrated in 1991. I very much hope that the value to this country on balance of appropriately focused and managed cooperation with China on science and technology is something about which this administration and this Congress can also come to agree. I am happy to try to answer any questions you may have. Thank you very much.

[The prepared statement of Mr. Holdren follows:]

**Statement of the Honorable Dr. John P. Holdren**
**Director, Office of Science and Technology Policy**
**Executive Office of the President of the United States**
**to the**
**Subcommittee on Oversight and Investigations**
**House Committee on Foreign Affairs**
**November 2, 2011**

Chairman Rohrabacher, Ranking Member Carnahan, and members of the Subcommittee, thank you for the opportunity to testify today on U.S.-China cooperation in science and technology (S&T). I hope that this testimony will be helpful in clarifying the Obama Administration's stance on the value such cooperation has had and can continue to have for our country, as well as on the measures that must be and are being undertaken to limit the potential downsides.

**The Rationale for International Cooperation in Science and Technology in General**

International cooperation in fundamental science has a long and rich tradition, rooted in the realities that outstanding scientific talent occurs in many countries and that the advance of science is accelerated, generally to the benefit of all involved, by exchange of data and analysis as well as by sharing of the best facilities and by direct engagement of the best minds with one another, wherever those facilities and minds may be. Of course, limits are sometimes placed on cooperation in fundamental science across the boundaries of countries that are adversaries or potential adversaries – or even competitors – when it is recognized that the first to achieve particular breakthroughs and subsequent practical applications of these may reap a large military or commercial advantage. That such circumstances sometimes apply, however, does not vitiate the value of cooperation to the advance of science where they don't apply.

As scientific and engineering activity moves from the realm of fundamental science toward applied science and the development of practical technologies, concerns about the balance of benefits versus liabilities of international cooperation naturally arise more often. Even so, there are many circumstances in which it may reasonably be judged that the benefits to the United States outweigh the liabilities, thus justifying cooperation. The main classes of potential benefits that may enter this calculus are as follows:

- gaining access to diverse R&D capacities, such as particular kinds of facilities and expertise, which are increasingly widely dispersed among countries;

- sharing the costs of research, development, and demonstration (RD&D) of kinds of innovation that would not bring much advantage to the country that achieved them first, or that entail larger RD&D costs than any one country is willing or able to bear;

- reducing costs of emerging technologies more rapidly through the accelerated learning that results from conducting demonstrations and pre-commercial deployments in larger and more varied markets and environments than those available domestically;

- enhancing U.S. firms' understanding of and access to large commercial markets for their products in other countries;

- accelerating the development and international deployment of technologies whose use elsewhere is likely to improve regional or global economic, environmental, or political conditions to the benefit of the United States (such as through reduced oil consumption, increased safety and proliferation resistance of nuclear-energy facilities, reduced climate-altering emissions, and politically stabilizing economic development in other countries); and

- providing a focus and venues for positive interactions with countries with which other aspects of our relations are strained, potentially providing opportunities and leverage to reduce the strains.

The potential liabilities of international S&T cooperation that is not well managed include: uncompensated transfer of intellectual property, inadvertent sharing of classified or otherwise sensitive information, and, ultimately, loss of economic or military competitive advantage.

For many years, in both Republican and Democratic administrations, this country's leadership has recognized that the benefits for the United States of appropriately focused and properly managed international S&T cooperation can outweigh the liabilities – even when the cooperation is with a potent adversary.

For example, the United States began formal government-to-government S&T cooperation with the Soviet Union in the Eisenhower Administration with the signing in 1958 of the "Agreement between the United States of America and the Union of Soviet Socialist Republics on Exchanges in the Cultural, Technical, and Educational Fields". In that same year, the second Atoms for Peace conference in Geneva led to the initiation of U.S.-Soviet cooperation on harnessing thermonuclear energy for electricity production, which persisted until the disintegration of the Soviet Union in 1991 (and continues with Russia to this day).

Cooperation between these two countries in the 1960s encompassed mathematics, physics, earth sciences, and life sciences, among other disciplines. And in the early 1970s, in the Nixon Administration, Secretary of State Henry Kissinger successfully initiated a decade of expanded U.S.-Soviet scientific and technological cooperation as a centerpiece of U.S. efforts to improve relations between the two countries. U.S.-Soviet cooperation in space – which began with exchanges of weather-satellite data in the 1960s, under the Kennedy and Johnson presidencies – took on much more substantial form in 1975 with the Soyuz-Apollo docking demonstration.

With the increasing globalization of scientific and technological capabilities over the ensuing decades, the benefits of strategic international S&T cooperation have only become more pronounced. The need to manage these interactions carefully to avoid the loss of commercial and military advantage persists, of course, but it is even more clearly recognized now than before that avoiding the interactions altogether is not the way to achieve this.

For example, a study conducted by the National Research Council during the Bush Administration and published in early 2009 before President Obama was inaugurated – *Beyond Fortress America: National Security Controls on Science and Technology in a Globalized World* – concluded firmly that U.S. national security benefits from strategically focused international S&T collaboration, even when the nations involved are ones we do not fully trust. Indeed, that study found that disengaging from, or unduly restricting, such cooperation reduces our security. It contended that restrictions on international collaboration have slowed maintenance of U.S. military equipment and discouraged foreign contractors from purchasing U.S. equipment.

The report went on to say that, commercially, U.S. restrictions on the sharing of science and technology information internationally can actually help our foreign competitors more than it hurts them, by pushing them to invest research dollars in areas where the U.S. currently reigns—a process that can eventually lead to their gaining equality or superiority in fields where they were previously dependent upon U.S. expertise. Undue restrictions also have been documented as helping to drive knowledge-intensive jobs offshore from the United States.

President Obama has clearly articulated his own recognition of the value of appropriately focused and properly managed international S&T cooperation, as well as his commitment to continuing to derive for this country the benefits that such cooperation offers. Just a few months after his inauguration, for example, he told the 2009 annual meeting of the National Academy of Sciences that "[M]y administration is ramping up participation in – and our commitment to – international science and technology cooperation across the many areas where it is clearly in our interest to do so." This recognition and commitment are reflected, as well, in the Administration's *National Security Strategy*, released in May 2010, where the section on "Advancing Our Interests" contains the following statement:

> *America's scientific leadership has always been widely admired around the world, and we must continue to expand cooperation and partnership in science and technology. We have launched a number of Science Envoys around the globe and are promoting stronger relationships between American scientists, universities, and researchers and their counterparts abroad. We will reestablish a commitment to science and technology in our foreign assistance efforts and develop a strategy for international science and national security.*

And the Administration's National Space Policy, released in June 2010, offers the following as one of the six overarching goals of our space programs:

> ***Expand international cooperation*** *on mutually beneficial space activities to: broaden and extend the benefits of space; further the peaceful use of space; and enhance collection and partnership in sharing of space-derived information.* [emphasis in original]

**The Specific Case of S&T Cooperation with China**

The relations of the United States with China are complex. The two countries behave as partners in some arenas, as competitors in some, and as potential adversaries in some. I am sure that most Americans – and certainly this includes me – are dismayed by the human-rights violations that have been repeatedly documented in China and that remain an affront to everyone

who cares about liberty and freedom. And certainly the Obama Administration is concerned about the theft of U.S. intellectual property that continues to be widespread in China, as well as about practices that discriminate against foreign firms in the Chinese marketplace under the banner of "indigenous innovation policy"; and we are aware of and concerned about the danger of loss of sensitive commercial and military technology in the course of cooperation with China. I commend you, Chairman Rohrabacher, along with Representative Wolf and others in Congress who have helped keep up the pressure on China to change its behavior in these areas, for these efforts.

That said, we in this Administration are not of the view that the solution to these challenges is to cut off our S&T cooperation with China. Quite the opposite, we believe U.S.-China S&T cooperation in forms that benefit both countries strengthens our hand in the effort to get China to change the aspects of its conduct that we oppose. Done properly, our cooperation can deepen the dialogue and facilitate progress in beneficial and sensitive areas alike. Besides this benefit, which corresponds to the last of the general benefits of international S&T cooperation that I listed earlier, all of the other benefits in that list also apply with particular force to the specific case of China. For example:

- it has rapidly growing capabilities in many domains of S&T – and rapidly growing resources being devoted to R&D – from which we can benefit through appropriately focused cooperation;

- its economy is the second largest in the world, after ours, and offers enormous potential markets to U.S. high-tech businesses whose access to and understanding of those markets are being facilitated in many cases by government-to-government S&T cooperation;

- as the world's largest energy consumer and largest emitter of greenhouse gases, China is affecting energy prices everywhere and global climate-change everywhere; by cooperating with China on energy-efficiency technologies and climate-friendly energy supply, therefore, we are helping ourselves not just in shared R&D costs but in reduced Chinese impact on our economic and environmental interests.

The value of S&T cooperation with China was clear to leaders of both U.S. political parties long before the preceding factors had reached their current dimensions, however. That is why, in January 1979, the U.S.-China S&T Cooperation Agreement became the first formal agreement between the two countries on any topic, following the normalization of relations. And it is why that agreement has been renewed by every administration since, Republican and Democratic alike. Here are some of its provisions:

> *The principal objective of this Agreement is to provide broad opportunities for cooperation in scientific and technological fields of mutual interest, thereby promoting the progress of science and technology for the benefit of both countries and of mankind.*
>
> *Cooperation under this Agreement may be undertaken in the fields of agriculture, energy, space, health, environment, earth sciences, engineering, and such other areas of science and technology and their management as may be mutually agreed, as well as educational and scholarly exchange.*

*Pursuant to the objectives of this Agreement, the Contracting Parties shall encourage and facilitate, as appropriate, the development of contacts and cooperation between government agencies, universities, organizations, institutions, and other entities of both countries, and the conclusion of accords between such bodies for the conduct of cooperative activities.*

The agreement specifies that OSTP shall be its Executive Agent on the U.S. side and that "[t]he Executive Agent of each Contracting Party shall be responsible for coordinating the implementation of its side of such activities and programs." It also specifies the establishment of a U.S.-China Joint Commission on Scientific and Technological Cooperation, which I, as Director of OSTP, co-chair with the Chinese Minister of Science and Technology.

This U.S.-China agreement has spawned many sub-agreements across domains as diverse as physics, public health, pest control, air-pollution control, and nuclear energy, and much that has benefitted the United States has been accomplished under their rubrics. A few recent examples:

- Joint research under an agreement between USDA's Forest Service and the Chinese State Forestry Administration is focusing on controlling the spread of the Asian long-horned beetle, which arrived in the 1990s in wood packing material from China and which, along with other Chinese wood-boring insects, is poised to cause as much as $138 billion in damage to U.S. hardwood forests.

- The U.S.-China Agreement created an environment under which health cooperation with China could expand and flourish. As a result of the Agreement, the U.S. Food and Drug Administration (FDA) was able to establish strong relationships and sign agreements with Chinese counterparts which, among other things: set standards for food and medical products entering the United States from China; increased information sharing; increased FDA access to production facilities; and encouraged China's involvement with international standard-setting bodies. In Fiscal Year 2009, FDA opened offices in Beijing, Shanghai, and Guangzhou, staffed by policy and technical experts and inspectors, giving FDA the capacity to inspect more Chinese facilities, work with the exporting industry, and provide technical advice to its Chinese counterparts. FDA's China Office represents an integral element of FDA's efforts to strengthen the safety of Chinese goods exported to the United States.

- Cooperation under the 1998 Peaceful Uses of Nuclear Technologies agreement has improved safety and emergency-management capabilities within China's nuclear sector and provided a more transparent view of China's nuclear industry, and it now helps U.S. nuclear power plant companies compete for China's rapid nuclear power plant development, which is a potential market of around $100 billion. The U.S. nuclear industry also benefits from a reduced chance of a major accident in China that could undermine nuclear energy prospects world-wide, including in the United States.

- In the spirit of advancing clean coal, clean vehicles, and improving the energy efficiency of buildings, a joint $150 million Clean Energy Research Center was established in November 2009 through collaboration among the Department of Energy (DOE) and

Ministry of Science and Technology and the National Energy Administration in China, with costs shared equally between the two countries. The objective of this Center is to leverage participation from research institutions, universities, and industry with potentially beneficial outcomes greater than had either country worked alone. U.S. government funds support domestic researchers and innovation, and particular attention has been paid to protection of intellectual property under the CERC, with IP agreements under the program endorsed by participating U.S. businesses.

Another focus of cooperation – this one situated within the U.S.-China Joint Commission on Scientific and Technological Cooperation at the request of the U.S. and Chinese leaders of the Strategic and Economic Dialogue (S&ED) between the two countries – is the U.S.-China Dialogue on Innovation Policy that I co-chair with Chinese Science and Technology Minister Wan Gang. These ongoing discussions, which include senior representatives of the departments/ministries/ offices of state, commerce, trade, finance, and S&T on both sides, have been centered around what actually works in innovation.

As a result of these discussions, China has pledged that its innovation policies going forward will be consistent with principles on non-discrimination, market competition, strong intellectual property protection and enforcement, and non-involvement of governments in the proprietary decisions of firms. And it has agreed to roll back specific, highly discriminatory measures related to government procurement that the Chinese government had been implementing under their heading of "indigenous innovation policy". These achievements will help to ensure that U.S. exporters and U.S. firms that operate in China will not be shut out of China's large government- procurement markets and that uncompensated loss to China of U.S. intellectual property will diminish.

The important Chinese concessions on innovation policy achieved through the U.S.-China Dialogue on Innovation Policy were confirmed by President Hu during the January 2011 summit in Washington, DC. The joint communique from that summit also noted the signing of the latest extension of the U.S.-China Agreement on Cooperation in Science and Technology and declared that "[t]he United States and China will continue to cooperate in such diverse areas as agriculture, health, energy, environment, fisheries, student exchanges, and technological innovation in order to advance mutual well-being."

**The Department of Defense and Full Year Continuing Appropriations Act of 2011**

As the Subcommittee is aware, Section 1340(a) of the Department of Defense and Full Year Continuing Appropriations Act of 2011, Public Law Number 112-10, contains language intended to bar OSTP from engaging in bilateral interactions with China. I am a scientist and not a lawyer, so I will only try to explain here in the briefest terms why OSTP has not complied with that prohibition. For details on the legal reasoning, I refer you to the formal opinion issued September 19, 2011, by the Department of Justice (DOJ). I'd like to ask that it be added to the hearing record as an addendum to my written testimony.

The Department of Justice advised me – as I testified before Chairman Wolf on May 4, as the DOJ confirmed to him by letter on June 28, and as the formal opinion issued by DOJ on September 19 further elaborated – that OSTP's activities in bilateral diplomacy with China on S&T issues fall under the President's exclusive constitutional authority to conduct foreign

diplomacy and thus cannot be precluded by Section 1340(a). In reliance on this advice, OSTP continued to engage in these activities.

**Conclusion**

Members of the Subcommittee, the issue of U.S.-China cooperation in science and technology has not historically been one on which our two political parties took opposing positions, and I don't think it should be now.

Recall that President Ronald Reagan, when he renewed in 1984, with some fanfare, the U.S.-China Agreement on Cooperation in Science and Technology, said that the two nations should "expand our economic and scientific cooperation, strengthen the ties between our peoples, and take an important step toward peace and a better life… We're sharing the benefits of research in medicine, energy, and other technical fields." He added that "Our scientists are learning a great deal from each other in public health, agricultural sciences, and many other areas."

Similarly, this is not an issue that separates military leaders from civilians. Consider the comments of Admiral Mike Mullen, until recently the Chairman of the Joint Chiefs of Staff, who wrote as follows in an opinion piece in the New York Times in July: "I'm not naïve. I understand the concerns of those who feel that any cooperation benefits China more than the United States. I just don't agree. This relationship is too important to manage through blind suspicion and mistrust. We've tried that. It doesn't work."

I very much hope that this is an issue on which this Administration and this Congress can come to agree. I thank you for your attention.

Mr. ROHRABACHER. Thank you very much, Dr. Holdren. And General Bolden.

**STATEMENT OF THE HONORABLE CHARLES BOLDEN, JR., ADMINISTRATOR, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION**

Mr. BOLDEN. Chairman Rohrabacher and Ranking Member Carnahan, thank you very much for the opportunity to appear here today. This is a critical time for our Nation's space exploration program. We have embarked upon an ambitious plan agreed to by President Obama and the bipartisan majority in Congress to maintain U.S. leadership in space for many years to come. Private U.S. companies will soon be taking over transportation of cargo and crew to the international space station. A deep space exploration vehicle and crew capsule to take humans farther into the solar system than we have ever gone before is in development. Science missions to Jupiter and asteroid, the moon and Mars are getting underway. Our technology development efforts are getting closer to demonstration, and our air aeronautics research is helping to advance cleaner and safer air travel.

For 50 years now, America has led the world in space exploration. Under the plan we have committed to as a nation, we will continue to do so for the next 50 years. It is important to note that our national success has been achieved in part thanks to international cooperation. Strategically we have entered into agreements that advance our national objectives and furthered the causes of science, space exploration and discovery. Currently, we have over 500 active agreements in place with 120 nations, excluding China. The United States has always led, but we also work with other countries when it serves our national interests. Having the flexibility to enter into these partnerships has been an important part of America's success in space exploration. Over the last decade NASA has had a very limited bilateral cooperation with China entities due to U.S. law and policy. In fact, NASA has only signed one agreement with the Chinese Academy of Sciences for the exchange of data for geodynamics research related to the prediction, monitoring of and response to natural disasters.

Additionally, joint working groups on earth and space science were established in 2007 under the Bush administration, and there have been reciprocal visits of NASA and People's Republic of China officials to facilities in each nation. I would like to emphasize that support for cooperation with China has spanned multiple administrations. NASA's bilateral cooperation with China was initiated under President George W. Bush and continued under President Barack Obama. Following a summit between President Bush and Chinese President Hu Jintao in 2006, it was agreed that the NASA administrator, one of my predecessors, would travel to China to begin exploratory discussions on space cooperation with Chinese officials.

