

U.S.-RUSSIAN COOPERATION IN SPACE

HEARING BEFORE THE SUBCOMMITTEE ON SPACE AND AERONAUTICS COMMITTEE ON SCIENCE HOUSE OF REPRESENTATIVES ONE HUNDRED EIGHTH CONGRESS FIRST SESSION

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U.S.-RUSSIAN COOPERATION IN SPACE

WEDNESDAY, JUNE 11, 2003

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON SPACE AND AERONAUTICS,
COMMITTEE ON SCIENCE,
Washington, DC.

The Subcommittee met, pursuant to call, at 2:09 p.m., in Room 2318 of the Rayburn House Office Building, Hon. Dana Rohrabacher [Chairman of the Subcommittee] presiding.

**COMMITTEE ON SCIENCE
SUBCOMMITTEE ON SPACE AND AERONAUTICS
U.S. HOUSE OF REPRESENTATIVES
WASHINGTON, DC 20515**

Hearing on

U.S. – Russian Cooperation in Space
Wednesday, June 11, 2003
10:00 p.m. – 12:00 p.m.
2318 Rayburn House Office Building

WITNESS LIST

Ambassador Steve Pifer,
Deputy Assistant Secretary of State,
Bureau of European and Eurasian Affairs, State Department

Mr. John Schumacher,
NASA Assistant Administrator for External Relations

Mr. Robert M. Davis,
President and CEO of the California Space Authority

Mr. Henry Sokolski,
Executive Director,
Nonproliferation Policy Education Center

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Chairman ROHRBACHER. I apologize for keeping us a little late here. We have had a little bit of a glitch in terms of who was willing to testify and who is not willing to testify, so—but I hereby call this meeting of the Space and Aeronautics Subcommittee to order. And without objection, the Chair will be granted the authority to recess this meeting at any time. Hearing no objection.

Last week, in St. Petersburg, President Bush and Russian President Putin issued a joint statement that is the subject of today's hearing. Both countries promised to continue to cooperate in the arena of human space flight and in the ongoing challenge of assembling and operating the International Space Station in light of the current Space Shuttle situation. They committed themselves to taking "energetic steps" toward greater space cooperation.

Today's hearing will explore the benefits and risks of U.S.–Russian cooperation in space, particularly in light, as I say, of the tragedy of the Space Shuttle *Columbia*. These issues, balancing our nonproliferation concerns against the benefits of space cooperation, remind me a little bit of that Russian, I think they call it, matryoshka doll where you can see it on the outside. It sort of looks like there is—that is what it is all about, but as you go down, you find layer after layer of different concerns and different things within the issue. So foreign—U.S. foreign policy vis-à-vis Russia is almost as complicated as rocket science issues, but of course, our Subcommittee does deal with rocket science issues.

The U.S.–Russian partnership on the Space Station over the years has been frustrating. And I have followed that very closely over the years, and that has been frustrating. And that especially was frustrating when our Russian partners failed to meet their commitments about a decade ago. But during—but in terms of the chaotic scene in Russia, that now appears to be stabilizing, as we would hope it would be, and a new potential may well be on the horizon.

I am pleased that the United States and Russia are continuing to combat the threat posed by proliferation of weapons of mass destruction. And while there is reason for optimism in terms of this relationship, let us always remember the words of my former boss, "Trust but verify."

Specifically, this hearing will explore Russia's ability to meet its commitments to the Space Station with Soyuz and Progress flights and our dependence on them. Of particular interest will be to examine calls from the United States industry for Congress and NASA to clarify the interpretations of the Iran Nonproliferation Act. Americans and Russians can work together on future space enterprises that will maximize our individual national goals and capabilities. We can do more by working together with the Russians than we can—than each of us could do working separately. We could benefit by working together, not just in terms of financial profit, but by working toward mutual goals.

And when it comes to making the Space Station a success, I believe that the United States companies should work with Russian companies. But it must be with companies that are not involved with the proliferation of weapons of mass destruction. That is clear that there is a—and it is clear that there is a restriction on working with the Russian Government in terms of as long as there is

a proliferation question. I, however, would advocate that we can work company to company, American company to Russian company, and still be within the bounds of this nonproliferation legislation.

Our relationship with Russia has changed in the past three years. Significant progress has been made since the days that our space dollars ended up financing lucky Russian bureaucrats, known as apparatchiks. But let us not dwell on the mistakes of the 1990's nor let us repeat those mistakes. Let us, instead, chart a positive course for the future, and to me, achieving our space goals, by definition, means working with the Russians to make sure we can accomplish what we can accomplish.

So with that said, I will be happy to now turn to Bart Gordon for his opening statement.

Mr. GORDON. Thank you, Mr. Chairman. And good morning everyone. I want to welcome you to today's hearing. I look forward to your testimony. I also want to thank Chairman Rohrabacher for holding this hearing. It is a very timely hearing and a very important hearing.

U.S.-Russian space cooperation has been an important part of our space program since the early 1990's. And today, it is critical to the continued survival of the International Space Station. With the Space Shuttle fleet grounded, it is no exaggeration to say that we are just one Progress or Soyuz failure away from having to pull the crew off of the Space Station. If that happens, the rest of the Space Station will go up significantly.

It is clear that the Iran Nonproliferation Act has complicated the situation. However, a discussion of how fast to achieve the Nation's nonproliferation goals is not the purpose of this hearing. And Members may have different views on whether linking the Space Station program to nonproliferation is a good idea. The fact of the matter is that the Iran Nonproliferation Act had been public law since 2000. In light of that, Congress needs to hear from the Administration in specific terms how it will protect the considerable taxpayer investment in the Space Station.

And Mr. Schumacher, in your testimony that you submitted, it was rather brief. It didn't really go into these questions. So let me, since you are going to have some extra time, I would like to pose these questions so that you could help us in your testimony, if you don't mind. The United States is responsible for providing Space Station crew return support for non-Russian astronauts starting in the year 2006. How will the Administration meet that commitment and still comply with the Iran Nonproliferation Act? Secondly, the Space Shuttle fleet was grounded for more than 2½ years after the *Challenger* accident. How will the Administration ensure that the Space Station can continue to operate if the Shuttle fleet is grounded that long again? And whether or not the Administration is expecting the Russians or other Space Station international partners to pay for the Soyuz and Progress flights until the Shuttle starts flying again as well as from 2006 onward, and have the partners, in fact, agreed to pay? And if so, is there a signed agreement?

And I will just point out, I understand, Mr. Schumacher, that you are going to be Mr. O'Keefe's new Chief of Staff, and congratulations on that important position. Similar questions were sub-

mitted to him on February the 27th, so hopefully you could maybe give us a first installment today and then you can look for those questions there in the office and help us with this. It is something that is important. And again, these are not easy questions. I—you know, and there won't be easy answers. I don't intend to say that. We have to start this process of trying to figure out where we are going.

NASA is dependent upon Russia's spacecraft to keep the Space Station operational until the Shuttle flights resume. Since the Administration canceled the U.S. Space Station Crew Return Vehicle in 2001, NASA is totally dependent on the Russian Soyuz CRV until the end of this decade. And finally, the only alternative to the Space Shuttle for getting crews into the space over the next 10 years is the Russian Soyuz spacecraft. So it is not enough to say that today there hasn't been a need for NASA to seek an exemption or to change the Iran Nonproliferation Act. Given existing commitments and other realities coming over the next 10 years, the Administration needs to tell us or at least start the process of telling us and trying to figure this out, you know, what to do and what we can do with these commitments and realities.

Again, we have got a lot of ground to cover. Thank you for being here. And I look forward to hearing your suggestions.

Chairman ROHRABACHER. Thank you very much. Without objection, the opening statement of other Members will be put into the record, but I would like to now, at this point, extend to the Chairman of Full Committee any—the—if he would like to say a few words, we would love to have them.

Mr. BOEHLERT. Well, thank you very much, Mr. Chairman. I want to commend you for having this important oversight hearing. This is the type of thing we do day after day, week after week. It is critically important.

I think the International Space Station and the transportation system now serving it provide a testimony to the benefit derived from a meaningful working partnership between the United States and Russia. And I would ask, Mr. Chairman, that you consider inserting in the record at this juncture the statements of President Bush and Putin arrived at last week. I think they are very important and reassuring, and I thank you for it.

Chairman ROHRABACHER. Yes, their statements will be inserted in the record without objection. And anything further, Mr. Chairman?

Mr. BOEHLERT. That is it, Mr. Chairman.

Chairman ROHRABACHER. Well, we are very, very pleased whenever the Chairman of the Full Committee graces our Subcommittee. And we appreciate your involvement and your guidance.