Subsequent to that successful visit in 2007, NASA and China established working groups focused on earth and space science cooperation. In their November 2009 joint statement, President Obama and President Hu noted that they look forward to "expanding discussions on space science cooperation and starting a dia-

logue on human space flight and space exploration based on the principles of transparency, reciprocity and mutual benefit."

As a result, I traveled to China in October 2010 to continue and expand our discussions on potential space cooperation. In response to limitations enacted by public law 112–10, NASA immediately suspended all activities under NASA's agreement with the Chinese Academy of Sciences. The suspension of this agreement precludes NASA from directly receiving a global navigation satellite system, satellite laser ranging and very long baseline interferometry data from stations in China.

In addition, NASA cancelled all plans for reciprocal visits and bilateral activities. NASA employees and contractors continue to participate in multi-lateral activities through such multi-national organizations as the U.N. Committee on the Peaceful Uses of Outer Space in which representatives of the PRC organizations or companies may also participate.

In closing, let me assure this subcommittee that any NASA engagement with China entities will be conducted in a manner that is consistent with all existing U.S. laws and regulations. I believe, however, that some level of engagement with China in space-related areas in the future can form the basis for dialogue and cooperation in a manner that is consistent with the national interest of both our countries when based on the principles of transparency, reciprocity and mutual benefit. Initial discussions in areas such as orbital debris mitigation and disaster management can provide benefits to the United States and perhaps eventually form the basis for a continued dialogue in other areas of space exploration.

Mr. Chairman, I thank you very much for your continued support of NASA. I would be pleased to respond to any questions you or other members of the committee may have.

[The prepared statement of Mr. Bolden follows:]

HOLD FOR RELEASE
UNTIL PRESENTED
BY WITNESS
November 2, 2011

**Statement of**
**The Honorable Charles F. Bolden, Jr.**
**Administrator**
**National Aeronautics and Space Administration**

**before the**

**Subcommittee on Oversight and Investigations**
**Committee on Foreign Affairs**
**U.S. House of Representatives**

Mr. Chairman and Members of the Subcommittee, thank you for the opportunity to appear before you today.

This is a critical time for our Nation's space exploration program. We have embarked upon an ambitious plan, agreed to by President Obama and a bipartisan majority in Congress, to maintain U.S. leadership in space for many years to come. Private United States companies will soon be taking over transportation of cargo and crew to the International Space Station; a deep space exploration vehicle and crew capsule to take humans farther into the solar system than we have ever gone before is in development; science missions to Jupiter, an asteroid , the Moon and Mars are getting underway; our technology development efforts are getting closer to demonstration; and our aeronautics research is helping to advance cleaner and safer air travel.

For fifty years, America has led the world in space exploration. And under the plan we have committed to as a Nation, we will continue to do so for the next half-century.

It is important to note that our national success has been achieved, in part, thanks to international cooperation. Strategically, we have entered into agreements that advanced our national objectives and furthered the causes of science, space exploration, and discovery. The United States has always led, but we also work with other countries when it serves our national interests. Having the flexibility to enter into these partnerships has been an important part of America's success in space exploration.

Over the last decade, NASA has had very limited bilateral cooperation with Chinese entities due to U.S. law and policy. In fact, NASA has only signed a single agreement with the Chinese Academy of Sciences for the exchange of data for geodynamics research related to the prediction, monitoring of, and response to natural hazards. Additionally, joint working groups on Earth and space science were established in 2007, and there have been reciprocal visits of NASA and PRC officials to facilities in each nation.

I would like to emphasize that support for cooperation with China has spanned multiple administrations. NASA's bilateral cooperation with China was initiated under President George W. Bush and continued under President Barack Obama. Following a summit between President Bush and Chinese President Hu Jintao in April 2006, it was agreed that the NASA Administrator would travel to China to begin exploratory discussions on potential space cooperation with Chinese officials. Subsequent to that successful visit, in 2007, NASA and China established working groups focused on Earth and space science cooperation. In their November 2009 Joint Statement, President Obama and President Hu noted that they look forward "to expanding discussions on space science cooperation and starting a dialogue on human space flight and space exploration, based on the principles of transparency, reciprocity and mutual benefit." As a result, I traveled to China in October 2010 to continue and expand our discussions on potential space cooperation.

The April 15, 2011, enactment of the Department of Defense and Full-Year Continuing Appropriations Act of 2011 (Public Law 112-10), included language intended to place additional limitations on NASA's interactions with the PRC beyond those already imposed by the China Sanctions Legislation (Public Law 101-246), the NASA Authorization Act of 2000 (Public Law 106-391), and other applicable laws.

NASA has taken several steps in response to this language. However, it must be noted that these steps do not reflect a determination by NASA that the new restrictions in Public Law 112-10 are constitutional as applied to NASA's activities or those of any other agency.

The steps NASA has taken in response to the language in Public Law 112-10 include the immediate suspension of all activities under NASA's agreement with the Chinese Academy of Sciences (CAS). The suspension of this agreement precludes NASA from directly receiving Global Navigation Satellite System, Satellite Laser Ranging, and Very Long Baseline Interferometry data from stations in China. However, it should be noted that given NASA's longstanding open data policy, the international community – including the PRC – continues to have access to the data that NASA was providing directly to CAS under this agreement.

Additionally, to address the language contained in Public Law 112-10, NASA is currently not pursuing any bilateral cooperation with Chinese entities and has:

- Suspended all activities of the NASA-China Earth Science and Space Science Working Groups. These working groups were established in 2007 to discuss areas of potential mutual interest in the areas of Earth observation (including disaster mitigation sciences, oceanographic sciences, land surface imaging, atmospheric sciences), Lunar and Planetary Sciences, and Space Geodesy.

- Cancelled all plans for a reciprocal visit to NASA facilities by senior Chinese officials following my delegation's visit to China in October 2010.

- Denied all requests for potential bilateral activities between NASA employees and Chinese entities – whether funded by NASA or other U.S. Government agencies.

- Cancelled all proposed travel to the PRC by NASA employees or NASA-sponsored contractors that could be interpreted as initiating, pursuing, or implementing bilateral cooperation or other bilateral activities with Chinese entities.

- Established a presumption of denial for all proposed visits by any persons employed by or otherwise representing the PRC Government at facilities belonging to or utilized by NASA.

It should be noted, however, that NASA employees and contractors continue to participate in multilateral activities (through such multinational organizations as the UN Committee on the Peaceful Uses of Outer Space, the International Telecommunications Union, the International Space Exploration Coordination Group, and the Committee on Earth Observations Satellites), conferences, or other fora essential to fundamental international space coordination in which representatives of PRC organizations or companies may also participate.

NASA has over 50 years of experience cooperating with other nations on a broad range of space and aeronautics activities. Currently, NASA has over 500 active agreements in place with 120 nations, excluding China. This cooperation has always been and will continue to be based on the principles of transparency, reciprocity, and mutual benefit. As a U.S. Government Agency on the leading edge of technological development and international cooperation in space, NASA provides responsible stewardship of the Nation's advanced technologies and full compliance with the Nation's export control laws and regulations. For example, during the five years of the Shuttle-Mir program between the United States and Russia and the subsequent 12 years of the International Space Station partnership among the United States and 14 other nations there have been no documented compromises of U.S. technology. These missions have involved over a thousand exchanges of personnel and 29 joint expeditions, each of which has included at least one American and one Russian crew member. NASA's Export Control Program is audited annually, pursuant to statute, and I and my Agency are committed to uncompromising compliance with the export control and technology transfer laws and policies of the United States.

In closing, let me assure this Subcommittee that any NASA engagement with Chinese entities will be conducted in a manner that is consistent with all existing U.S. laws and regulations, specifically including the provisions of section 1340 of Public Law 112-10, unless those provisions are determined to be unconstitutional as applied to particular NASA activities. I believe, however, that some level of engagement with China in space-related areas in the future can form the basis for dialogue and cooperation in a manner that is consistent with the national interests of both our countries, when based on the principles of transparency, reciprocity, and mutual benefit. Initial discussions in areas such as orbital debris mitigation, disaster management, and atmospheric and planetary sciences could provide benefits to the United States and perhaps eventually form the basis for continued dialogue in other areas of space exploration. Our key international partners from Europe, Japan, Canada, and Russia share this view and are increasingly cooperating with China in these and other areas. Looking back on our Nation's history with the Soviet Union, the Apollo-Soyuz Test Program successfully demonstrated that, while other significant difficulties in the relations between our two nations existed, we could in fact successfully and responsibly work together if we were both committed to doing so.

Mr. Chairman, thank you for your continued support of NASA. I would be pleased to respond to any questions you or the other Members of the Subcommittee may have.

Mr. ROHRABACHER. Well, thank you both for your testimony. And we appreciate you coming here today to have this discussion. Let's get right down to some of the details here. Dr. Holdren, who was it who suggested to you that only things like this in terms of your interaction with foreign governments is only based on Presidential authority and that thus, I say the only word means the legislative branch does not have jurisdiction.

Mr. HOLDREN. Mr. Chairman, I wouldn't formulate it in that particular way, but I have been advised by the Department of Justice, and I have suggested that their written opinion to this effect on September 19th be added to the record. And they were very clear in their language that section 1340(a) is unconstitutional as applied to certain activities undertaken pursuant to the President's constitutional authority to conduct the foreign relations of the United States. That is an exact quote. And they went on to say that OSTP's officers and employees therefore may engage in those activities as agents designated by the President for the conduct of diplomacy with the People's Republic of China.

I am not a lawyer. The White House asked that a Department of Justice lawyer be provided here to answer those legal questions. I can't debate the law with you. But our request was unfortunately not granted.

Mr. ROHRABACHER. It wasn't granted by us or by the Department of Justice?

Mr. HOLDREN. My understanding it was not granted by the committee. That is my understanding.

Mr. ROHRABACHER. All right. I probably would have granted that had I known personally about it because I think that that proposition certainly deserves a great deal of discussion. And you are saying that this was the position of the Department of Justice, but it is not necessarily your position, is that what we are hearing today?

Mr. HOLDREN. Mr. Chairman, I am not qualified to reach positions on matter of constitutional law. I am advised by the Department of Justice that their opinion is binding on me as an officer of the executive branch, even if their opinion is in conflict with that of the General Accounting Office. That is what I have been advised by the Department of Justice.

Mr. ROHRABACHER. All right. So let's just note that when—let me ask you this then. This came from the Department of Justice. This did not come from your superiors at the White House?

Mr. HOLDREN. I don't generally talk about the content of my conversations with the President, who is my superior——

Mr. ROHRABACHER. Well, conversations don't have to be personal conversations.

Mr. HOLDREN [continuing]. In the White House. But the Department of Justice opinion represents the administration's view of this matter. And as I say, it is binding on me in the judgment of the Office of the Legal Counsel in that department.

Mr. ROHRABACHER. So if indeed Congress was to pass a law that said that government employees could not do certain actions as long as they were involved with, as long as these government employees were under the command of the executive branch, then that would be meaningless, right?

Mr. HOLDREN. I think that is a more general statement than the one the Department put out. And I, again, would refer you to the statement they put out. I am not going to speculate on a broader interpretation.

Mr. ROHRABACHER. It is an interpretation, but let me note it is a principle, and I think that that is—I will tell you that if any of the—and let me just acknowledge what both you and General Bolden said. This is not a partisan issue. These discussions about cooperation with China have certainly been Republican and Democratic administrations have both taken the position that you have in terms of the cooperation is worth the benefits, it is worth getting those benefits. We understand the risks, but it is worth the benefits, obviously which I disagree with, and Congressman Wolf and others. And obviously to the point that those who disagree with that were able to get that enacted into law.

The only question now is whether or not the executive branch feels compelled to obey that law. And what we are getting now is that—which is not bipartisan. If this was a Republican administration, believe me, there would be, and the Democrats were in charge of Congress, this would be a holocaust, I mean, it would be an uproar beyond imagination having an administration saying that really, Congress doesn't have the right to say where appropriated funds will be spent as long as it deals with foreign policy.

Let's go into some of the—before we get more into that, let's go into the benefits and the risks, which is what both of your basic testimony is. Do you believe that the cooperation that we had during the Clinton administration bore any similarity to the cooperation that is now being advocated by this administration in terms of space and technology cooperation?

Mr. BOLDEN. Mr. Chairman, I would say that every administration has advocated reasonable cooperation with China. The former Soviet Union, now Russia. And you can see where that decision has borne the fruits of the decision, though it may have been controversial at the time. And the greatest example I can give you is the benefit of the international space station, which orbits today and has been for 11 years. And had we followed the philosophy of those who believed that engagement is not the proper course of action we would not have the international space station today.

Mr. ROHRABACHER. And at the time of that cooperation, what was the level of the Russian space program as compared to the MACE space program as compared to back in those days the American space program versus the Chinese space program?

Mr. BOLDEN. When the cooperation began, which was with the Apollo Soyuz test project in 1975, and it was the Soviet Union, we had already been to the moon, as you know, we had demonstrated that we were better than everybody else in the world, much more technically capable.

So I would say that we were at the same position we are today where we are the number one space-faring nation in the world and intend to stay that way.

Mr. ROHRABACHER. Okay. But you don't recognize that the Chinese missile and rocket capabilities at that time were very limited, and in fact, as was the task force reported after this whole crisis

and scandal emerged, that we had dramatically improved a rocket-missile technology?

Mr. BOLDEN. Mr. Chairman, I think you may misunderstand what I said. I was comparing where we are today with China with where we were in 1975 with the Soviet Union.

Mr. ROHRABACHER. Right.

Mr. BOLDEN. And at that time we were engaged, heavily engaged in the Cold War, and both nations had nuclear missiles poised at each other. And so I think we were in much more dire stress then than we are today.

Mr. ROHRABACHER. General, let me point this out to you, that the Russian rockets that were available then were very capable and at the same level as our own rockets now. Whether or not they were able to get to the moon is another issue. The Chinese rockets, when we began cooperating with them during the 1990s, the Long March rocket had a huge failure rate until, of course, Americans cooperated by them and their failure rate was diminished dramatically, meaning they became very, going to like nine out of 10 would be, couldn't make it up because they didn't have the right stage separation or the right bearings, or they could carry one payload.

Do you think it is a good thing that now that the Chinese were able, after our cooperation to carry more than one payload on their rockets and that now nine out of 10 of their rockets succeed rather than blow up on a launch pad?

Mr. BOLDEN. Mr. Chairman, I can only speak as the NASA administrator. And my number one job is as to facilitate is to ensure the success of our crews as we go to and from space, as we fly through the atmosphere in aeronautics and as we conduct the international cooperation that we do. And I can only say that from the standpoint of NASA, as far as I know, since our engagement with China, Russia, any other nation began, there are no documented cases of transfer of technology that gave advantage to any other nation. Not from NASA arrangements, NASA agreements. We have guarded our technology and kept it from being transferred.

Mr. ROHRABACHER. Let me just suggest that you have not read the task force, the congressional task force on technology transfer to China that was done and voted on and unanimously voted in a bipartisan fashion that totally contradict your last statement. I am not saying you are lying or anything, I am just saying that you haven't read that or you wouldn't have made that statement. Because there was a major investigation into the transfer of technology because of this cooperation, a bipartisan task force, was the Cox report was issued, and it was unanimously accepted by both parties, which goes, which concluded that there had been great damage to our security based on that cooperation.

Dr. Holdren, have you read that report, that task force?

Mr. HOLDREN. I have read a summary of it, I have not read the report. And I think the question that is not clear from the summaries so far is whether that was NASA cooperation or the cooperation that went on between a private company and China at the time.

Mr. ROHRABACHER. Correct. And that is a very good distinction. And let me note that when NASA cooperates quite usually what

happens and follows is there is cooperation by major high tech corporations in the United States. And that is what usually is the purpose of the NASA cooperation, is to further that direct contact.

I don't think that the people that I know would agree with you, either one of you, in terms of the benefits outweigh the risks. I am not sure what the benefits to the American people are. We know that the Chinese have now been producing major consumer items in the United States with capabilities that our companies, major corporations involved in technology, have been able to ship there. I don't understand how that benefits the American people.

Maybe it is good for American workers to have those jobs earning a little bit more money rather than having the Chinese produce these products which they have not developed and that our companies have. And let me just note as far as your last statement, I personally investigated this issue in the 1990s. I was here and I spent a considerable amount of time in the field going to the actual companies and seeing exactly how they were cooperating back and forth. And one of the things the Chinese did not have was state separation at the time. After this cooperation, there was stage separation among their rockets and nine out of 10 worked. Before, nine out of 10 didn't work. That is not good.

I don't know if that, in and of itself, says that is—how does that stack up to us being able to get certain things manufactured there at a cheaper price, especially when the other thing that we gave them was the ability to have more than one payload on their rockets, meaning merving in the military sense. We provided that to the Chinese.

Now, providing the world's worst human rights abuser which is now building up its military and making, and being demonstrably hostile to the United States in the South China Sea and elsewhere and making alliances with every other vicious gangster regime in the world, I do not understand what benefit we get by perfecting their rockets and giving them the ability to merve and to throw three nuclear weapons at us per rocket rather than one. But that is what this is all about, that is what this hearing is all about. That is why that was written into the law.

It was written into law because Frank Wolf, who is a Member of Congress, who also went through that same investigation and Dana Rohrabacher and others who have been watching this issue for a long time are aware of the specifics. And we are, we convinced our friends in the legislative branch to put that into law. The President then signed it into law without a reservation stating that there is a constitutional question here whether or not the legislative branch has a right to limit the expenditure of money that is used by the executive branch in determining foreign policy relationships. So this issue seems to be—please feel free to answer those points.

Mr. HOLDREN. Yes, I would, Mr. Chairman, like to respond on a couple of points.

Mr. ROHRABACHER. Yes, sir.

Mr. HOLDREN. First of all, I certainly don't dispute that there have been instances of technology transfer to China that we did not wish and should not have welcomed. That is part of the cost in liability that has to be traded off against the benefits. I think it is

possible to exaggerate the importance of any one technology transfer by assuming the Chinese would never have figured that out on their own if they hadn't gotten it by technology transfer. Usually what happens is these technology transfers accelerate by some amount but not always a great deal the acquisition of a capability that is important to a country. But I don't dispute there was a loss there. But there have been many benefits.

And I point out on pages 5 and 6 of my written testimony a number of them. I will mention a few more. We have cooperated with China in the domain of public health and disease in ways that have greatly increased our capacity to respond to epidemics that originate in China, which many influenzas do, and have enhanced our capacity to deal in the biological regime with invasive species with pests that originate in China. Our cooperation with China on nuclear safety has reduced the chances that a Chinese nuclear reactor will suffer an accident.

If a Chinese nuclear reactor suffers a big accident, as reactors in Fukushima, Japan recently did, that puts in jeopardy our own capacity to operate our nuclear reactor system. It puts in jeopardy the consent of the public to operate this important component.

Mr. ROHRABACHER. You have just given us good examples of mutual benefit.

Mr. HOLDREN. Exactly.

Mr. ROHRABACHER. But can you give us an example of just benefit? I mean, this is—yeah, I can understand why they would want us to come in and help make sure that they don't have epidemics and I can understand why they would be happy to have us perfect their nuclear program.

Mr. HOLDREN. Yes, I would be happy to give you an example of a straight benefit. Again, in the dialogue on innovation policy, which was a negotiation, the Chinese were persuaded to relinquish policies they had put in place which discriminated against American businesses. And I can tell you that the American business community that works in China is very grateful for the effort we made and for the benefit we got.

Mr. ROHRABACHER. So the benefit, you are saying now, is we persuaded them, the Communist Chinese Government, to quit restricting our American businessmen who want to put our technology in China? That is a benefit to us?

Mr. HOLDREN. No. Our businessmen who want to sell products made in America——

Mr. ROHRABACHER. Okay. Sell products.

Mr. HOLDREN [continuing]. In the Chinese market. And that is a benefit to American workers, it is a benefit to our economy, it is a benefit to our balance of payment.

Mr. ROHRABACHER. Okay. So the benefit is that there were certain things that we were not permitted to sell in China, and you weren't saying that we eliminated their restrictions on actually putting things into China, meaning technology that would permit them to have greater manufacturing capabilities, things like that?

Mr. HOLDREN. First of all, Mr. Chairman, I would not guarantee that in some of the forms of cooperation, including joint ventures between U.S. companies and Chinese companies, there will be some transfer of technology. The key issue there is one of intellec-

tual property rights and that that transfer of technology be compensated at the satisfaction of the owners of the intellectual property. But I would assert that among the benefits of the agreements we secured from the Chinese on their innovation policy was increased access to Chinese markets for American products made in America by American workers.

Mr. ROHRABACHER. Well, we have read it differently because the read that I have had of American access to their markets has been that they have continued to have major restrictions on our ability to sell finished goods, but they are perfectly willing to permit us to go to their market and sell them what is necessary to, the technology necessary to build up their own manufacturing capabilities. We may be talking about the same thing.

Mr. HOLDREN. I think we have more to do in these negotiations. That is one of the reasons why I am eager to continue them. We haven't gotten everything that we need in terms of access to Chinese markets and nondiscrimination against American firms. But we are making progress. We need to make more. It will be to the benefit of American firms, American workers and the American economy when we do.

Mr. ROHRABACHER. All right. And we will have a second round, but I have been taking up too much time already. Mr. Carnahan, would you like to, or Mr. Cicilline?

Mr. CARNAHAN. Thank you, Mr. Chairman, and to our witnesses for being here today. You have given us, I think, a fuller picture of this bigger debate. Certainly the give and take tug-of-war between Congress and the administration on foreign affairs is not new. That has been going on probably since the very beginning of this country. But—and I appreciate Dr. Holdren, you know, you very succinctly and simply described the relationship with China as complex. That is probably an understatement.

But, you know, I, too, am of the belief that it is important that we look for ways to maximize the benefits of engagement, while at the same time minimizing those risks and that certainly engagement outweighs any of those risks. And I appreciate also the fact that in the context of the executive branch, that you sought the appropriate legal advice in pursuing this meeting. Folks in Congress may disagree with this, and I think this is a legitimate issue for us to be talking about here today, but I wanted to really get into an area that really gets to the heart of this matter in terms of what protections are in place to ensure that as we engage in this dialogue at all levels, that we are maximizing those benefits and minimizing those risk. And let me start with Dr. Holdren.

Mr. HOLDREN. Sure. There are a wide variety of protections in place that apply to these interactions and other interactions. We have a variety of restrictions on the kinds of technologies that can be transferred to China and appropriately so in our export restrictions. We have a variety of programs in place, including under the Committee on Foreign Investment in the United States, CIFIUS, that tracks acquisitions by Chinese and other foreign entities of businesses in the United States that could have adverse impacts on our national security through technology transfer or by other means.

OSTP, by the way, is a voting member of the Committee on Foreign Investment in the United States and reviews all of these matters. In the domains of cybersecurity which have been alluded to by some of the previous witnesses, we have a very wide and robust interagency set of measures that address the cybersecurity threats associated with China and other countries. When we travel to China, we take extensive precautions in interaction with the appropriate U.S. intelligence agencies to ensure that no sensitive or classified information is compromised. We are very well aware in this administration, as previous administrations have been, of the liabilities and the risks associated with these kinds of interactions, and we are taking every step that we can think of to minimize those risks and liabilities. Some of those measures, of course, fall in the classified domain. We would not be able to discuss them here. But I would be happy, in a suitable venue, to provide more detail.

Mr. CARNAHAN. Thank you. And General Bolden, the U.S., China and Russia are the only three countries with manned space flight capability. We recently ceased operating our shuttle fleet. What risks are posed to the U.S. space program if we are not cooperating with China and Russia and with the broader international coalition that we work with in terms of our space program?

Mr. BOLDEN. Mr. Carnahan, what risk we take is that we lose our position of leadership in the world. And it is tenuous even as we speak today because we are the only one of the international partners involved with the international space station that does not have a working relationship with China. But again, I would say in my case, I am responsible for the space agency and not science and technology advice to the President, as is Dr. Holdren. So my area of expertise and my area of responsibility is very limited. When we did have bilateral dealings with China, they were in the area of geodynamics research, which was essentially talking about how can we predict earthquakes and then what do we do after it occurs, areas like orbital degree mitigation. And so there is not my concern that NASA will be subjected to providing technical information as the chairman is concerned. And we limit it that way.

We have an agency-wide export control board that determines what we can do in terms of export control, and we are part of the interagency process, as Dr. Holdren described. NASA is very limited in what we do in terms of the concerns that are expressed by the committee.

Mr. CARNAHAN. And finally, I want to get your comment. You describe limitations in suspending or canceling certain bilateral activities with China pursuant to the law, but of course, you are authorized to continue multi-lateral engagement in activities with China. Does this make any real practical difference that that engagement has to be done in a multilateral setting that you cannot do in a bilateral setting?

Mr. BOLDEN. Let me make sure I understand your question. Are you saying that by not being able to do it in a bilateral setting, does it limit my ability to carry out what NASA is supposed to do?

Mr. CARNAHAN. Right. To really continue the mission of NASA.

Mr. BOLDEN. To date or right now it does not limit my ability to do the three primary things that the Congress of the United States

and the President have designated for us, the three priorities that we have right now, which is the formulation of an exploration program consisting of a heavy lift launch vehicle, a crew module, expansion of the utilization of the international space station by bringing about the vibrant commercial industry that can provide us transportation to and from space so that I can stop having to pay our Russian partners to do that as I do right now, and then thirdly focusing in the area of science on the James Webb Space Telescope as the dominant science project, but also in the area of earth science where we did cooperate with the Chinese. But we have other entities that provide us that information so it is not critical right now. Cessation of multi-lateral participation would put us on the outside looking in.

We would not be able to participate in things like UN–COPUOS. I can go on and on with international conferences, congresses, the U.N. again. NASA would just be on the outside looking in and we would serve no purpose for the Nation.

Mr. CARNAHAN. Thank you. I am going to wrap up my time because I know we have got a colleague that wants to engage in this as well. I am going to yield at this point.

Mr. ROHRABACHER. Wait a minute now. I want to know specifically how to pronounce your name.

Mr. CICILLINE. Cicilline.

Mr. ROHRABACHER. Cicilline. Mr. Cicilline, you take as much time as you would like.

Mr. CICILLINE. Thank you, Mr. Chairman. Thank you General Bolden and Dr. Holdren for being here. As I reviewed both the testimony that you just provided as well as the written testimony that was provided and reviewed by me last evening, certainly the subject of the dangers of engagement with China was the subject of a lot of this material. But what struck me in reviewing this is that there is another danger, which I would really like to ask Dr. Holdren about. And it really stems from an intention by the Chinese to really invest in innovation in a very, very serious way. In February 2006 China's state council issued the national medium and long-term program for science and technology development which we often refer to as MLP. And in that, they committed to changing China within 15 years from a major manufacturing center to a major global source of innovation.

And by 2050, to make China a global leader in innovation. And the plan further says that by 2020 gross expenditures for research and development would rise to 2.5 percent of GDP from 1.3 percent in 2005, so nearly doubling it. And when you look at sort of that kind of a serious investment in innovation and research and development in a time when we are being, when some of my colleagues in the Congress of the United States are, in fact, making strong arguments for reducing investments in research and development and innovation, and it struck me as I reviewed this that that poses a great danger to our innovation economy and to the long-term economic prosperity of our country.

And I would like to know some of your thoughts generally about what sort of policies we should be pursuing so that we remain competitive, particularly when faced with that sort of investment by

the Chinese. And then I have a second part to the question, but I would like you to go to that part first.

Mr. HOLDREN. Well, thank you Congressman for that question. Certainly, the Chinese intend to be our competitor in high technology. They are already our economic competitor in a variety of regimes. I noted that in my testimony. And they intend to do better. We still have the best colleges and universities in the world, we still have the best research laboratories in the world, we still out-innovate everybody in the world. In order to maintain that lead, we are going to need to continue to make the investments in research and development, the investments in our research universities and our national laboratories, and the investments in our education system, particularly science, technology, engineering and math education, that the President is calling for, and which again, have historically been a matter of bipartisan agreement.

The need to make these investments in the basis of our future in science, technology, innovation and their application to the economy, to our security, to the environment, this is something in which we have been the best. We need to continue to be the best. But the notion that China intends to compete with us does not mean the solution is to disengage from them. Germany competes with us; England competes with us; Russia competes with us; increasingly, countries in South America want to compete with us.

We do not generally conclude that the solution to competition is disengagement. The solution is intelligent engagement measured, focused, appropriately managed so that we get the benefits for our own innovation system, that we help other countries get particular benefits that are in our interest and that we stay engaged with the best minds and the best facilities in the world, wherever they may be. The President has said very clearly that to win the future, we need to out-educate, out-build, and out-innovate everybody else. We plan to continue to do that. But part of doing that is also staying engaged with everybody else.

Mr. CICILLINE. Thank you, Doctor. And the second issue, and I apologize if you addressed this, I had to step out for a minute. If you did, I apologize. But I wonder if you could just comment on how effective the strategic and economic dialogue has been or any other dialogues that have been, that have been engaged with between the United States and China over the theft of intellectual property and forced technology transfer of policies. Particularly, I am interested to know whether China has followed through on its commitments to delink indigenous innovation policies from public procurement at all levels of government. I represent a State that has a long history of manufacturing and have heard from a number of manufacturers in my home State about experiences they have had with the theft of intellectual property and the challenges they face.

And I think we all agree that in a level playing field, we have the greatest innovators, the greatest innovators and the greatest workers in the world, but the theft of intellectual property and this opportunity for public procurement only to come about as a result of the transfer of intellectual property remains an issue. And I just wondered what your thoughts are on where we stand and whether

the dialogue has been helpful in protecting American workers and American manufacturers in that regard?

Mr. HOLDREN. First of all, it does remain an issue. We have made progress. But as I said a moment ago, we need to make much more. One of the interesting things to which the Chinese have agreed is the result of our interaction in the dialogue on innovation policy and the strategic and economic dialogue, is to have a bilateral team of technology experts set up that actually goes out into the field, into the provinces, into the cities to find out whether the new instructions from the Central Government about eliminating some of these discriminatory policies and being unattentive to the theft of intellectual property, to see whether that is really happening. And this is extraordinary. I mean, this is the equivalent of accepting on-site verification in arms control, which was always a great challenge to achieve. The Chinese have accepted this. The President of China in the summit in January announced that China was abandoning these particular policies, and they are committed to make stronger efforts to protect intellectual property. I might just add that probably no American company has suffered a greater loss of intellectual property to China than Microsoft. And we have the chief strategy officer of Microsoft as a member of the President's Council of Advisors on Science and Technology, Craig Mundie, and he is participating energetically and enthusiastically with me as part of the U.S. delegation to the dialogue on innovation policy as a member of PCAST because he believes that we are making progress and of course that we need to make more and therefore we need to continue it.

Mr. CICILLINE. Thank you. Thank you, Mr. Chairman.

Mr. ROHRABACHER. Well, I want to thank the witnesses. I know I took a long time, and the chairman's prerogative. It took me a long time for me to be chairman so I could actually take that time. But I was hoping that Mr. Carnahan would have another chance if he had anything else to ask. Just a couple of thoughts. And that is, I think, number one, that we were talking about an issue of legality, the constitutionality which these witnesses have made sure that they are—we understand that you are not the definers of what is constitutional and what is not, and you are part of an administration and will take direction from your President, which is appropriate.

I think there is a major constitutional issue here. After hearing the testimony, I believe there is a major constitutional issue to be determined about whether or not Congress does have the rights to limit you and your jobs and what your personnel can do in the area, that steps in the foreign policy arena.

Are we permitted then, as Congress, to say that you cannot expend those funds. Thus, you cannot have your people doing these things. And the Department of Justice obviously has said that, no foreign policy belongs to the executive branch and that will have to be determined. And I appreciate you coming here realizing that is the core of the dispute, an issue, I also appreciate both of you coming here in order to argue your case for the benefit of the policy itself, and not the constitutionality, necessarily, of it.

And I think on that, we have some major disagreements, and I would think that the great investment—the only thing I know per-

sonally is, well, you know, I was working with the Reagan administration for 7 years. And, again, I noted earlier that when Reagan increased the level of cooperation with the Chinese, it was predicated in those very agreements and statements that he made that this is based on a liberalization continuing in China that has led to a very robust democracy movement, which after Tiananmen Square was slaughtered and China actually has less democratic rights now than they had then, although they have had a lot of economic progress.

I am not convinced that making a dictatorship more efficient and providing more wealth will lead to democratization, but I understand there are people who honestly believe that if we increase the level of wealth of a country, you will eventually eliminate the ghouls and the goons and the gangsters who run some of these countries.

I did not see that in Russia. Ronald Reagan did agree that there was some cooperation going on, would never have agreed to most-favored nation status, and, in fact, ratcheted up the other types of confrontations that we had with Russia which actually bankrupted their system.

It was not benevolent acts that won them over that led to the destruction of the Communist Party dictatorship in Russia, it was just the opposite. And so with that said—at least that is in the chairman's opinion.

And I want to thank you again for coming today, and there will be, if there is any written questions that we have, we will submit them to you and hope that you can get them back to us in a timely manner.

And so this part of the hearing is over and, again, thank you to the witnesses.

Mr. ROHRABACHER. For our final panel, we have Rick Fisher, who is a senior fellow at the International Assessment and Strategy Center and an expert on Chinese military development. He has previously served as a senior fellow for the Center or Security Policy and editor of the Jamestown Foundation's China Brief and as a senior fellow with the White House Republican Policy Committee.

Adam Segal is the Ira Lipman Senior fellow at the Counterterrorism and National Security Studies for the Council on Foreign Relations.

Before going to the council on foreign relations Dr. Segal was an arms control analyst for the China Project at the Union of Concerned Scientists and has recently written a book entitled, "Advantage: How American Innovation Can Overcome the Asian Challenge."

We appreciate both of you being here, and you may proceed with your testimony. Mr. Fisher.

## STATEMENT OF MR. RICK FISHER, SENIOR FELLOW, INTERNATIONAL ASSESSMENT AND STRATEGY CENTER

Mr. FISHER. Thank you, Mr. Chairman. It is an honor to appear before this committee to assist your deliberations on this very important issue.

Mr. Chairman, I very much appreciate your leadership in working tirelessly to alert the country to the dangers emerging from the

People's Republic of China and the need to protect ourselves, defend ourselves. I am also very grateful for the leadership of Congressman Wolf. I am grateful for his testimony today.

I am also grateful for your mentioning of the Cox report. As you mentioned, I had the opportunity briefly to work for Chris Cox just after his report was released. And at that time, I remember the crisis in our relationship with the PRC. We were discovering the espionage, the military potential was very great.

One of my favorite stories that emerged from that period was about the Martin, former Martin Marietta Corporation and how a Chinese engineer explained to me one evening how solid fuel rocket technology from a kick motor that Martin Marietta had sold or had used on a U.S. satellite revealed to the Chinese how to perfect their own solid fuel rocket motors.

Well, that rocket motor became the basis for the DF–21 medium range ballistic missile. The DF–21 became the basis for the anti-satellite system used successfully in 2007, and is also the basis for the new anti-ship ballistic missile, the DF–21(D) that is a revolutionary weapon targeting our aircraft carriers and other large ships in Asia.

So what I stressed in my written testimony was the real dangers that can emerge from uncontrolled and unmonitored cooperation with China in space. I have been studying the People's Liberation Army, writing about its modernization for about 15 years. A large part of that time, I have spent focused on monitoring China's space program.

And there are two fundamental observations that one must make. The first is that the Chinese space program is controlled by the People's Liberation Army. They are the ones that set the priorities, they control the programs.

The second, an obvious conclusion that I have drawn, is that China's space program is nearly entirely dual use.