So without objection, we will include that reference to the statements issued by President Putin and President Bush in the record. (See Charter, Attachment 1, p. 11.)

As I said, other Members here will have to put their opening statements in the written record, and I—hearing no objection, so ordered. I also ask unanimous consent to insert at the appropriate place in the record the background memorandum prepared by the Majority Staff for this hearing. Hearing no objection, so ordered.

HEARING CHARTER

**SUBCOMMITTEE ON SPACE AND AERONAUTICS
COMMITTEE ON SCIENCE
U.S. HOUSE OF REPRESENTATIVES**

**U.S.–Russian Cooperation
in Space**

WEDNESDAY, JUNE 11, 2003
2:00 P.M.–4:00 P.M.
2318 RAYBURN HOUSE OFFICE BUILDING

Purpose of Hearing

On Wednesday, June 11, 2003, at 2:00 p.m. in Room 2318 of the Rayburn House Office Building, the Space and Aeronautics Subcommittee will hold a hearing on *U.S.–Russian Cooperation in Space*. This hearing will explore the benefits and risks of U.S.–Russian cooperation on space programs. Specifically, the hearing will review Russia’s participation in the International Space Station (ISS) program and the Russian Space Agency’s (RSA) ability to provide near-term and long-term support for the ISS with Soyuz and Progress space vehicles. Members will examine how NASA has interpreted Section 6 of the Iran Nonproliferation Act (INA) of 2000, how the INA has affected U.S.–Russian space collaboration, and how INA policies have influenced Russian nonproliferation. In addition, the hearing will also review other areas of technical collaboration in space between the U.S. and Russia and how best to organize these collaborations between government and industry.

Major Issues for Congress

Joint Statement on U.S.–Russia Cooperation in Space. On June 1st, President Bush and Russian President Putin issued a Joint Statement on Cooperation in Space that committed the U.S. to safely returning the Space Shuttle to flight and Russia to meeting the Space Station crew transport and logistics resupply requirements until the Shuttle returns to flight. The statement also reaffirmed a U.S.–Russia commitment to take “energetic steps” to enhance cooperation in space technologies and techniques. How will Russia fund its commitments for the Space Station?

Reliance on the Russians to Support the Space Station. U.S. human spaceflight is completely reliant on the Russian Soyuz and Progress space vehicles for all crew transport and rescue as well as cargo delivery to the Space Station while the Space Shuttle fleet is grounded. Even when the Space Shuttle fleet returns to flight, U.S. human spaceflight will still rely on the Russian Soyuz vehicle for Space Station crew rescue. Several NASA reports call into question the inability of RSA to support the Space Station over the next several years without additional funding.

The Iran Nonproliferation Act (INA). Section 6 of the INA prevents the U.S. Government from providing payments to the Russian Government, including the RSA, in connection with the ISS unless certain conditions are met. U.S. industry has raised questions about whether the INA allows U.S. contractors to enter into relationships with Russian contractors on Space Station work.

Background on Russia’s Participation in the International Space Station. The history of the Cold War and human spaceflight are closely intertwined with U.S.–Soviet/Russian foreign relations. In 1993, President Clinton invited Russia into the international partnership (Europe, Canada, and Japan were already partners) to build the Space Station. The primary reasons behind this invitation were to promote Russian adherence to the Missile Technology Control Regime (MTCR) and promote nonproliferation by helping Russia’s aerospace industry shift from military to civilian work. Between 1994 and 1998, NASA paid the Russian Space Agency approximately \$800 million to build the Zarya space station module, support the Shuttle-Mir program, and other spaceflight activities while the RSA agreed to build and launch the Zvezda Service Module as well as Soyuz and Progress crew and cargo vehicles to support the Space Station.

Throughout the past 10 years, Russia had financial problems and schedule delays in meeting its commitments to the Space Station program. Also, during the 1990s, several reports raised concerns that the RSA and Russian aerospace industry were proliferating weapons technologies to rogue states. In response to these concerns, the House and Senate unanimously (419–0 in the House and 98–0 in the Senate) passed the Iran Nonproliferation Act (INA) that became law on March 14, 2000.

The Iran Nonproliferation Act (INA) restricts the U.S. Government from making payments to the RSA or any organization under its jurisdiction in connection with the International Space Station unless the President determines that the Russian Government is not proliferating any weapons of mass destruction (WMD) or ballistic missile technology to Iran. Exceptions to this restriction are allowed in cases of crew safety, and support for the Russian Zvezda Service Module (See Attachment 3 for more detailed background on U.S.–Russia Space Cooperation and Attachment 5 for the relevant portions of the INA). Key issues to consider:

- Has Section 6 of the INA helped stem proliferation between Russia and Iran?
- How has Section 6 of the INA impacted the Space Station program?

Reliance on Russian Support to the Space Station. The Space Shuttle *Columbia* tragedy and subsequent grounding of the Shuttle fleet has made the U.S. human spaceflight program completely reliant on the Russian Soyuz and Progress space vehicles for all crew transport and rescue as well as cargo delivery to the International Space Station while the Space Shuttle fleet is grounded. RSA informed the ISS international partners at the February 26th Multilateral Configuration Board meeting that while RSA agreed to the accelerated production schedule for Progress cargo vehicles (see Attachment 2) additional funds from the international partners were needed to meet that schedule. Since then, the Space Station international partners have agreed to a Progress and Soyuz flight schedule while the Space Shuttle fleet is grounded, but have not yet found the necessary funds for those Russian flights. NASA described its concern last April:

“The concern was based on the fact that Russian performance appeared to depend on the receipt of ‘off-budget’ funds from the sale of flight opportunities [space tourist flights] on the Soyuz missions. The European Space Agency (ESA) had arranged to purchase two of the four available flight opportunities, but prospects for the other two were unclear. The grounding of the Space Shuttle fleet and the subsequent Multilateral Coordination Board-agreed upon interim operations plan have put additional financial strain on Rosaviakosmos [Russian Space Agency]. To assist during this difficult period, ESA has agreed to defer the flights of its astronauts, while continuing payments to Rosaviakosmos for the flights on the original schedule.”¹

Unless the Administration requests a waiver to the Iran Nonproliferation Act, additional funds for Russia’s support to the Space Station will need to come from the international partners other than the U.S.

Long-Term Viability of Russian Support for the Space Station. Even before the *Columbia* tragedy made issues about reliance on Russian Progress and Soyuz flights more acute, NASA reported “uncertainties associated with the outlook for Russia’s future funding”² for the Space Station in its bimonthly performance reports to the Committee. The agreement between the international partners called upon Russia to provide Soyuz capsules to serve as crew rescue vehicles through 2006. These NASA reports call into question the ability of the Russian Space Agency to support the Space Station over the next several years without additional funding from the Russian Government, the Space Station international partners, or the sale of more space tourist flights.

- How is NASA mitigating the risks to the Space Station and its crew if the Russian Space Agency is not able to support long-term crew transport/rescue as well as cargo delivery?
- Due to NASA’s problems in developing a Space Station crew rescue vehicle and RSA’s financial problems, is continued reliance on the Russian Soyuz a prudent and viable plan?

¹NASA Bimonthly Russian Performance Report with regard to the International Space Station January 1, 2003–February 28, 2003, dated April 14, 2003.

²NASA Bimonthly Russian Performance Report with regard to the International Space Station July 1–August 31, 2002, dated November 13, 2002.

Safety of the Soyuz Vehicles

The flight of the Russian Soyuz vehicle that returned the Expedition 6 crew last month raised new questions about the safety of our reliance on Russian vehicles. This capsule did not re-enter the Earth's atmosphere as planned but re-entered the Earth's atmosphere in an anomalous ballistic entry, and the capsule landed over 275 miles from its intended landing target in Kazakhstan. The astronauts experienced more than 8 G forces versus the normal 4 Gs during this re-entry. Further, search and rescue crews took more than two hours to locate the crew. Rescue teams could not pinpoint the crew until they unfurled a 15-foot auxiliary antenna.

Key issues include:

- What actions have the ISS international partners taken to ensure that the necessary resources are available for Russian Progress cargo flights to the Space Station?
- Are the funding shortfalls for Russian Soyuz and Progress missions causing any undue safety risks to the Space Station or its crew while the Shuttle fleet is grounded?