Everything that the Chinese put into space, including their manned space program, is designed to produce military benefit for the People's Liberation Army and the conduct of military operations on Earth.

All of the first seven Shenzhou missions, their first manned space capsule, conducted some form of military mission and I have listed those in my testimony.

Shenzhou 7 in 2008, September 2008 did something completely different, though, it flew to a point about 27 miles from the International Space Station. Just before it reached that point, though, it launched a micro satellite so you essentially had this body moving 17,000 miles an hour with a projectile out in front of it and there was two Russians and an American on the International Space Station.

I have written that this raised the possibility of real danger to those on board the ISS. But, Mr. Chairman, I cannot find a single statement by a U.S. Government official questioning this incident or reacting to it.

And so this will continue. The space lab that was launched on September 29 has surveillance capabilities. The future space station that will be launched in about the 2020 timeframe will be easily configured for military missions. Space claim, the same thing.

In my opinion this dual-use character will continue with the PLA's space program to the moon and beyond.

So to help illuminate these dangers, I have suggested in my testimony three questions that the administration should answer to try to satisfy the many concerns that have been expressed today and for many years by the Congress.

The first question is does the vast difference in PRC and U.S. space transparency mean that any level of contact between official, corporate or university sectors could pose a disproportionate threat to the United States?

All individuals that we could possibly invite to the United States from China to cooperate in space programs, how do we know who they really worked for?

A second question, does the clear dual-use nature of the PLA, Chinese space program, mean that potential Chinese space cooperation will never produce the same mutual benefit for the United States?

Whatever China learns from our space program will be applied to assist military goals. Our space program is civilian. It is not producing military benefit, at least directly for the U.S. military.

Third, does the PRC's aggressive pursuit of pervasive espionage also dictate that the benefits of U.S.-PRC space cooperation will never be mutual?

And, finally, I ask, does the proposition that U.S.-PRC cooperation in space can improve their relations on Earth really stand up to historical examination? We have heard in the testimony today reference to the 1975 U.S.-Russia Soyuz mission. Well, that was all fine and good after, but after 1975, China—Russia, the Soviet Union, proceeded to build a lot greater and more dangerous weapons to put into space. And they would have done so had the Soviet Union survived past 1990.

I think the proposition is simply not backed up by history and those who feel that we can advance terrestrial relations with China by cooperating in space have really got it backwards, and I will stop there.

Mr. ROHRABACHER. Thank you, Mr. Fisher.

[The prepared statement of Mr. Fisher follows:]

**Testimony for the United States House of Representatives, Committee on Foreign Affairs, Oversight and Investigations Subcommittee, for the hearing "Efforts To Transfer America's Leading Edge Science To China," November 2, 2011**

***Military Space Ambitions of the People's Republic of China and How Near Term PRC-U.S. Cooperation with China In Outer Space Could Threaten U.S. Interests***

**By Richard D. Fisher, Jr., Senior Fellow, International Assessment and Strategy Center**

Mr. Chairman and Distinguished Members of this Committee:

It is an honor to offer testimony to assist the deliberations of this Committee concerning the effects of the transfer of leading edge American technological and scientific research to the People's Republic of China (PRC). While this is a very broad area of concern to the United States, I would like to focus my testimony on an issue of particular interest to this Congress: the dangers to the United States that could result from a leakage of U.S. space technology to the PRC.

This challenge has been one of longstanding concern for the Congress. It was an accumulation of reports regarding the leakage of U.S. missile technology to the PRC in the mid-1990s that in part led to a 409-10 vote in the House of Representatives on June 18, 1998 to form the *Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China*, co-chaired by former Congressman Christopher Cox and Congressman Norm Dicks. This Select Committee's unclassified report was released to the public on May 25, 1999 and it remains today the most comprehensive examination by the Congress of the PRC's broad effort to acquire U.S. space and military technology.

More recently Congressional concern about the dangers of space cooperation with the PRC has been led by Congressman Frank R. Wolf. In testimony on May 11, 2011 before the U.S. China Economic and Security Review Commission, Congressman Wolf stated his concerns about cut backs in the National Aeronautics and Space Administration (NASA) space exploration programs while the PRC's is expanding, and listed his concerns about PRC behavior regarding its military buildup, aggressive behavior toward U.S. Navy ships, intense espionage and cyberwarfare activities, proliferation of missiles and human rights. He then explained, "That is why I included language in the Fiscal Year 2011 Continuing Resolution preventing NASA and the Office of Science and Technology Policy from using federal funds 'to develop, design, plan, promulgate, implement or execute a bilateral policy, program, order, or contract of any kind to participate, collaborate, or coordinate bilaterally in any way with China or any Chinese-owned company.'"[1]

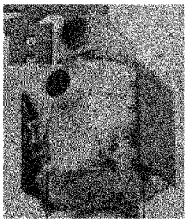
However, the White House Office of Science and Technology Policy (OSTP) proceeded to hold meetings with PRC counterparts between May 6 and May 10, 2011 for the U.S. and China

[1] WOLF STATEMENT AT U.S. - CHINA COMMISSION HEARING ON MILITARY AND CIVIL SPACE PROGRAMS IN CHINA, Says U.S. 'Has No Business' Helping China Develop Its Space Program, May 11, 2005, http://www.uscc.gov/hearings/2011hearings/written_testimonies/11_05_11_wrt/11_05_11_wolf_testimony.pdf

Strategic and Economic Dialogue (S&ED). In an October 11, 2001 letter to Congressman Wolf, the U.S. Government Accountability Office stated, " we conclude that OSTP's use of appropriations to fund its participation in the Innovation Dialogue and the S&ED violated the prohibition" described by Congressman Wolf. The GAO also concluded that "OSTP's involvement in the Innovation Dialogue and the S&ED resulted in obligations in excess of appropriated funds available to OSTP; as such, OSTP violated the Antideficiency Act, 31 U.S.C. § 1341(a)(1)(A)."[2]

**Background On U.S.-PRC Space Cooperation Amid Increasing PRC Militarization of Space**

This confrontation between the Congress, led by Congressman Wolf, and the Obama Administration is but the latest manifestation of controversy surrounding the question of whether the United States should pursue substantive cooperation with China in space. It is a controversy that has divided political parties and U.S. government agencies as factions in both the administrations of presidents George W. Bush and Barack Obama have sought to advance space cooperation with the PRC while the PRC has only increased the militarization of its manned and unmanned space program. Initial reports of Bush Administration interest in NASA and the State Department about cooperating with the PRC in space surfaced soon after the launch of the PRC's *Shenzhou-2* space capsule in January 2001. This was encouraged by then China National Space Agency Director Luan Enjie during a November 2001 visit. However, in January 2001 former PRC leader Jiang Zemin signaled the People's Liberation Army's (PLA) lead over the PRC manned space program when he congratulated the Director of the PLA's General Armament's Department (GAD) on the *Shenzhou-2* flight. In October 2003 the PRC launched its first manned mission, *Shenzhou-5*. While lauded as a triumph for PRC science and technology, *Shenzhou-5's* main payload comprised two high resolution surveillance cameras in its orbital module, which continued operations for another 152 days.



Shenzhou-5's orbital module shows two large high-resolution cameras. This indicates that intelligence gathering was the primary mission for the PRC's first manned space mission.

In January 2004 President Bush announced his program to return the U.S. to the Moon by 2015 to 2020, which became NASA's Constellation Program. In December 2004, current Chinese Communist Party Secretary General and Chairman of the Central Military Commission of the People's Liberation Army, Hu Jintao, announced the "New Historic Missions" for the PLA, which included that it increasingly would defend the Communist Party's international interests.

[2] Letter to The Honorable Frank R.Wolf, from Lynn H. Gibson, General Counsel, United States Government Accountability Office, October 11, 2011, B-321982.

The following Five Year Plan, starting in 2005, saw a higher emphasis on power projection weapons like aircraft carriers, amphibious assault ships, large transport aircraft and 5th generation fighters. There is also an increase in "dual use" PLA space programs like the space station, space planes and Moon programs.

Despite an increasing understanding of the military character of the PRC manned space program, by the end of 2005 reports emerged that outgoing NASA Administrator Sean O'Keefe was ready to begin official preliminary discussions regarding space. This period saw reports of consideration of initiatives like a common space docking adaptor to allow the *Shenzhou* spaceship to dock with the International Space Station. Then in September 2006, Michael Griffin made the first visit to the PRC by a NASA Administrator, during which he ruled out early manned space cooperation, but offered that it was possible that unmanned space projects could be realized. Reflecting the optimism held by some during this period, at a July 11, 2006 forum, former Congressman (now Senator) Mark Kirk stated, "I think the manned space program has a potential all out of proportion to its size and cost for improving the diplomatic, political, and military atmosphere between the United States and China."[3]

But unknown save to the U.S. intelligence community, since about 2005 the PLA had been testing its SC-19 ground-launched direct-ascent anti-satellite (ASAT) weapon, which successfully destroyed a PRC FY-1C weather satellite on January 11, 2007. This demonstration shocked the world and resulted in the largest cloud of space debris that will threaten the satellites and manned space ships of all countries for many years to come. It also served to confirm the longstanding concern of many analysts that the PLA was developing a range of military space and space combat capabilities. Though the Congress forced the Reagan Administration to stop development of an air-launched ASAT in the mid-1980s, the Bush Administration decided it needed to respond to the PRC with an ASAT demonstration, and quickly modified a U.S. Navy SM-3 anti-missile interceptor to shoot down the falling USA-193 surveillance satellite on February 11, 2008.

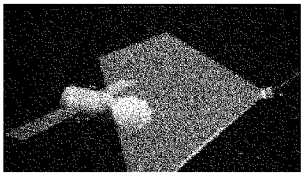
During 2008, Michael Griffin also raised the prospect that the PRC could become a space competitor to the U.S., noting in interviews the PRC manned space program could reach the Moon before the U.S. But Griffin would also offer cautious optimism about U.S.-PRC space cooperation, telling the BBC in July 2008, "I think we're always better off if we can find areas where we can collaborate rather than quarrel. I would remind your [audience] that the first US-Soviet human co-operation took place in 1975, virtually at the height of the Cold War…And it led, 18 years later, to discussions about an International Space Station (ISS) programme in which we're now involved."[4] But then on September 27, 2008, while most in the U.S. were distracted by the presidential election, during the second day of the PRC's *Shenzhou-7* space mission, this craft launched its BX-1 microsatellite hours before passing to a point 45km from the International Space Station.[5] Despite what could have turned into disaster for the two Russians

[3] Quoted in Jeff Foust, "U.S. China space cooperation: the Congressional view," *The Space Review*, July 17, 2006, *http://www.thespacereview.com/article/661/1*

[4] Paul Rincon, "China 'could reach Moon by 2020,'" *BBC Web Page*, July 15, 2008, http://news.bbc.co.uk/2/hi/7506715.stm

[5] Confirmation of the Shenzhou-8's near pass by the ISS was provided by the US Strategic Command (USSTRATCOM) via the NASA public affairs office in an email to this analyst on October 7, 2008. This is incident is further explored in this analyst's

and one American onboard, in the event of a malfunction – and, the appearance that the PLA was practicing a potential "co-orbital" combat interception of the ISS -- no NASA or other U.S. official has to date offered a public reaction to this incident.



Shenzhou-7 approached to a point 45km from the ISS after having launched a 40kg microsatellite. A malfunction could have destroyed the ISS. No U.S. government official has offered a public reaction to this incident.

In 2009, the Obama Administration started by voicing a stronger interest in space cooperation with the PRC. In an April 2009 interview, White House Office of Science and Technology Policy Director Dr. John Holdren suggested that the PRC might provide transport to the ISS for U.S. astronauts following the planned retirement of the U.S. Space Shuttle. In response to a question as to whether the U.S. could have confidence in China's ability to launch U.S. astronauts, Holdren offered, "I think it's possible in principle to develop the required degree of confidence in the Chinese. I put it out there only as speculation, but I don't think it should be ruled out."[6]

Then, in November 2009, in conjunction with the 60th anniversary of the PLA Air Force (PLAAF), its commander and other top officers began to describe a new "strategy" or doctrine for the PLAAF, which would in the future create an "integrated air and space force capable of offensive and defensive actions." PLAAF Commander General Xu Qiliang explained this shift in strategy:

> "China's national interests are expanding and the country has entered the age of space. The Party and the people have given us a historic mission. After thorough consideration, we decided to change…The air force will extend its reach from the sky to space, from defense of Chinese territory to attack [of threats] as well. We will improve the overall capability to strike a long-distance target with high precision, fight electronic or internet warfare with back-up from space... and deliver our military strategic assets…China will become a world power by the mid-21st century and its air force must be able to counter many forms of security threats."[7]

These statements stood in stark contrast to longstanding PRC campaigning against the militarization of outer space. One PRC commentator made clear that the PRC intended to militarily deter "hegemonism," in outer space, meaning the United States, noting, "The Chinese Air Force decided to make the historical change by adopting the strategy of 'integration of air

---

article, "Closer Look: Shenzhou-7's Close Pass by the International Space Station," *International Assessment and Strategy Center Web Page*, October 9, 2008, http://www.strategycenter.net/research/pubID.191/pub_detail.asp

[6] Jeffrey Mervis, "In Full Interview, John Holdren Eschews New Nukes, Hints At Spaceflight Delays," *ScienceInsider*, April 8, 2009, http://news.sciencemag.org/scienceinsider/2009/04/in-full-intervi.html

[7] Comments as reported by Stephen Chen and Greg Torode: "China 'To Put Weapons in Space'," *South China Morning Post*, November 3, 2009.

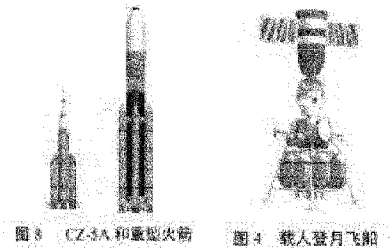
and space, possessing both offense and defensive capabilities' precisely for the purpose of restricting the militarization of air and space and realizing an aerospace military balance."

While the PLA was making clear its intention to militarily challenge the United States in space, the Obama Administration took early steps to begin a dialogue that would lead to greater cooperation with the PRC in space. In the November 17, 2009 Joint Statement that was issued during President Obama's November 15-18 visit to the PRC, it was stated:

> "The United States and China look forward to expanding discussions on space science cooperation and starting a dialogue on human space flight and space exploration, based on the principles of transparency, reciprocity and mutual benefit. Both sides welcome reciprocal visits of the NASA Administrator and the appropriate Chinese counterpart in 2010."

Then on January 11, 2010 the PLA conducted a successful missile warhead interception, although this was originally reported to be an ASAT exercise. This test could be viewed as part of the PRC's strong reaction to the announcement of new U.S. arms sales to Taiwan in December 2009, which also included veiled threats to U.S. companies. The PLA test also served to illustrate the relationship between the technologies needed to produce an ASAT capability and those needed to produce a ballistic missile defense (BMD) capability. Asian military sources have told this analyst that by the mid-2020s the PLA could have a national BMD capability to compliment a larger force of nuclear missiles. PRC belligerence continued as it loudly opposed planned U.S. exercises in the Yellow Sea which were a response to North Korea's March 26, 2010 sinking of a South Korean corvette with the loss of 46 crew members.

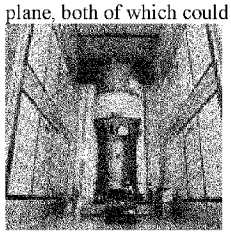
By early February 2010, the Obama Administration was signaling its decision to end the Constellation Moon program of the Bush Administration, saving parts and instead focusing on a new large, heavy SLV. By March 2010, PRC media sources revealed that the PRC was also developing a new 130 ton capable heavy space launch vehicle (SLV) -- providing a clear signal, after several years of hinting, that its own manned Moon program was moving closer to reality. Informal PRC sources suggest the PRC may intend to conduct its first manned Moon mission by 2024, and may develop a Moon Base by 2049. The PRC has also over the previous several years had gradually revealed its plans to loft a 60-100 ton space station by 2020, and to field a reusable SLV, possibly a space plane, by the same period.




These illustrations from a recent PRC journal article show one concept under consideration for a Moon mission architecture. It is very similar to the cancelled U.S. Constellation program.

Near the end of this difficult year in U.S.-PRC relations and for the U.S. space program, from October 16 to 21, 2010, NASA Administrator Charles F. Bolden visited the PRC advance discussions with PRC space officials following on the U.S.-PRC decision to advance discussion in December 2009. Prior to his departure there was an exchange of letters between Administrator Bolden and Congressman Frank Wolf. In and October 5, 2010 letter to Bolden, Congressman Wolf warned, "It should go without saying that NASA has no business cooperating with the Chinese regime on human spaceflight. China is taking an increasingly aggressive posture globally, and their interests rarely intersect with ours."[8] In an October 8, 2010 letter Bolden sought to assure Wolf, "my visit is intended to introductory in nature and will not include consideration of any specific proposals for humans pace flight cooperation or new cooperation in any other areas of NASA's activities. NASA is also planning to host a reciprocal introductory visit by Chinese Government officials to NASA facilities…let me assure you that under no circumstances will the visits include the conveyance of any non-public technical, operational, strategic or classified information."[9]

The year 2011 has seen the retirement of the Space Shuttle after 30 years in service, and a continuation of a standoff between Congress and the Obama Administration. Legislative language submitted by Congressman Wolf forbids the Administration from continuing discussions or undertaking joint programs concerning space cooperation with the PRC. Nevertheless the Administration continues to justify such cooperation, with OSTP Director John Holdren, during May 4, 2011 hearings before the House Appropriations Committee, stating that President Obama favors discussions with the PRC concerning potentially expensive missions to Mars and regarding cooperation over detection and tracking orbital debris. Chinese space officials have so far not returned Administrator Bolden's 2010 visit as intended. Meanwhile on September 29, 2011 the PRC launched its first *Tiangong* space laboratory, to practice space docking and conduct manned missions to develop a larger space station. The *Tiangong-1* is equipped with two cylinders that could house high-resolution camera or launch nano-satellites. PRC sources say *Tiangong-2*, to be launched by 2015, will stress Earth and space observation missions. In early 2011, informal PRC sources suggested that in 2009 or 2010 the PLA tested a small suborbital space plane called *Shenlong*, to validate technologies for future larger reusable SLVs. The *Shenlong* may be similar in size to the U.S. Air Force's Boeing X-37B small space plane, both of which could be configured to perform military missions.