The Iran Nonproliferation Act. The INA prohibits the U.S. Government from making payments to Russia in connection with the ISS and prohibits payments to any other entity if the U.S. Government anticipates that such payments will be passed on to an entity proliferating to Iran. Recently, industry bidders for the Space Station Cargo Mission Request for Proposals (RFP) sought guidance from NASA on the applicability of INA restrictions to U.S.–Russian company subcontracts. NASA asked for information from potential bidders on their proposed Russian subcontractor relationships and impact on the bidder's team if the Russian company could not participate in the work. Key issues include:

- What impacts have potential bidders to the ISS Cargo Mission RFP identified to NASA as a result of this guidance?
- To what degree does Section 6 of the INA restrict U.S.–Russian companies relationships on launch vehicles or cargo carriers to the Space Station?

Collaboration with Russia on Space Programs. The Iran Nonproliferation Act only covers U.S.–Russian collaboration on the International Space Station, but the U.S. and Russia collaborate in several other space programs. NASA provided a summary of its cooperation with Russia in Attachment 4.

The joint U.S.–Russia statement says that the two countries “are prepared to take energetic steps to enhance our cooperation in the application of space technology and techniques.” Other than the Space Station, space launch is the main area of collaboration between the U.S. and Russia. These joint ventures are formed between U.S. and Russian companies rather than through government-to-government collaboration.

Rocket Engines. Lockheed Martin's Atlas V uses the RD–180 first stage engine built by Energomash, a Russian company, and Sea Launch is a partnership between Boeing, Energia, and Yuzhnoye/Yuzhmash using the Ukrainian Zenit rocket and Russian upper stage engines. Several U.S. commercial satellites are launched from Russia or Kazakhstan.

Space Nuclear Power. NASA, through the Department of Energy, purchases plutonium fuel from Russia for its in-space nuclear power. During the early 1990s, the U.S. purchased the Russian Topaz space nuclear reactor in order to analyze its design for future systems. However, further collaboration between the U.S. and Russia in NASA's new nuclear systems development appears doubtful.

Russian Collaboration with other Nations. The Russian Space Agency also has a number of cooperative ventures with other countries in space—France, Germany, Canada, China, India, Bulgaria, Hungary, Pakistan, Portugal, Israel, and the European Space Agency. Of particular interest, RSA signed agreements to support China's human spaceflight program. Russia also has ties with India and Pakistan's rocket program.

- What are some areas of technical collaboration in space between the U.S. and Russia that would provide meaningful benefit to the U.S. space program while also discouraging Russian proliferation of space and missile capabilities to other countries?
- How best should these cooperative space endeavors be organized, either between U.S.–Russian companies or between the governments?

Witnesses

Amb. Steve Pifer, Deputy Assistant Secretary of State, Bureau of European and Eurasian Affairs, State Department

Mr. John Schumacher, NASA Assistant Administrator for External Relations

Mr. Robert M. Davis, President and CEO of the California Space Authority

Mr. Henry Sokolski, Executive Director of the Nonproliferation Policy Education Center

Witness Questions

The witnesses were asked to address the following questions in their testimony.

Questions for Ambassador Steve Pifer, Deputy Assistant Secretary of State, Bureau of European and Eurasian Affairs, State Department

- How has the INA, along with other factors, influenced the activities and behavior of Russian Government, Russian Space Agency, and other organizations under its jurisdiction to exert more control to stem the proliferation of space and missile technology from Russia to states such as Iran?
- Is the State Department actively monitoring Russian collaboration in space and missile technology with the U.S. and other countries and keeping other Federal agencies informed of these Russian collaborations?
- What is the State Department's role in working with NASA to ensure that the INA is interpreted and implemented properly?

Questions for Mr. John Schumacher, NASA Assistant Administrator for External Relations

- What have been the benefits and difficulties from NASA–Russian Space Agency cooperation on the ISS over the past three years?
- What actions have the International Partners taken to ensure that the Russian Space Agency has the necessary resources to accelerate the production for Progress resupply flights and meet the cargo needs for the ISS while the Space Shuttle is grounded?
- Given the problems with the Soyuz TMA–1 return flight with the Expedition 6 crew, have NASA and the Russian Space Agency considered any changes to remedy safety concerns with Soyuz flight operations? If so, what are those changes?
- Have any potential bidders for NASA procurements identified any adverse impacts due to NASA's interpretation of Section 6 of the Iran Nonproliferation Act?
- To what degree does NASA believe that Section 6 of the Iran Nonproliferation Act restricts U.S. contractor-to-Russian contractor relationships?

Questions for Mr. Robert M. Davis, President and CEO of the California Space Authority

- What are the benefits and risks when U.S. companies collaborate with the Russian Space Agency or Russian companies on space projects?
- What areas of technical collaboration with Russian space industry would you recommend that U.S. aerospace companies pursue?
- How has the INA affected U.S. aerospace industry collaboration with Russia?

Questions for Mr. Henry Sokolski, Executive Director of the Nonproliferation Policy Education Center

- What areas of collaboration between the U.S. and Russia in space have been beneficial or difficult over the past three years?
- How reliant is Russia on funding from other countries to maintain its space and missile capabilities? In what areas is Russia collaborating with other countries on space capabilities? What are the proliferation concerns of these collaborations?
- What areas of future collaboration in space would you recommend between the U.S. and Russia governments and companies?
- How have the behavior and actions of the Russian government and Russian Space Agency changed over the past three years in order to better stem the proliferation of space and missile technology from Russia?

Attachments:

1. Joint Statement by President Bush and Russian President Putin on U.S.–Russian Cooperation in Space
2. Chart: MCB–Approved Soyuz and Progress Launch Schedule Re-Plan 2003–2004
3. Congressional Research Service Background Paper
4. NASA Summary on U.S.–Russia Space Cooperation
5. Sections 6 and 7 of the Iran Nonproliferation Act of 2000

Attachment 1

Joint Statement by President Bush and Russian President Putin on U.S.–Russian Cooperation in Space. On June 1, 2003 during their meeting in St. Petersburg, Russia, the U.S. and Russian presidents issued the following joint statement:

The loss of the Space Shuttle Columbia has underscored the historic role of the United States and Russia as partners in space exploration, who have persevered despite tragedy and adversity. During this challenging time, our partnership has deepened and the International Space Station (ISS) program remains strong. The extraordinary efforts of our countries continue.

The United States is committed to safely returning the Space Shuttle to flight, and the Russian Federation is committed to meeting the ISS crew transport and logistics resupply requirements necessary to maintain our joint American astronaut and Russian cosmonaut teams on board the ISS until the Space Shuttle returns to flight.

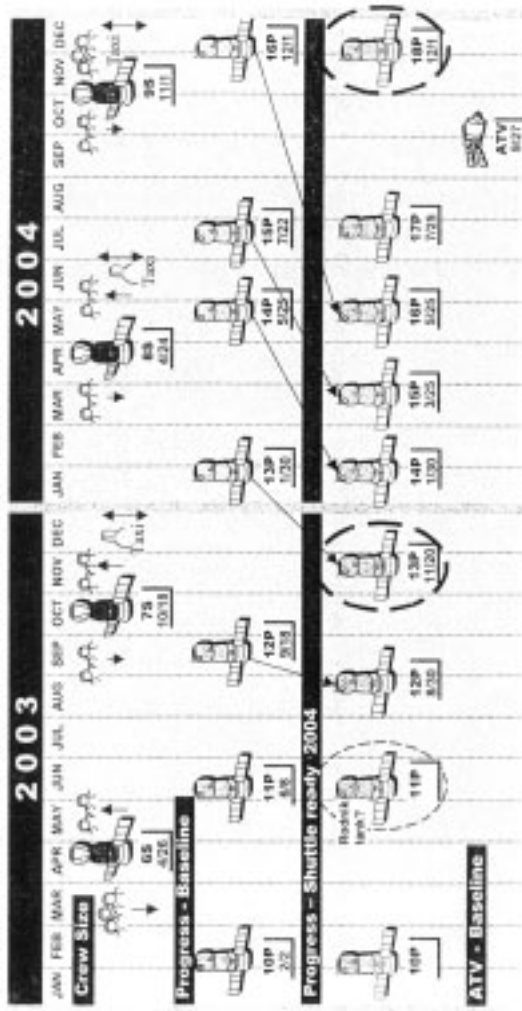
We confirm our mutual aspiration to ensure the continued assembly and viability of the International Space Station as a world-class research facility, relying on our unprecedented experience of bilateral and multilateral interaction in space. We reaffirm our commitment to the mission of human space flight and are prepared to take energetic steps to enhance our cooperation in the application of space technology and techniques.³

³White House Office of the Press Secretary, June 1, 2003.