Launched on September 29, 2011, Tiangong-1 continues the PLA's "dual-use" of manned platforms. While intended to develop a later space station, Tiangong-1 also has two cylinders amidship that could carry high resolution cameras or launch nano-satellites.

[8] Quoted in Amy Klamper, "U.S. Lawmaker Balks At NASA Chief's China Visit," *Space News*, October 6, 2010, http://www.spacenews.com/civil/101006-lawmaker-balks-nasa-china-visit.html

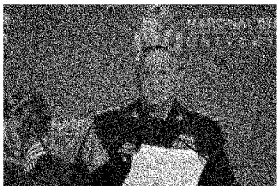
[9] Letter reprinted at "NASA's Bolden To Visit China's Space Leadership," *Spacecoalition.com*, October 13, 2010, http://spacecoalition.com/blog/nasa%E2%80%99s-bolden-to-visit-china-space-leadership

**What Is To Be Gained From Space Cooperation With The PRC?**

In their December 17, 2009 Joint Statement the U.S. and PRC governments proposed to pursue space cooperation under "the principles of transparency, reciprocity and mutual benefit." It is not clear that PRC and U.S. officials share the same definitions of these words, but it is worth considering what they would mean for the United States, and whether the PRC is capable of fulfilling U.S. expectations sufficiently to justify confidence in cooperation. It is suggested that the Administration consider the following questions, and offer its explanations, as a way of addressing congressional, U.S. public and international concerns about the PRC space program.

1. **Does the vast difference in PRC and U.S. space "transparency" mean that any level of contact between official, corporate and university sectors could pose a disproportionate threat to the United States?**

Even though the most recent PRC space program is about 25 years old, compared to the U.S. space program the PRC space program is barely transparent. One does not have access to PRC space plans, official testimony, or annual or Five Year Plan budget documentation. Furthermore, it was not until 2001, or about 15 years into this program that the PRC leadership acknowledged that leadership of its manned space program rested with the PLA, specifically, the Director of the General Armaments Department (GAD) of the Central Military Commission (CMC). While there is a China National Space Agency (CNSA) subordinate to the PRC State Council, it is understood that CNSA remains subordinate to the GAD. It is not fully known how PLA leadership is implemented or what that means broadly for the PRC space program. Furthermore, neither the PLA nor the PRC government provide any details concerning how the PLA leads the PRC space program. Instead of inviting PRC space officials from CNSA to visit the United States, does it make more sense for NASA to invite the Director of the General Armaments Department to discuss space cooperation?



General Chen Bingde is currently Director of the General Staff Department of the CMC, or the PLA's chief "warfighter." From 2004 to 2007, he was Director of the General Armaments Department and overall commander of the manned space program. He also oversaw the January 11, 2007 ASAT demonstration. This makes him an experienced "space war fighter."

Without a full understanding of the degree of, and methods for, PLA control over the PRC space program, how is the U.S. to pursue interaction in manner that protects U.S. technology, classified information or even U.S. security? Why should the U.S. have any contact with a PLA controlled enterprise intended to produce military advantages in space that can threaten U.S. security? Given what is known about how the GAD controls PRC space companies and research institutes, and even has influence over the research of PRC technical universities, it has to be considered that any PRC space government official, space company official or university expert is ultimately responsible to the PLA. This consideration should also be applied to PRC students

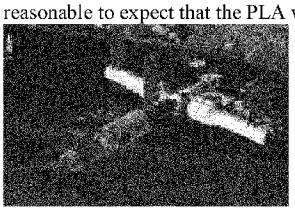
that come to the U.S. to pursue technical degrees in aerospace fields; will this education, and access to top U.S. experts, ultimately benefit the PLA's aerospace ambitions?

This stands in substantial contrast to the U.S. tradition of civilian leadership over most space and space exploration programs. Indeed there is a large U.S. military space program subordinate to the Department of Defense (DoD) and individual U.S. military services. There is also clear overlap; NASA space launch facilities are used to launch most DoD satellites, but as far as is publicly known, NASA is not designed, equipped or trained to perform military space or space combat missions. The first PRC astronaut on *Shenzhou-5*, arguably, was a secondary payload after the PLA's two large surveillance cameras. As far as is known publically the United States has not produced "dual use" space craft intended to perform space combat missions.

The challenge of promoting greater PRC transparency is just as difficult in the military and nuclear-strategic spheres. The PRC and the PLA have refused to substantively engage both the Bush and Obama Administrations regarding their current and future nuclear postures. It is likely that the U.S. does not know how many nuclear missiles the PLA has today, much less know of its future nuclear buildup plans. And while the U.S. has spent over 20 years trying to "engage" the PLA, the PLA has not revealed substantive official information concerning its goals, strategies or modernization plans as can be obtained in the case of the U.S. or Japan. Much can be discerned from PLA academic and engineering literature, interviews and contacts. But the PLA does not make reliable military data available to its own public or to a foreign audience in a manner that would promote confidence.

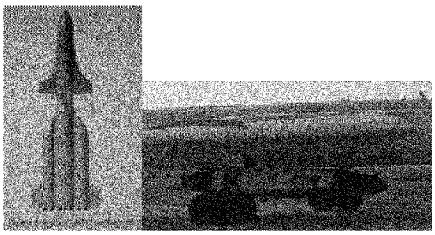
2. **Does the clear "dual use" nature of the PRC/PLA manned space program mean that potential U.S.-PRC space cooperation will never produce the same "mutual benefit" for the United States?**

One of the clear results of PLA domination is that the PRC manned space program is "dual use," or designed to produce specific benefits for the PLA. As the following chart indicates, all seven *Shenzhou* missions performed some missions useful to the PLA, mainly Earth surveillance from the detachable orbital module. *Shenzhou-7* could have demonstrated the potential to perform "co-orbital" combat interceptions by its 45km "close pass" by the International Space Station, just after having launched a microsatellite. The first *Tiangong* space lab has housing for high resolution cameras or nano-sat launchers. PRC sources note that the second *Tiangong* mission will focus on Earth and space observation missions. The future PRC space station will resemble the Soviet/Russian *Mir*, in that it will use large maneuverable modules to create a larger station. The Soviet intention for the Mir was to be able to accommodate dedicated military modules. It is reasonable to expect that the PLA will have similar designs for its space station.



This PRC illustration of a future space station shows its "modular" concept similar to the Soviet *Mir* space station concept. There is the potential for special military modules, or military-modified Tiangong cargo ships to be able to turn the space station into a combat

A PRC history of their space plane program notes that while under consideration in the mid-to-late 1980s, military missions were a key priority for PRC space plane development.[10] A 2006 space plane concept by the China Academy of Launch Vehicle Technology (CALT) has a substantial portion of the space's volume taken up by fuel. This is needed to reach orbit, but can also be used for maneuvers that would allow the space plane to reach different orbits, meaning it could be used to attack multiple targets.



A 2006 space plane concept from CALT (left), and a 2007 image of the Shenlong space plane technology validation platform, seen carried by an H-6 bomber for glide testing. It is likely that the PLA will use both as military mission platforms.

PRC sources also note that that the *Chang'e-3* Moon lander, scheduled for launch in 2013, may be equipped with a small radar and a laser rangefinder for "scientific" missions. Might later *Chang'e* missions, or later manned Moon missions, carry larger radar and laser equipment?

From the Moon such systems could provide an additional capability to target deep space U.S. satellites, like the Defense Support Program (DSP) satellites that provide vital warning of nuclear missile attack. PRC officials leading their Moon program, like Ouyang Ziyuan, often mention the Moon's military strategic value. Might the PRC someday seek to claim defend resources or strategic positions on the Moon?

Clearly, it can be argued that U.S.-PRC space cooperation will result in disproportionate benefits. The PRC will be able to apply any benefits gained from cooperation with the U.S., such as insights into space stations or space planes, to similar PRC systems that perform military missions. Inasmuch as the U.S. does not have a "dual use" policy for its manned space platforms, any access the U.S. gains to PRC space programs cannot be used to achieve the same military benefits that would flow to the PRC.

**3. Does the PRC's aggressive and pervasive espionage also dictate that the benefits of U.S.-PRC space cooperation will never be "mutual?"**

From the beginning of the previous phase of U.S.-PRC space cooperation, the PRC sought to gain as much illicit benefit as it could via pressures and espionage. Following early 1990s failures of its Long March space launch vehicle (SLV) involving satellites from the Hughes

[10] The most comprehensive Chinese history of the 863-204 program is by Li Chengzi and Zheng Xiaoqi (Beijing University of Aeronautics and Astronautics), "The Debate Over Placing Priority on the Space Shuttle or Manned Spacecraft During Consideration of China's Manned Space Program," Science and Technology Review, Submitted August 2009.

| Shenzhou and Tiangong: Scientific and Military Mission Highlights | | | | | |
|---|---|---|---|---|---|
| **Mission** | **Launch Date** | **Crew Module Duration** | **Scientific Mission Highlights** | **Orbital Module In-Space Duration** | **Military Mission Highlights** |
| **Shenzhou 1** | 11/19 /99 | .88 day | First mission to test craft flight and recovery of command module; carried seeds | 6 days | ELINT module external to OM |
| **Shenzhou 2** | 1/9/01 | 6.7 days | 64 scientific payloads including monkey, rabbit; reported hard landing | 6 months | ELINT or E/O module external to OM |
| **Shenzhou 3** | 2/25/02 | 6.7 days | First near full man-rated version; use of sweating manikin to test space suit | 260 days | Medium resolution imaging radar external to OM; E/O camera inside OM |
| **Shenzhou 4** | 12/29/02 | 6.7 days | 52 science payloads; orbital track simulated rendezvous with second spacecraft | 6 months | E/O Earth observation cameras; monitored US buildup to Iraq War |
| **Shenzhou 5** | 10/15/03 | .89 day | First manned mission, one crew member | 152 days operations | Two larger E/O Earth observation cameras internal and external to OM |
| **Shenzhou 6** | 10/12/05 | 4.8 days | Two member crew; first manned use of orbital module; lengthy OM mission supported future docking missions | @ 2 years; boosted to higher orbit | Apparent one E/O camera internal to OM |
| **Shenzhou 7** | 9/25/08 | 2.8 days | Three member crew; depressurization of OM; first use of PRC-made manned EVA suit; launch of microsat; external video of EVA mission; coms with TianLian-1 TDRSS | 100 days ? which was the life of BX-1 mission | 9/27: Launched BX-1 microsat just before passing to 45km of the ISS; could be viewed as co-orbital interception exercise |
| **Tiangong 1** | 9/29/11 | 2 years | Validate habitation technologies for larger space station; validate space docking technology; undertake multiple manned missions; 1-2 more Tiangong missions may be planned before space station lofting about 2020 | Not yet known how long Shen-8 OM will remain | Tiangong has two spaces that could house cameras or nano-sat launchers; Shenzhou OM could also carry surveillance systems; Tiangong could also be configured for space combat missions |
| **Tiangong 2** | 2015 (?) | 1-2 years | Earth observation and space observation reported to be main missions. May also launch micro satellites. Will likely further advance space docking and habitation technology. | NA | Earth and space observation and microsats could also serve military missions |
| Abbreviations: E/O: electro-optical; ELINT: electronic intelligence; EVA: extra-vehicular activity; NA: not available; OM: orbital module; TDRSS: tracking and data relay satellite system<br>Sources: Mark Wade, *Encyclopedia Astronautica*; Chinese press reports. | | | | | |

Electronics Corporation and Loral Space and Communications Corporation, the PRC sought successfully to gain information from these companies to improve their SLVs, resulting in the

U.S. imposing fines on both companies. It is likely that this information was also used to improve their closely related DF-5 intercontinental ballistic missiles (ICBMs). The DF-5 ICBMs of the Second Artillery Corp of the People's Liberation Army that likely were aided by this technology remain today targeted on the United States. The PRC also obtained information from the former Martin Marietta Corporation about how to perfect solid rocket motors, as a consequence of Martin Marietta's provision of a solid fuel satellite "kick motor" for a U.S. satellite launched from a Long March SLV. A former PRC solid rocket engineer explained to this analyst that this data helped perfect the DF-21 medium range ballistic missile (MRBM). This missile has since been developed into the SC-19 ASAT, and the new DF-21D anti-ship ballistic missile (ASBM). This analyst has also learned that the DF-21C MRBM that likely resembles the dismantled U.S. *Pershing-2* MRBM is no accident; the PRC was able to purchase discarded *Pershing-2* information from U.S. military bases during the 1990s.

Russia has also been a likely victim of its willingness to enter into space cooperation with the PRC. In 2009, this analyst was told of a Russian-PRC space cooperation initiative from the 1998-1999 timeframe in which the PRC paid to place a hundred or more engineers as "students" at Russia's "Star City" Cosmonaut training facility, and at major Russian space companies. According to Russian space company officials, these "students," were able to learn enough about Russian space station technology to advance their own space station design, which owes a great deal to the Russian *Mir* design. These Russian officials were clear that the PRC did not purchase Russian space station designs.

NASA has also been a victim of a PRC "student." In 1989, Professor Zhang Litong of Northwestern Polytechnical University (NPU) gained a prestigious Visiting Fellow position connected to the Lewis (now John Glenn) Research Center in Cleveland Ohio, to study Ceramic Matrix Composite (CMC) materials. According to her biographies, in 1987 the PRC government switched her career path from trying to copy the metallurgy of the British Rolls Royce *Spey* turbofan engine, to starting the PRC's research on CMCs for use as thermal protection for future spacecraft. These biographies note that despite the 1989 Tiananmen embargoes, she was able to remain in her position until early 1991, when she returned with her "foreign research" and began to develop the PRC's early ability to develop CMCs. In a January 8, 2011 PRC TV news program, Professor Zhang and her NPU laboratory were featured in a story about NPU's contribution to the *Shenlong* space plane, which could be developed into a military platform. Zhang is now a much lauded "hero" of science in service to the leadership of the Chinese Communist Party.

On January 8, 2011 a Shanxi City TV program featured Professor Zhang Litong of Northwestern Polytechnical University and her laboratory's contributions to the Shenlong space plane program. Zhang received early insights on Ceramic Matrix Composites from NASA from 1989 to 1991.

These known examples of PRC espionage and exploitation of commercial and academic relationships provide ample basis for caution about entering into future space related cooperative ventures with the PRC. Moreover, todays PRC's espionage effort is far more aggressive and pervasive. In addition to exploiting all contacts, from officials to business to students, the PRC is broadly understood to be the most aggressive country in terms of waging cyber warfare for espionage and for battle space preparation. A simple email address becomes a weapon when its owner falls for a phishing attack that opens his company to further exploitation. Were NASA to allow PRC engineers access to U.S. space station technology, or to control, research and training facilities, as part of a program for joint use of the International Space Station, it can expected that these engineers will be ordered to carry out specific espionage assignments, which in the era of cyber warfare could result in great damage.

4. **Does the proposition that U.S.-PRC cooperation in space can improve their relations on Earth really stand up to historical examination?**

Supporters of expanded U.S.-PRC cooperation in outer space often point to its potential to create a basis for improving overall U.S.-PRC relations. Many of these same proponents also often cite the example of the 1975 U.S.-Soviet Apollo-Soyuz mission as having improved U.S.-Soviet relations during the early phase of their "Détente." However, this historical example does not validate the initial proposition. After 1975, there was an increase in U.S. and Soviet military competition in space, as there was increasing strategic military competition on Earth. Soviet *Almaz* military space lab missions were followed by the development of space planes and space stations designed for space combat missions. Since the collapse of the Soviet Communist regime, Russian sources have revealed that had the Soviet Union survived another decade, by the mid-1990s there would have been Soviet space bombers derived from the *Buran* space plane, stationed on the *Mir* space station. The real lesson, then, is that U.S.-Russian space cooperation in the 1990s onward was facilitated less by any early instance of cooperation in the 1970s, than by the far more crucial change in its political system that removed Russia's reason for comprehensively confronting the United States.

It is highly questionable whether the United States and the PRC can find a basis for cooperation in space that would then cause a fundamentally positive change to their relations here on Earth. As with the former Soviet Union, any real change in PRC relations with the U.S. will depend far more on a transformation away from the current Communist Party dictatorship and its military guarantors toward an open, accountable democratic system. The PRC Party-Military amalgam depends on domestic repression and recurrent reference to so-called external threats to remain in power. In fact, we see each of these escalating dangerously recently, leading to notable expressions of concern from its neighbors, this Congress, and indeed this Administration. In such a context there is little NASA can do to effect positive change -- whilst conversely, it could do a great deal of harm to U.S. interests if it were to continue to enable the PRC to extract one-sided advantage from U.S. science and space technologies.

Mr. ROHRABACHER. Dr. Segal.

**STATEMENT OF ADAM SEGAL, PH.D., SENIOR FELLOW, COUNCIL ON FOREIGN RELATIONS**

Mr. SEGAL. I want to thank the chair and the other distinguished members of the committee for the invitation to speak here today. It is a real honor.

While I share many of the committee's concerns about China's rise as a scientific technology power, I respectfully differ on the means for addressing that challenge.

One of China's great strengths has been a laser-like focus on shaping foreign interactions to serve its national innovation goals. By comparison, the United States is greatly handicapped as it lacks the ability to gather a comprehensive picture of science and technology exchanges with China and to coordinate its response to some of the most malevolent aspects of China's rise.

The solution is not to cut off all exchanges with China. What is needed is a more comprehensive approach. And so instead of limiting funding for the Office of Science and Technology Policy, the more strategic response would be to actually expand support for the OSTP. To be sure, there are challenges in how China is pursuing its objectives in scientific technology and how it might use the results for economic and military power.