Altair/Space 2



MCB-Approved Option Soyuz and Progress Launch Schedule Re-Plan 2003-2004



Resumption of Shuttle flight

ATV 507
SLE-1
S5CB 02-24-03

U.S.-Russian Space Cooperation: 1993-2003**Government Level Cooperation**

Although the United States and the Soviet Union were historical rivals in the field of space, cooperation at some level existed between them from the earliest days of the Space Age. The first formal agreement was signed in 1962. In the Soviet-era, the highlight was the 1975 Apollo-Soyuz Test Project where a three-person U.S. Apollo spacecraft docked with a two-person Soviet Soyuz spacecraft for two days of joint experiments. Cooperation waned (but did not cease) in the late 1970s following the Soviet invasion of Afghanistan, but expanded after the collapse of the Soviet Union in 1991. A year later, President George H.W. Bush and Russian President Yeltsin announced new space cooperation plans, including flying an astronaut to Russia's Mir space station, a cosmonaut on the U.S. space shuttle, and a shuttle-Mir docking. In 1993, President Clinton significantly expanded that cooperation by bringing Russia into the international partnership that is building the International Space Station (Europe, Canada, and Japan already were partners). Although there has been other U.S.-Russian space cooperation in the past 10 years (particularly in space science through NASA, and development of new sensors for early warning satellites through the Department of Defense), human space flight cooperation has been the dominant theme.

The 1993 agreement called for three phases of space station cooperation. Phase I (1995-1998) involved multi-month visits by U.S. astronauts on Russia's Mir space station, dockings of the U.S. shuttle with Mir, and flights of Russian cosmonauts on the U.S. space shuttle. Phase II (1998-2001) and Phase III (ongoing) blend into each other and involve construction of the International Space Station (ISS). Getting Russia to adhere to the Missile Technology Control Regime (MTCR) was one motivation behind the decision to bring in Russia as a partner. The MTCR seeks to stop the proliferation of missile technology. The United States objected to a contract Russia made with India that would have given India advanced rocket engines and associated technology and know-how. The United States did not object to giving India the engines, but wanted Russia to restructure the contract so that technology and know-how would not be transferred. Russia claimed that restructuring the contract would cost them \$400 million. The 1993 agreement involved the United States paying Russia \$400 million for space station cooperation, while Russia agreed to restructure the contract and to abide by the MTCR. Between 1994 and 1998, the \$400 million grew to a total of approximately \$800 million, including \$207 million that NASA paid to Boeing to contract with the Russian company Khrunichev to build the first space station module (FGB, later named Zarya), which provided initial guidance, control, and navigation for ISS.

Russia agreed to build, at its own expense, a number of other ISS modules, including the Service Module (later renamed Zvezda) that provides crew quarters; Soyuz spacecraft to serve as "lifeboats" so the crew can evacuate the station in an emergency; and Progress cargo spacecraft to take cargo and fuel to the space station and to "reboost" the station's altitude periodically so that it does not reenter Earth's atmosphere. All of those capabilities enable the space station to function. The U.S. space shuttle can take crews

and cargo to and from the space station and provide limited reboost, but does not remain attached. Thus it cannot serve as crew quarters or a lifeboat, or be permanently available for reboost. In the current absence of the space shuttle, the Russian Soyuz and Progress spacecraft are the only method the space station partners have to take crews back and forth, deliver cargo (the Progress cannot return cargo to Earth as can the shuttle), and reboost the station.

Throughout the past 10 years, Russia has experienced financial difficulties in meeting its commitments to the space station program. Space station construction was suspended from December 1998 to July 2000 because Russia had difficulty funding construction of the Service Module (although NASA concedes that some of its modules would not have been ready under the original schedule either). Russia's Soyuz spacecraft must be replaced at 6-month intervals, so Russia's commitment is to launch two Soyuz spacecraft per year, as well as three or more Progress cargo spacecraft. The Russian space agency repeatedly has indicated to the other ISS partners that it does not have sufficient funds to meet those commitments over the long term. These statements have intensified since the grounding of the U.S. space shuttle program. The Russian government reportedly has agreed to accelerate payments to the Russian space agency so that it can speed up the production of Progress spacecraft to ensure the current 2-person space station crew can be resupplied at least through the end of this year. Discussions are still underway within the Russian government and among the partners on funding for more Progress spacecraft if the shuttle is grounded beyond that time. However, Europe, Canada, and Japan are facing constraints in their own space budgets, and the Iran Nonproliferation Act (P.L. 106-178) prohibits NASA from making payments to Russia in connection with the space station program unless Russia stops proliferating certain technologies to Iran.