It is clear that China's goals are ambitious. As the 2006 Medium-Long-term Plan states, China's goal is to become an innovation nation by 2020 and a global scientific power by 2050. Investment in R&D has grown by 20 percent a year since 1999, and it is expected to top $153 billion by this year.

China, as is well-known to this committee, has adopted mercantilist policies to foster indigenous innovation. Procurement strategies, competing technologies, standards and the failure to protect IPR have all been adopted in order to create new barriers and force technology transfer.

U.S. intellectual property is now widely targeted by cyber hackers and industrial spies. Since 2010, Google NASDAQ, DuPont, Johnson & Johnson and General Electric, RSA and at least a dozen others have had proprietary information stolen. And on Monday, Symantec released a new report tracing attacks on 48 chemical and defense industries back to China.

China has also leveraged the globalization of scientific technology to improve the technological capabilities of its defense sectors. Shifting research centers to China and developing collaborative business relations with Chinese companies inadvertently involves American institutions in the diffusion process, speeding Beijing's military modernization.

The shipping and telecommunications industries, for example, have made steady improvements in R&D through their engagement with the international economy, and this has resulted in quieter subs and more advanced C4ISR capabilities.

But the rise of new science powers China, but also India and Brazil, presents an extremely viable opportunity for the United States. For the last 50 years, we have assumed that the scientific dominance of the United States will continue. This assumption is

now in question as scientific capabilities will be more widely distributed in the future.

From 2002 to 2007, for example, developing countries, including China, India and Brazil, more than doubled their expenditures on R&D, increasing their contributions to world R&D spending from 17 to 24 percent.

The United States has been one of the major beneficiaries of globalization and science and technology. An American society is probably better positioned than any other to tap into these new sources of discovery.

The dominance of the American computer industry was built on the ability to develop global design and manufacturing networks. Immigrant scientists and entrepreneurs have been a major source of dynamism in our universities and our start-up culture.

The globalization of science and technology has also played a role in American military dominance. American universities and private companies, not Federal labs, provide much of the technology required for the U.S. military to keep its qualitative lead over potential challenges.

These same universities and private companies need access to talented markets and developing economies, especially China, to remain competitive. Abandoning S&T exchanges is not a strategy.

The United States needs a strategy that is not just whole of government that entails the numerous views of department and agencies, but a whole of society strategy that includes the companies, entrepreneurs, scientists and universities that drive the globalization and scientific technology.

While parts of that strategy are clear, and I include reinvigorating the U.S. innovation system and pressing China broadly on indigenous innovation and other predatory policies, much of it remains uncertain because China is opaque in the bilateral relations that are so complicated.

The OSTP should be well positioned to help develop that strategy to provide insight into Chinese motivations and plans and into a larger context of how global science and technology is evolving.

For most of the last 36 years, the bilateral science and technology relationship was basically an afterthought in U.S.-China relations. Though it was often a source of stability in a relationship that has often seen its ups and downs over Taiwan, trade and human rights.

Today, science and technology plays an increasingly central role in economic and national security interests and relations with China. These interests are better served by a more capable OSTP, one that has access to more information and is better able to coordinate a U.S. response than one that is severely limited.

Thank you very much, and I will take any questions.

[The prepared statement of Mr. Segal follows:]

COUNCIL on FOREIGN RELATIONS

November 2, 2011

# The United States, China, and the Globalization of Science and Technology

Prepared statement by
**Adam Segal**
*Ira A. Lipman Senior Fellow for Counterterrorism and National Security*
*Council on Foreign Relations*

Before the
Committee on Foreign Affairs, Subcommittee on Oversight and Investigations
*United States House of Representatives*
*1st* Session, *112th* Congress

## Hearing on Efforts to Transfer America's Leading-Edge Science to China

Chairman Rohrabacher, Ranking Member Carnahan, and members of the committee, thank you for the opportunity to testify on this important subject.

U.S.-China science and technology (S&T) relations are shaped by two paradoxes. First, as many have noted, global problems require global solutions, but while the science that drives these solutions is increasingly collaborative spanning different disciplines, institutions, and geographical locations, it is also an essential component of national power. The results of scientific discovery are public goods, but they can also lead to first-mover advantages and the ability to lock others out of important markets. As a result, China and the United States are collaborators as well as competitors for talent, new ideas, market share, and status and prestige.

Second, science and technology diffusion has and will continue to improve Chinese military capabilities. Shifting research centers to China and developing collaborative business relations with Chinese companies inadvertently involves American institutions in the diffusion process, speeding Beijing's military modernization. But the globalization of science and technology ensures American security at the same time that it creates new security threats for the United States.[1] American universities and private companies, not federal labs, provide much of the technology required by the U.S. military to keep its qualitative lead over potential challengers. Those same universities and private companies need access to talent and markets in developing economies, especially China, to remain competitive. Moreover, the best and the brightest are still coming to the United States, staffing university labs and founding innovative companies.

*The Council on Foreign Relations takes no institutional positions on policy issues and has no affiliation with the U.S. government. All statements of fact and expressions of opinion contained herein are the sole responsibility of the author.*

In order to manage these paradoxes, the United States will have to maintain its scientific strength at home, pressure China on its mercantilist technology policies, and strengthen the ability of the Office of Science and Technology Policy to coordinate and develop S&T relationships with China. Certainly the United States has to ensure that critical science and technologies do not flow to potential adversaries, but at the same time, maintaining ties with emerging science powers is essential to American economic and national security interests.

**Rising Powers, Globalizing Science**

The United States is still the world leader in science and technology, but others are increasing their capabilities rapidly. A report from the UK Royal Society describes the current situations as an "Increasingly multipolar scientific world, in which the distribution of scientific activity is concentrated in a number of widely dispersed hubs." From 2002 to 2007, for example, developing countries—including China, India, and Brazil—more than doubled their expenditures on R&D, increasing their contribution to world R&D spending from 17 percent to 24 percent.[2]

China's goals in science and technology are particularly noteworthy. The 2006 National Medium- and Long-Term Plan for the Development of Science and Technology (MLP) states China's goal of becoming an "innovative nation" by 2020 and a "global scientific power" by 2050.[3] Investment in R&D has grown by 20 percent a year since 1999 and is expected to top US$153 billion in 2011.[4] R&D spending is now approximately 1.6 percent of GDP and it is supposed to reach 2.5 percent of GDP in 2020. The MLP includes twenty science and engineering megaprojects in such areas as high-end generic chips, manned aerospace and moon exploration, developmental biology, and nanotechnology. China is also turning out huge numbers of science and engineering graduates—2.18 million in 2009.

Chinese analysts and policymakers have expressed disappointment in the qualitative gains in the science and technology system, especially given this massive level of investment (though it should be noted that a recent report in the Chinese press suggests 60 percent of R&D funds have been wasted through embezzlement and misappropriation[5]). Still by most metrics, the results are impressive. In 1996, the United States published more than ten times as many scientific research papers as China. In 2010, China became number two in world paper publication and may overtake the United States in 2013.[6] A 2010 study by Thomson Reuters predicts that China will pass the United States and Japan in new patent applications by the end of this year.[7]

Compounding the sense that China is gaining fast is a fear that the United States has been distracted, neglecting science and underfunding basic research. In 2007, *Rising above the Gathering Storm*, a report produced by the National Academies, warned, "the scientific and technological building blocks critical to our economic leadership are eroding at a time when many other nations are gathering strength."[8] Today, the United States is hampered by tight budget constraints and future funding is uncertain at best. Capital for high-risk technology development has evaporated. American multinationals have cut R&D spending at home while increasing it in their foreign subsidiaries.
Despite this tendency to characterize R&D investment as a race among countries, the concept of national S&T systems is no longer an accurate description of what is happening in science and technology. Instead, science is interconnected and global. According to the Royal Society, over 35 percent of all articles published in international journals are collaborative, up from 25 percent 15 years ago.[9] The globalization of science and technology is driven by several factors. Cheaper communication technologies and travel make it easier for scientists to develop and maintain projects in several locations at once. Many of the most exciting scientific questions draw on knowledge from several fields, and the equipment needed is so big and expensive that it requires that scientists come to it. Perhaps most important, individual scientists collaborate globally to gain access to funds, data, and other talented scientists.[10]

---

2

The border between "American" and "Chinese" science is no longer as sharp as international R&D networks and business collaborations expand. China-based scholars, for example, choose to coauthor with U.S. colleagues more frequently with those from other countries; nearly 40 percent of China's science and engineering publications in international journals had U.S.-based coauthors.[11] The information technology sector is particularly interconnected, stretching across the Pacific and involving Chinese, American, and Taiwanese entrepreneurs, designers, managers, and technicians. While outside observers may focus on the reform of the Chinese Academy of Sciences and the shift of R&D funding from government research institutes to enterprises, the most critical developments may be occurring at the nexus between multinational R&D centers and Internet companies in Beijing, or U.S.-based venture capital funds and local chip design companies in Shanghai.[12]

**Framework of U.S.-China Relations**

The official framework for U.S.-China science and technology relations is the January 1979 Agreement Between the Governments of the People's Republic of China and the United States of America on Cooperation in Science and Technology (hereafter the Agreement). The Agreement now includes more than 25 protocols and 60 annexes and implementation is the responsibility of the Joint Commission on S&T Cooperation (JCM), which is cochaired by the Chinese Minister of Science and Technology and by the President's Science Advisor and meets about every two years.[13] Some of these protocols include a High-Level Biotechnology Working Group that involves the USDA and the Ministries of Agriculture and
Science and Technology (MOST); cooperation between the Department of Energy and MOST on power systems, clean fuels, oil and gas, and energy and environmental control technologies; and a memorandum of understanding between the Department of Health and Human Services and the Ministry of Health for cooperation in prevention activities, treatment, and research of AIDS.

Much of the energy and dynamism of the relationship exists outside of official channels. American universities are expanding the number of formalized relationships they have with their Chinese counterparts. In October 2011, the Bill and Melinda Gates Foundation announced a memorandum of understanding with MOST for joint investment in R&D targeted at global public health and agriculture.

It is also worth noting that the United States government does not provide direct assistance in support of Chinese projects. Instead, Washington has insisted that costs be shared in proportion to the benefits received. Still, U.S. contributions to the reform of China's science and technology have been substantial.[14] Most important has been the support and training of tens of thousands of Chinese graduate students by U.S. universities through research grants to their mentors from U.S. government agencies. Many have returned to China and play leading roles in universities, research institutes, and corporations.[15]
This contribution is likely to continue for at least another decade; China is currently the largest source of foreign students in U.S. science and engineering programs.

While the Agreement has been a source of stability in a relationship that has had its share of ups and downs, much of the original motivation for maintaining and expanding the agreement has changed. Coming out of the chaos and destruction of the Cultural Revolution, China was desperate to gain access to international and American science in particular. Speaking at a 2010 conference on U.S.-China Cooperation on Science, Technology, and Innovation, Yang Xianwu of China's Ministry of Science and Technology said "Cooperation with the U.S. has always been our priority."[16]
For the United States, certainly at the beginning, gaining access to science and technology was probably the least of motivations. Although there was naturally some level of interest, the working assumption for most was that the United States was so far ahead that there was little to be gained from collaboration with China. Instead, the Agreement was part

---

3

of a larger relationship designed first to help balance against the Soviets and then to draw China into the international community through a web of commitments and ties.

**Changing Assumptions**

As China increases its scientific capabilities, the assumption that it has little to offer the United States is gradually changing. In nanotechnology, for example, 5,000 scientists work at 50 Chinese universities, 20 Chinese Academy of Sciences Institutes, and 300 companies, and the National Science Foundation of China funds over 650 projects with nanotechnology in the title, according to the Center for Nanotechnology in Society at the University of California, Santa Barbara.[17]

Moreover, while science and technology were historically an afterthought regarding issues like Taiwan, trade, and human rights, they now play an increasingly important role in economic and national security interests in relations with China. Unhappy being factory to the world and wanting to move from "Made in China" to "Innovated in China," Chinese policymakers have adopted a range of policies designed to create "indigenous innovation" and reduce dependence on the West for advanced technologies, and on the United States and Japan in particular. These policies include government procurement, competing technology standards, and requiring technology transfer from multinational corporations in return for market access. In April 2010, for example, Beijing ordered high-tech companies to turn over the encryption codes to their smart cards, Internet routers, and other technology products in order to be included in the government procurement catalog.[18] In addition, China's failure to protect intellectual property rights leads to massive theft and piracy, and in turn improves the short-term competitiveness of Chinese firms.

The theft can also be more direct. Since January 2010, Google, Nasdaq, DuPont, Johnson & Johnson, General Electric, RSA, and at least a dozen others have had proprietary information stolen by hackers, although how many of these attacks originated from China is uncertain.[19] In the physical world, Chinese nationals have been recently charged in the theft of radiation-hardened microchips and precision navigation devices. In addition, according to a recent report for the U.S.-China Economic and Security Review Commission, the theft of American technology is often conducted through the PRC's science and technology institutes and industrial enterprises.[20] The "key modality is no longer the spy," according to Jim Richberg, former deputy national counterintelligence executive, "but the businessman, student, or academic."[21]

The globalization of S&T also has the potential to improve the technological capabilities of indigenous defense sectors. In China, the shipping and telecommunications sectors have made steady improvements in R&D and production through their engagement with the international economy. The 2011 report from the U.S.-China Economic and Security Review Commission reportedly argues that U.S. aerospace companies may have unknowingly assisted Chinese military modernization.

**Policy Response**

The most necessary response to the rise of China is to ensure the innovativeness of the American economy. The United States needs to exploit its software, its social and cultural strengths: the ability to conduct cutting-edge, interdisciplinary research; recognize new markets and consumer demands; manage across time, distance, and culture; tolerate risk and support entrepreneurship; and welcome new ideas and talent no matter what their origin.[22]

The government's role in funding basic research has become even more important as business has shifted away from funding "blue sky" projects with uncertain immediate commercial use but with the promise of big breakthroughs.[23] Federal investment in R&D, however, remains hostage to the larger political debate about how to reduce spending and the

deficit. No matter the final spending level, it is essential that the money funds high-risk, high-return R&D. Hard times make scientists more conservative, as they seek to secure grants by writing proposals that extend what they already know, not striving toward something new. To counteract the tendency to stay in comfortable territory, more money should be directed to early-career grants and to support well-designed failures—ideas that push the envelope of accepted paradigms.

The United States must continue to confront China on indigenous innovation. Raising it to the top of the agenda at bilateral summits is important, for it signals intent and interest. A strong display of concern from the American side at the January 2011 meeting helped produce a commitment to delink government procurement strategy from innovation policies, though it is too early to know if China will follow through on the promise. Multilateral pressure is especially important; Japan and the European Union are pressing China on the same set of issues and Beijing has in the past been willing to step back when several governments—and governments and the private sector—speak with one voice.

One of China's great strengths has been a laser-like focus on shaping foreign interactions to serve national innovation goals. By comparison, the United States is greatly handicapped as it lacks the ability to gather a comprehensive picture of scientific and technological exchanges with China and to coordinate a whole of society response to Chinese predatory policies. No longer can the United States rely on its more informal, decentralized process; the combination of a rising China and globalizing science and technology make a more strategic approach to interacting with China in science and technology a necessity. Instead of limiting funding for the Office of Science and Technology Policy, the more strategic response would be to expand support for the OSTP.

---

5

[1] Adam Segal, *Advantage: How American Innovation Can Overcome the Asian Challenge* (W.W. Norton, 2011).
[2] "Knowledge, networks and nations: global scientific collaboration in the twenty first century" (Royal Society, London, March 2011) available: http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/publications/2011/4294976134.pdf
[3] "The National Medium- and Long-Term Plan for the Development of Science and Technology (2006-2020)," State Council, People's Republic of China.
[4] Gautam Naik, "China Surpasses Japan in R&D as Powers Shift," *Wall Street Journal*, December 10, 2010.
[5] Wu Xiaojie, "60% of Scientific Research Funds Lost to Corruption and Embezzlement," *Guangming Daily*, September 7, 2011, http://news.sohu.com/20110907/n318651118.shtml
[6] David Shukman, "China 'to overtake US on science' in two years," *BBC News*, March 28, 2011, http://www.bbc.co.uk/news/science-environment-12885271.
[7] David Barboza, "China Poised to Lead World in Patent Filings," *The New York Times*, October 6, 2010.
[8] *Rising Above the Gathering Storm* (National Academies Press, 2007).
[9] "Knowledge, networks and nations: global scientific collaboration in the twenty first century" (Royal Society, London, March 2011) available: http://royalsociety.org/uploadedFiles/Royal_Society_Content/policy/publications/2011/4294976134.pdf
[10] Caroline Wagner, *The New Invisible College: Science for Development* (Brookings Institution Press 2008).
[11] Richard Suttmeier, "From Cold War Science Diplomacy to Partnering in a Networked World: 30 Years of Sino-US Relations in Science and Technology," National Science Foundation, 2009, http://china-us.uoregon.edu/pdf/030409.pdf
[12] Adam Segal, "Autonomy, security, and inequality: China, India, the United States, and the globalization of science and technology, Technology and Society," *Technology in Society*, Vol. 30, 3-4 (2008).
[13] Richard Suttmeier, "From Cold War Science Diplomacy to Partnering in a Networked World: 30 Years of Sino-US Relations in Science and Technology," National Science Foundation, 2009, http://china-us.uoregon.edu/pdf/030409.pdf
[14] ibid
[15] "China's Program for Science and Technology Modernization: Implications for American Competitiveness," Prepared for The U.S.-China Economic and Security Review Commission, January 2011, http://www.uscc.gov/researchpapers/2011/USCC_REPORT_China's_Program_forScience_and_Technology_Modernization.pdf
[16] National Research Council, *Building the 21st Century: U.S. China Cooperation on Science, Technology, and Innovations* (The National Academies Press, 2011).
[17] Rachel Parker, "Nanotechnology, Science-Led Development, and Technological Leapfrogging in China," American Association for the Advancement of Science Annual Conference, Boston, February 17, 2008.
[18] Adam Segal, "China's Innovation Wall: Beijing's Push for Homegrown Technology," *Foreign Affairs*, September 28, 2010, http://www.foreignaffairs.com/articles/66753/adam-segal/chinas-innovation-wall
[19] "Significant Cyber Events Since 2006," Center for Strategic and International Studies, Last Modified March 9, 2011, http://csis.org/files/publication/110309_Significant_Cyber_Incidents_Since_2006.pdf; Michael Riley and Sara Forden, "Hacking of DuPont, J&J, GE Were Google-Type Attacks That Weren't Disclosed," *Bloomberg*, March 8, 2011, http://www.bloomberg.com/news/2011-03-08/hacking-of-dupont-j-j-ge-were-google-type-attacks-that-weren-t-disclosed.html
[20] "China's Program for Science and Technology Modernization: Implications for American Competitiveness," Prepared for The U.S.-China Economic and Security Review Commission, January 2011, http://www.uscc.gov/researchpapers/2011/USCC_REPORT_China's_Program_forScience_and_Technology_Modernization.pdf
[21] Jim Richberg, "The Counterintelligence Implications of Deemed Export Control," Workshop on the Globalization of the University and Deemed Export Policy, Oak Ridge Center for Advanced Studies, March 6–7, 2006.
[22] Segal, *Advantage*.
[23] Adam Segal, "U.S. Innovation and Economic Recovery," Council on Foreign Relations, June 6, 2011, http://www.cfr.org/economics/us-innovation-economic-recovery/p25198

Mr. ROHRABACHER. Thank you both, and just a couple of questions here.

So, Mr. Fisher, you, when people talk about cooperating with or actual investment by American companies that was described by Dr. Holdren there, that technology, that investment that we have, you know, when we are going over there selling those products, you are suggesting that there is almost always a dual use to those products?

Mr. FISHER. Well, in many cases, yes, Mr. Chairman. When we, when General Electric proposes to help develop a new turbo fan engine with China, that definitely has a dual use. The engine that will emerge from that cooperation will inform, significantly, an indigenous Chinese engine that will power transport aircraft, that will power bombers, that will be taking troops around the world.

Mr. ROHRABACHER. Okay, so let me be real clear here about what we are talking about because when we were discussing the benefit that all this China trade had had to the United States, we were saying that we would had some great progress and that we have convinced the Chinese to permit us to sell some of our technology products over there.

General Electric might be one of those examples that where they now—they are permitting us to sell our technology over there, which will then permit them to have an aerospace industry that will put our people out of work. Is that the sort of——

Mr. FISHER. It is a painful character, Mr. Chairman. For decades, we have been complaining about the trade imbalance with China. The Chinese invariably always respond, well, you could sell us some more of your technology. We will buy that and, of course, they want that technology because of the dual-use implication.

Mr. ROHRABACHER. Right. So we end up creating their manufacturing base by selling them things that, technology, what a great victory it is. They have agreed to buy our technology that will make them better at producing things that eventually can be sold here but also can be used to upgrade their military capabilities like jet engines and things such as that.

And the PLO—or, excuse me, the PLA, owns many of these companies that are partnering with these American companies, isn't that right?

Mr. FISHER. Well, the companies are controlled by government. The PLA exercises control. I wouldn't so much call it ownership but control. The PLA controls the money that funds them, funds their programs. The PLA sets the priorities that then are carried out in terms of research, development and production.

Mr. ROHRABACHER. Dr. Segal, you mention in your testimony that tens of thousands of Chinese students have come to the United States to learn, and you see, and have returned home. And you see this as a good thing, that we have now taken Chinese students, Ph.D level, which we have spent millions if not billions of dollars developing the technology and the science that we now are imparting to them and then they go home and use it to develop their country to be more competitive?

Mr. SEGAL. Actually, my preference would be that they would stay here quite honestly, that we encourage Chinese PhDs, engineers, other graduates with scientific and engineering degrees to

stay here, to start companies and be involved in the U.S. innovative capabilities. And that, I think, is what we should be trying to do.

We should be trying to promote them. That is what traditionally has happened. In fact, we have only started seeing an early phase of some scientists going back.

Mr. ROHRABACHER. Of course, your preference is they stay here, but how many do, and you want to say something to that, Mr. Fisher?

Mr. FISHER. When you are finished.

Mr. ROHRABACHER. Okay. I was just going to suggest that, number one, we have a limited number of Ph.D. Programs. We have a limited number of students that we are going to permit into our major universities at this high level, we are now talking about tens of thousands a year, I think we are probably talking a couple thousand a year.

For us to try to suggest that we should fill those ranks with as many Chinese students as we can, as compared to filling the ranks with, say, American students that were A-minus students rather than A-plus students, I think it might be more beneficial to our country to have those Americans—by the way, those Americans might be Chinese Americans too, and they might be, you know, Afro Americans or Irish Americans, but they are Americans, as compared to Chinese nationalists.

Mr. SEGAL. I think the problem has been, is, as you have said, over the last two decades that American universities at the Ph.D. Level have been very dependent on overseas students to fill Ph.D. and master's programs.

That has been because American-born students, no matter what their ethnic or other heritage, have chosen not to go into the sciences, mainly for economic incentive reasons, right. If you are a smart young American, you are going to look at what the financial sector was making versus what it was going to be for a Ph.D. for 10 years.

Mr. ROHRABACHER. Well, the Chinese actually said we are going to pay all of your experience if you go over and to that university and get that Ph.D. And come back. And the Americans have been told, if you get this Ph.D. You are going to be able to graduate and have a $200,000 debt to pay back the rest of your life.

Mr. SEGAL. Well, that is why I think, you know, the answer to that solution is to make science and engineering degrees more attractive to American University students.

In fact, you know, the widespread assumption is that Americans aren't interested in science and math. But if you do most surveys of freshman classes, about a third of them in fact say, yes, I am interested in science and math.

Mr. ROHRABACHER. Well, I think that is true that we should be encouraging our students, our schools to be taking American students and we should be making it easier for them. But that still doesn't really get to the point where you have—we are now bolstering China's capabilities and bolstering China's capabilities, this is the debate.

I mean, people, some people, and I think the title of your book does suggest that innovation in itself is a good thing, but maybe

you are just suggesting—the innovation on the American side would be what would make this a better world, not necessarily a general innovation that encompasses the dictatorships of the world as well.

Mr. SEGAL. The book is focused on how to improve American innovation capabilities. But historically those students that you are talking about have stayed, right. We look at Chinese and Indians in Silicon Valley and Route 128 and all those others places that have stayed. We are now starting to see people going back.

But, again, most of those people are maintaining connections to the United States, right. They are in the language of Anneliese Aksidian from Berkeley, argonauts, right, travelling in space all of the time back and forth between the U.S. and China. That, I think, is a better outcome, right, than them just going back to China.

Mr. ROHRABACHER. I would think that anything is a better outcome when after a 10-year period you can show that the standard of living that the American people has been increased and improved because of that and the safety of our people has been improved and the prosperity of our country has been improved, as compared to what I see, which is our relationship with China has led to an improvement in their situation but not ours.

It seems to me that there is wealth being transferred here via the knowledge that goes into producing wealth that we have taken, the intellectual property that we have invested, hundreds of billions of dollars in, and it now is working for the benefit of other people, and worst of all, the other people happen to be run by a government that is the most vicious anti-human rights government in the world.

Mr. SEGAL. But, again, I think if you just look at the numbers again on immigrant entrepreneurship, right, those people are starting companies in the United States. They are hiring locally, they are developing locally and they are innovating locally. So that is, I think——

Mr. ROHRABACHER. I am not against legal immigration in the United States and making it targeted toward people who want to invest from there.

But when they send people over here so that they can be educated and then they go home with billions of dollars worth of information in their head that the American people have paid for, that is not in our benefit.

Mr. Fisher, and then we will go on to our colleagues.

Mr. FISHER. Mr. Chairman, I just wanted to comment that for many years, I have been hearing from colleagues that the counterintelligence challenge of monitoring Chinese students, graduate students that come to the United States to learn very specific technical skills, which they take back to China, is one of the most, one of the greatest unaddressed counterintelligence challenges that we face.

In my testimony on page 11, I describe an example of how a Chinese student actually gained a visiting fellowship in a laboratory connected to the former Lewis but now John Glenn Research Center of NASA in Cleveland, Ohio, and got a head start in creating China's competency in ceramic matrix composite materials, which

are used for re-entry and for other things like missile warheads, nose cones.

Professor Zhoan Latong was able to come to Cleveland in—I believe it was April 1989. Despite the Tiananmen embargo she was able to remain at these NASA laboratories until 1991 and her biographies, her Chinese biographies are all glowing about how she took her foreign research back home to China to create China's competency in ceramic matrix composites.

Just this last January, she was featured on a Chinese television show that was about how her laboratory was contributing to China's first small experimental space plane.

Mr. ROHRABACHER. I think that speaks for itself.

Thank you. Mr. Cicilline.

Mr. CICILLINE. Cicilline.

Mr. ROHRABACHER. Cicilline, I am going to get that right, yes, sir.

Mr. CICILLINE. Thank you, Mr. Fisher and Dr. Segal for your thoughtful and informative testimony.

I want to just pick up on, first on this issue of innovation and entrepreneurship and the great universities of America, because one of the things that was interesting during our orientation for new Members of Congress at the Kennedy School at Harvard University, the President of Harvard University spoke to us and actually challenged us to focus on what she saw as one of the biggest challenges facing our country, and that was the loss of this great intellectual capacity that is graduating out of the world's best universities here in America, and that the challenge is that it is not that they come here to study at the great universities—the greatest universities in the world like Brown University in my district—and then they choose to leave, but we actually kick them out. They are not free to stay.

So I think one of the challenges we have to look at is how do we encourage people from all over the world to continue to see America as a great beacon of intellectual development and innovation so that they not only come to study at our great universities, but they remain here to start companies, hire Americans, locally, innovate and build companies, and rather than lose that capacity, go back and do the same thing in another country.

And so I think we lose that.

The second part is that I think we lose the opportunity to show people all over the world the power of democracy, to be a student here and study and see how America functions as the world's best and strongest, the most productive democracy, has huge value. It changes students forever and they become very often ambassadors to democracy back in their own home.

So I just wanted to—I think you, Dr. Segal, have made that point, and I think it is an important one.

What I would like you to address, as I reviewed your testimony today, in your written testimony what really struck me was that you—I would just like to point out a couple things that you mentioned, and that is first the importance of the United States maintaining its scientific strength here at home, that the United States remains the world leader in science and technology, but that there are some developing nations like China and India and Brazil who

have more than doubled their expenditures on research and development in 2002 to 2007.

And China, in particular, has grown its investment by 20 percent a year since 1999 and is expected to exceed $153 billion of investment this year alone.

And what I think is really alarming is China is producing an enormous number of scientists and engineers from their graduate schools in excess of 2 million in 2009 alone.

And so I think when we look at what do we do, what are the policies we should put into place as a country, they obviously include investments in science and research and particularly focusing on STEM education, to ensure that we have the workforce and the ability to compete successfully.

But one of the challenges we face is even if we make all the right investments, the science and research and innovation and higher education, we end up with an uneven playing field because of the theft of intellectual property and because of Chinese practices of requiring the transfer of intellectual property.

So while I am going to keep advocating for what we need to do to compete successfully and win. If at the end of the process, the Chinese or others simply get to steal what we, you know, the results of that investment, you know, from pre-K–12, to Head Start, to Pell Grants, and all of the infrastructure that is necessary, I am going to continue to advocate for that. But at the end of it, if we haven't protected our investment by successfully protecting American intellectual property, then it is hard to kind of keep advocating for it.

And so what I would like to know is what do you think we should be doing, why aren't we doing more enforcement at the WTO?

What tools could we make better use of to protect this huge investment we are making in order to be sure at the end of this process we are competing successfully and winning?

Mr. SEGAL. Thank you very much for your question. I totally agree that there is no way we can continue innovating and have the Chinese completely tip the table toward them, right. The free trade system is based on comparative advantage. Our comparative advantage is innovation. And if they are going to undermine that, then you can't have that system continue to work.

So besides doing things at home, I think we have to keep pressuring China on indigenous innovation and intellectual property rights. The fact that it was now at the top of the list for this strategic and economic dialogue I think was an important step—it's only the first step, right. What we have to see, as your earlier question to Dr. Holdren suggested, we have to see how they are going to follow it through.

But we know what works, right. There have been specific instances with either IPR or with indigenous innovation where the Chinese have backed away. That has primarily happened when both U.S. companies and foreign countries all push in the same position, right. What has typically happened in other cases is you get a lot of detection, right.

U.S. companies don't want to be seen as the one who publicly embarrassed China because they know that the Chinese Govern-

ment is going to punish them sometime in the future with safety inspection or other types of interference with their business.

And the Chinese are often very good at splitting countries, right. The EU may have this position, we may, and the Japanese may be somewhere else. So in those instances where everyone is in a row, the Chinese have backed down. We saw this with the WAPI standard for WiFi. Everybody stayed together and didn't back down.

So I think in those kinds of instances where you can get that type of thing, that is what we should be working for, then we can push the Chinese.

The other thing to do, of course, is that R&D is mobile. And so what you see is that if a U.S. company takes the benefits from a grant from the NSF or something at a U.S. university and then scales it up in China, that doesn't serve our purpose, right? So we have to think about how do we tie that scaling up side to local, right? How do we improve manufacturing jobs, how do we get those people?

And I think part of the way to do that is to make those grants collaborative, right, to insist that companies work with other U.S. companies, that they work with U.S. universities and tie them locally. Those are the two ideas.

Mr. CICILLINE. And it would seem to me another approach would be to repeal existing tax incentives and tax breaks to give to American companies who do that kind of scaling up in China rather than here in the U.S.

Mr. SEGAL. Yeah, that would also be one.

Mr. CICILLINE. Thank you, Mr. Chairman.

Mr. ROHRABACHER. I want to thank the witnesses. Mr. Fisher, did you have a final comment that you would like to make and Mr. Segal, did you have a final comment?

Let me then close this hearing by saying and emphasizing something that was said by Mr. Wolf, Congressman Wolf when he was here at the beginning of the hearing, and that is don't mistake any of the criticism that we have made of China with a criticism of the Chinese people. China is a dictatorship in which the people do not choose their own leaders. The political leadership in China suppresses the people. It is—the relationship is different than here.

Our Government reflects the will of the people, at least it should, and, there, that is just not the case.

So, who are our greatest allies in correcting a bad situation that is developing between China and the United States? Our greatest ally are those people in China who want to live in freedom and in peace and want prosperity for their families as we do.

And so nothing in this hearing should be interpreted as being anti-Chinese. This is anti the Beijing dictatorship. This is all these things that we are talking are based on the fact that you have a militaristic human rights abusing government in Beijing that is oppressing their own people as much as they are threatening the stability of the rest of the world. We have seen, with that regime a transfer, a major transfer of wealth, perhaps the most historic transfer, voluntary transfer of wealth from one country to another in the history of the world. We have seen money and wealth that would be in the United States transferred to uplift the people of China.

Now I happened to have been there in the beginning when Reagan made this, and again, let me assert when people are talking about Ronald Reagan, he was very clear the reason why he was agreeing, and the American establishment agreed to permit this type of policy establishing itself, everything was established during that time period, was that there was a liberalization going on in China that would have resulted in a more democratic country that was at peace with its own people and at peace with the world.

At that moment, that is what was evolving into place. Had Ronald Reagan been the President at Tiananmen Square, I have no doubt that he would have sent a telegram to the leadership of the Communist Party and said if you unleash the party on the army on the democratic movement in Tiananmen Square, the deal is off. No more technology transfers, no more investment, no more of the United States turning around and letting this theft of our technology and investment go there. It is all over. All of our credits, it is done, the economic deal—that is what he would have said in this telegram. I would have written it for him.

And, guess what. He wasn't President. Herbert Walker Bush was President. And do you know what the telegram that Herbert Walker Bush said that he sent to the Communist Party leadership?

That is it, nothing.

And when they slaughtered those people and they turned China back on course to dictatorship and they kept China on a course of belligerency toward the western world and toward massive repression of their own people, they didn't pay any economic price whatsoever. They benefited from it and our witnesses were correct.

This is not a partisan issue. It was bipartisan governments here in the United States, both Republican and Democrat, have permitted this transfer of wealth and power to go on to this vicious dictatorship which rivals, certainly rivals the monstrous behavior of the Hitler regime who, of course, we shouldn't forget that IBM and a lot of American companies did business with Hitler too, didn't they? Did that make that any more peaceful in the world? No.

And Germany, let us remember, was a very advanced economic country. So it is not out of poverty you have this dictatorship, no. What you have got is evil forces in this world. And then you have a lot of wonderful people who populate this planet, where wonderful people should work together and side with each other when they see someone being oppressed and someone—and we have a government in China that takes people in the Falun Gong, and their crime is that they believe in meditation and yoga, and that is, in a religious way, and that is appealing to the Chinese and the Communist Party is arresting them by the thousands, murdering them and selling their organs.

I don't even think that we can get past the corporate people who are backing China here. I don't think we can get a law passed that even says that you can't buy organs from China as long as they keep taking them from prisoners who they have executed because a lot of their prisoners are political prisoners and religious prisoners.

When we lose sight of the moral underpinnings of our policy, our country will go down and is going down in relationship to its influ-

ence and power to a vicious dictatorship by a dictatorship that does those sort of heinous deeds to their own people and bolsters the strength of gangster regimes around the world.

I hope that this has been interesting to those people who are reading the Record and who are watching on C–SPAN. And I want to thank my fellow colleagues here, especially on the Democratic side of the aisle, because they showed up, and I hope that I have given, I know I have spoken longer than others, but I wanted my colleagues to know that they have just as much time as I would ever use, and I usually try to be fair about that.

Mr. CICILLINE. I thank the chairman for his accommodation.

Mr. ROHRABACHER. So with that said, thank you to the witnesses, and this hearing is adjourned.

[Whereupon, at 5:47 p.m., the subcommittee was adjourned.]

# APPENDIX

---

## Material Submitted for the Hearing Record

**SUBCOMMITTEE HEARING NOTICE**
**COMMITTEE ON FOREIGN AFAIRS**
*U.S. HOUSE OF REPRESENTATIVES*
*WASHINGTON, D.C.*

**Subcommittee on Oversight and Investigations**
**Dana Rohrabacher (R-CA), Chairman**

October 26, 2011

You are respectfully requested to attend an OPEN hearing of the Subcommittee on Oversight and Investigations, to be held in **Room 2172 of the Rayburn House Office Building (and available live, via the WEBCAST link on the Committee website at http://www.hcfa.house.gov):**

**DATE:** Wednesday, November 2, 2011

**TIME:** 3:00 p.m.

**SUBJECT:** Efforts to Transfer America's Leading Edge Science to China

**WITNESSES:** Panel I

The Honorable Frank Wolf (R-VA)
Chairman
Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies

Panel II

Mr. Thomas Armstrong
Managing Associate General Counsel
Government Accountability Office

The Honorable John Holdren, Ph. D.
Director
Office of Science and Technology Policy

The Honorable Charles Bolden, Jr.
Administrator
National Aeronautics and Space Administration

Panel III

Mr. Rick Fisher
Senior Fellow
International Assessment and Strategy Center

Adam Segal, Ph. D.
Senior Fellow
Council on Foreign Relations

**By Direction of the Chairman**

*The Committee on Foreign Affairs seeks to make its facilities accessible to persons with disabilities. If you are in need of special accommodations, please call 202/225-5021 at least four business days in advance of the event, whenever practicable. Questions with regard to special accommodations in general (including availability of Committee materials in alternative formats and assistive listening devices) may be directed to the Committee.*

## COMMITTEE ON FOREIGN AFFAIRS

MINUTES OF SUBCOMMITTEE ON *Oversight and Investigations* HEARING

Day *Wed.* Date *11/2/11* Room *2172 RHOB*

Starting Time *3:11 pm* Ending Time *5:47 pm*

Recesses *n/a* (____to ____) (____to ____) (____to ____) (____to ____) (____to ____) (____to ____)

**Presiding Member(s)**

*Chairman Dana Rohrabacher*

*Check all of the following that apply:*

Open Session ☑
Executive (closed) Session ☐
Televised ☑

Electronically Recorded (taped) ☑
Stenographic Record ☑

**TITLE OF HEARING:**

*Efforts to Transfer America's Leading Edge Science to China*

**SUBCOMMITTEE MEMBERS PRESENT:**

*Chairman Rohrabacher, Ranking Member Carnahan, and Rep. Cicilline*

**NON-SUBCOMMITTEE MEMBERS PRESENT:** *(Mark with an * if they are not members of full committee.)*

**HEARING WITNESSES: Same as meeting notice attached? Yes ☑ No ☐**
*(If "no", please list below and include title, agency, department, or organization.)*

**STATEMENTS FOR THE RECORD:** *(List any statements submitted for the record.)*

*Submitted by Rep. Frank Wolf: The New York Times, "G.E.'s Strategies Let It Avoid Taxes Altogether"*
*Submitted by the Honorable John Holdren, Ph. D.: "Memorandum Opinion for the General Counsel, Office of Science and Technology Policy"*
*Prepared Statement of Mr. Thomas Armstrong*
*Prepared Statement of the Honorable John Holdren, Ph. D.*
*Prepared Statement of the Honorable Charles Bolden, Jr.*
*Prepared Statement of Mr. Rick Fisher*
*Prepared Statement of Dr. Adam Segal*

TIME SCHEDULED TO RECONVENE
or
TIME ADJOURNED *5:47 pm*

Subcommittee Staff Director

MATERIAL SUBMITTED FOR THE RECORD BY THE HONORABLE FRANK WOLF (R–VA), CHAIRMAN, APPROPRIATIONS SUBCOMMITTEE ON COMMERCE, JUSTICE, SCIENCE, AND RELATED AGENCIES

The New York Times Reprints

This copy is for your personal, noncommercial use only. You can order presentation-ready copies for distribution to your colleagues, clients or customers here or use the "Reprints" tool that appears next to any article. Visit www.nytreprints.com for samples and additional information. Order a reprint of this article now.

March 24, 2011

# G.E.'s Strategies Let It Avoid Taxes Altogether

By DAVID KOCIENIEWSKI

General Electric, the nation's largest corporation, had a very good year in 2010.

The company reported worldwide profits of $14.2 billion, and said $5.1 billion of the total came from its operations in the United States.

Its American tax bill? None. In fact, G.E. claimed a tax benefit of $3.2 billion.

That may be hard to fathom for the millions of American business owners and households now preparing their own returns, but low taxes are nothing new for G.E. The company has been cutting the percentage of its American profits paid to the Internal Revenue Service for years, resulting in a far lower rate than at most multinational companies.

Its extraordinary success is based on an aggressive strategy that mixes fierce lobbying for tax breaks and innovative accounting that enables it to concentrate its profits offshore. G.E.'s giant tax department, led by a bow-tied former Treasury official named John Samuels, is often referred to as the world's best tax law firm. Indeed, the company's slogan "Imagination at Work" fits this department well. The team includes former officials not just from the Treasury, but also from the I.R.S. and virtually all the tax-writing committees in Congress.

While General Electric is one of the most skilled at reducing its tax burden, many other companies have become better at this as well. Although the top corporate tax rate in the United States is 35 percent, one of the highest in the world, companies have been increasingly using a maze of shelters, tax credits and subsidies to pay far less.

In a regulatory filing just a week before the Japanese disaster put a spotlight on the company's nuclear reactor business, G.E. reported that its tax burden was 7.4 percent of its American profits, about a third of the average reported by other American multinationals. Even those figures are overstated, because they include taxes that will be paid only if the company brings its overseas profits back to the United States. With those profits still offshore, G.E. is effectively getting money back.

Such strategies, as well as changes in tax laws that encouraged some businesses and professionals to file as individuals, have pushed down the corporate share of the nation's tax receipts — from 30 percent of all federal revenue in the mid-1950s to 6.6 percent in 2009.

Yet many companies say the current level is so high it hobbles them in competing with foreign rivals. Even as the government faces a mounting budget deficit, the talk in Washington is about lower rates. President Obama has said he is considering an overhaul of the corporate tax system, with an eye to lowering the top rate, ending some tax subsidies and loopholes and generating the same amount of revenue. He has designated G.E.'s chief executive, Jeffrey R. Immelt, as his liaison to the business community and as the chairman of the President's Council on Jobs and Competitiveness, and it is expected to discuss corporate taxes.

"He understands what it takes for America to compete in the global economy," Mr. Obama said of Mr. Immelt, on his appointment in January, after touring a G.E. factory in upstate New York that makes turbines and generators for sale around the world.

A review of company filings and Congressional records shows that one of the most striking advantages of General Electric is its ability to lobby for, win and take advantage of tax breaks.

Over the last decade, G.E. has spent tens of millions of dollars to push for changes in tax law, from more generous depreciation schedules on jet engines to "green energy" credits for its wind turbines. But the most lucrative of these measures allows G.E. to operate a vast leasing and lending business abroad with profits that face little foreign taxes and no American taxes as long as the money remains overseas.

Company officials say that these measures are necessary for G.E. to compete against global rivals and that they are acting as responsible citizens. "G.E. is committed to acting with integrity in relation to our tax obligations," said Anne Eisele, a spokeswoman. "We are committed to complying with tax rules and paying all legally obliged taxes. At the same time, we have a responsibility to our shareholders to legally minimize our costs."

The assortment of tax breaks G.E. has won in Washington has provided a significant short-term gain for the company's executives and shareholders. While the financial crisis led G.E. to post a loss in the United States in 2009, regulatory filings show that in the last five years, G.E. has accumulated $26 billion in American profits, and received a net tax benefit from the I.R.S. of $4.1 billion.

But critics say the use of so many shelters amounts to corporate welfare, allowing G.E. not just to avoid taxes on profitable overseas lending but also to amass tax credits and write-offs that can be used to reduce taxes on billions of dollars of profit from domestic manufacturing. They

say that the assertive tax avoidance of multinationals like G.E. not only shortchanges the Treasury, but also harms the economy by discouraging investment and hiring in the United States.

"In a rational system, a corporation's tax department would be there to make sure a company complied with the law," said Len Burman, a former Treasury official who now is a scholar at the nonpartisan Tax Policy Center. "But in our system, there are corporations that view their tax departments as a profit center, and the effects on public policy can be negative."

The shelters are so crucial to G.E.'s bottom line that when Congress threatened to let the most lucrative one expire in 2008, the company came out in full force. G.E. officials worked with dozens of financial companies to send letters to Congress and hired a bevy of outside lobbyists.

The head of its tax team, Mr. Samuels, met with Representative Charles B. Rangel, then chairman of the Ways and Means Committee, which would decide the fate of the tax break. As he sat with the committee's staff members outside Mr. Rangel's office, Mr. Samuels dropped to his knee and pretended to beg for the provision to be extended — a flourish made in jest, he said through a spokeswoman.

That day, Mr. Rangel reversed his opposition to the tax break, according to other Democrats on the committee.

The following month, Mr. Rangel and Mr. Immelt stood together at St. Nicholas Park in Harlem as G.E. announced that its foundation had awarded $30 million to New York City schools, including $11 million to benefit various schools in Mr. Rangel's district. Joel I. Klein, then the schools chancellor, and Mayor Michael R. Bloomberg, who presided, said it was the largest gift ever to the city's schools.

G.E. officials say the donation was granted solely on the merit of the project. "The foundation goes to great lengths to ensure grant decisions are not influenced by company government relations or lobbying priorities," Ms. Eisele said.

Mr. Rangel, who was censured by Congress last year for soliciting donations from corporations and executives with business before his committee, said this month that the donation was unrelated to his official actions.

**Defying Reagan's Legacy**

General Electric has been a household name for generations, with light bulbs, electric fans, refrigerators and other appliances in millions of American homes. But today the consumer appliance division accounts for less than 6 percent of revenue, while lending accounts for

more than 30 percent. Industrial, commercial and medical equipment like power plant turbines and jet engines account for about 50 percent. Its industrial work includes everything from wind farms to nuclear energy projects like the troubled plant in Japan, built in the 1970s.

Because its lending division, GE Capital, has provided more than half of the company's profit in some recent years, many Wall Street analysts view G.E. not as a manufacturer but as an unregulated lender that also makes dishwashers and M.R.I. machines.

As it has evolved, the company has used, and in some cases pioneered, aggressive strategies to lower its tax bill. In the mid-1980s, President Ronald Reagan overhauled the tax system after learning that G.E. — a company for which he had once worked as a commercial pitchman — was among dozens of corporations that had used accounting gamesmanship to avoid paying any taxes.

"I didn't realize things had gotten that far out of line," Mr. Reagan told the Treasury secretary, Donald T. Regan, according to Mr. Regan's 1988 memoir. The president supported a change that closed loopholes and required G.E. to pay a far higher effective rate, up to 32.5 percent.

That pendulum began to swing back in the late 1990s. G.E. and other financial services firms won a change in tax law that would allow multinationals to avoid taxes on some kinds of banking and insurance income. The change meant that if G.E. financed the sale of a jet engine or generator in Ireland, for example, the company would no longer have to pay American tax on the interest income as long as the profits remained offshore.

Known as active financing, the tax break proved to be beneficial for investment banks, brokerage firms, auto and farm equipment companies, and lenders like GE Capital. This tax break allowed G.E. to avoid taxes on lending income from abroad, and permitted the company to amass tax credits, write-offs and depreciation. Those benefits are then used to offset taxes on its American manufacturing profits.

G.E. subsequently ramped up its lending business.

As the company expanded abroad, the portion of its profits booked in low-tax countries such as Ireland and Singapore grew far faster. From 1996 through 1998, its profits and revenue in the United States were in sync — 73 percent of the company's total. Over the last three years, though, 46 percent of the company's revenue was in the United States, but just 18 percent of its profits.

Martin A. Sullivan, a tax economist for the trade publication Tax Analysts, said that booking such a large percentage of its profits in low-tax countries has "allowed G.E. to bring its U.S. effective tax rate to rock-bottom levels."

G.E. officials say the disparity between American revenue and American profit is the result of ordinary business factors, such as investment in overseas markets and heavy lending losses in the United States recently. The company also says the nation's workers benefit when G.E. profits overseas.

"We believe that winning in markets outside the United States increases U.S. exports and jobs," Mr. Samuels said through a spokeswoman. "If U.S. companies aren't competitive outside of their home market, it will mean fewer, not more, jobs in the United States, as the business will go to a non-U.S. competitor."

The company does not specify how much of its global tax savings derive from active financing, but called it "significant" in its annual report. Stock analysts estimate the tax benefit to G.E. to be hundreds of millions of dollars a year.

"Cracking down on offshore profit-shifting by financial companies like G.E. was one of the important achievements of President Reagan's 1986 Tax Reform Act," said Robert S. McIntyre, director of the liberal group Citizens for Tax Justice, who played a key role in those changes. "The fact that Congress was snookered into undermining that reform at the behest of companies like G.E. is an insult not just to Reagan, but to all the ordinary American taxpayers who have to foot the bill for G.E.'s rampant tax sheltering."

**A Full-Court Press**

Minimizing taxes is so important at G.E. that Mr. Samuels has placed tax strategists in decision-making positions in many major manufacturing facilities and businesses around the globe. Mr. Samuels, a graduate of Vanderbilt University and the University of Chicago Law School, declined to be interviewed for this article. Company officials acknowledged that the tax department had expanded since he joined the company in 1988, and said it now had 975 employees.

At a tax symposium in 2007, a G.E. tax official said the department's "mission statement" consisted of 19 rules and urged employees to divide their time evenly between ensuring compliance with the law and "looking to exploit opportunities to reduce tax."

Transforming the most creative strategies of the tax team into law is another extensive operation. G.E. spends heavily on lobbying: more than $200 million over the last decade, according to the Center for Responsive Politics. Records filed with election officials show a significant portion of that money was devoted to tax legislation. G.E. has even turned setbacks into successes with Congressional help. After the World Trade Organization forced the United States to halt $5 billion a year in export subsidies to G.E. and other manufacturers, the

company's lawyers and lobbyists became deeply involved in rewriting a portion of the corporate tax code, according to news reports after the 2002 decision and a Congressional staff member.

By the time the measure — the American Jobs Creation Act — was signed into law by President George W. Bush in 2004, it contained more than $13 billion a year in tax breaks for corporations, many very beneficial to G.E. One provision allowed companies to defer taxes on overseas profits from leasing planes to airlines. It was so generous — and so tailored to G.E. and a handful of other companies — that staff members on the House Ways and Means Committee publicly complained that G.E. would reap "an overwhelming percentage" of the estimated $100 million in annual tax savings.

According to its 2007 regulatory filing, the company saved more than $1 billion in American taxes because of that law in the three years after it was enacted.

By 2008, however, concern over the growing cost of overseas tax loopholes put G.E. and other corporations on the defensive. With Democrats in control of both houses of Congress, momentum was building to let the active financing exception expire. Mr. Rangel of the Ways and Means Committee indicated that he favored letting it end and directing the new revenue — an estimated $4 billion a year — to other priorities.

G.E. pushed back. In addition to the $18 million allocated to its in-house lobbying department, the company spent more than $3 million in 2008 on lobbying firms assigned to the task.

Mr. Rangel dropped his opposition to the tax break. Representative Joseph Crowley, Democrat of New York, said he had helped sway Mr. Rangel by arguing that the tax break would help Citigroup, a major employer in Mr. Crowley's district.

G.E. officials say that neither Mr. Samuels nor any lobbyists working on behalf of the company discussed the possibility of a charitable donation with Mr. Rangel. The only contact was made in late 2007, a company spokesman said, when Mr. Immelt called to inform Mr. Rangel that the foundation was giving money to schools in his district.

But in 2008, when Mr. Rangel was criticized for using Congressional stationery to solicit donations for a City College of New York school being built in his honor, Mr. Rangel said he had appealed to G.E. executives to make the $30 million donation to New York City schools.

G.E. had nothing to do with the City College project, he said at a July 2008 news conference in Washington. "And I didn't send them any letter," Mr. Rangel said, adding that he "leaned on them to help us out in the city of New York as they have throughout the country. But my point there was that I do know that the C.E.O. there is connected with the foundation."

In an interview this month, Mr. Rangel offered a different version of events — saying he didn't remember ever discussing it with Mr. Immelt and was unaware of the foundation's donation until the mayor's office called him in June, before the announcement and after Mr. Rangel had dropped his opposition to the tax break.

Asked to explain the discrepancies between his accounts, Mr. Rangel replied, "I have no idea."

**Value to Americans?**

While G.E.'s declining tax rates have bolstered profits and helped the company continue paying dividends to shareholders during the economic downturn, some tax experts question what taxpayers are getting in return. Since 2002, the company has eliminated a fifth of its work force in the United States while increasing overseas employment. In that time, G.E.'s accumulated offshore profits have risen to $92 billion from $15 billion.

"That G.E. can almost set its own tax rate shows how very much we need reform," said Representative Lloyd Doggett, Democrat of Texas, who has proposed closing many corporate tax shelters. "Our tax system should encourage job creation and investment in America and end these tax incentives for exporting jobs and dodging responsibility for the cost of securing our country."

As the Obama administration and leaders in Congress consider proposals to revamp the corporate tax code, G.E. is well prepared to defend its interests. The company spent $4.1 million on outside lobbyists last year, including four boutique firms that specialize in tax policy.

"We are a diverse company, so there are a lot of issues that the government considers, that Congress considers, that affect our shareholders," said Gary Sheffer, a G.E. spokesman. "So we want to be sure our voice is heard."

○