The Iran Nonproliferation Act (INA) was enacted in 2000 after three years of allegations that Russian companies were selling missile technology to Iran, which resulted in U.S. sanctions against 10 Russian companies (none of which were involved in the space station program). The law, *inter alia*, prohibits the U.S. Government from making payments, in cash or in kind, to Russia in connection with the space station program unless the President certifies that neither the Russian space agency nor any entity reporting to it has transferred weapons of mass destruction or missile systems to Iran for at least one year prior to such determination. Exceptions are made for payments needed to prevent imminent loss of life by or grievous injury to individuals aboard ISS (the "crew safety" exception); for payments to construct, test, prepare, deliver, launch, or maintain Zvezda; and \$14 million for hardware needed to dock a U.S. module (ICM) that was being built as a contingency in case Zvezda was never completed. President Clinton provided Congress with the required certification on June 29, 2000 with regard to the \$14 million, but no certification was forthcoming for additional funds NASA planned to

transfer to Russia. Without such a certification, NASA could pay for Progress flights (or other space station-related activities) only by meeting one of the remaining exceptions—maintenance of Zvezda or crew safety—or if the President certifies that Russia is in compliance with the Act. H.R. 1001 (Lampson) would amend the INA to allow payments to Russia any time the space shuttle fleet is grounded.

Private Sector Activities

Private sector cooperation between U.S. and Russian firms is focused primarily on providing commercial space launch services. Lockheed Martin has a joint venture, International Launch Services, with two Russian companies (Energia and Khrunichev) to launch Proton launch vehicles. Boeing has a joint venture, Sea Launch, that launches the Zenit 3SL launch vehicle (the first two stages are Ukrainian, the third stage is Russian) from a mobile ocean drilling rig built by a Norwegian company.

Allowing Russia to compete in the international market to provide commercial launch services was another inducement the United States offered Russia in exchange for its agreement to abide by the MTCR. (The United States has considerable leverage over this activity because most satellites requiring launch are U.S.-built or include U.S. components and therefore need U.S. export licenses.) Coincident with the signing of the space station agreement in 1993, the United States and Russia adopted a bilateral trade agreement which established the "rules of the road" under which Russia could enter the market, including a quota system to limit the number of commercial launches Russia could make and pricing guidelines (to prevent Russia, as a non-market economy, from unfairly competing in the marketplace), as well as technology safeguards to protect U.S. technology while the satellites are in Russia or Kazakhstan (the launch site for the Proton rocket is the Baikonur Cosmodrome in Kazakhstan, which Russia leases). The quota was discontinued in 2000. A similar bilateral agreement was signed with Ukraine in 1996 for launches of Zenit. That quota also was discontinued in 2000. (See CRS Issue Brief 93062 for more detail.)

Another space project involving U.S. and Russian companies is Lockheed Martin's use of rocket engines (RD-180s) for the Atlas 3 and Atlas 5 launch vehicles. RD-180s are built under a joint venture between Russia's NPO Energomash and Pratt & Whitney. A number of other joint projects have been discussed, but their status is unclear. Among them are a Boeing-Khrunichev agreement to build a commercial space station module using a backup for the FGB/Zarya module; a Boeing-Russian Space Agency project to study launching the two-stage version of Zenit from the Baikonur Cosmodrome; and a Spacehab-Energia agreement to build a commercial space station module.

Attachment 4

United States–Russia Space Cooperation Summary

Background

NASA has been engaged in cooperative activities with Russia for nearly 40 years, starting with modest contacts in fields such as space biology and medicine, geodesy and geodynamics. In 1972, the United States and the Soviet Union signed the *Agreement Between the United States of America and the Union of Soviet Socialist Republics Concerning Cooperation in the Exploration and Use of Outer Space for Peaceful Purposes* (Civil Space Agreement), which expanded these contacts into other areas of study including space science, Earth science, satellite-based search and rescue and later, human space flight. Cooperation with the USSR reached a high point with the Apollo-Soyuz Test Project in 1975. The Civil Space Agreement was renewed in 1971, but was allowed to lapse in 1982 as a sign of U.S. dissatisfaction with Soviet behaviors, especially in Afghanistan. In 1987 the Agreement was revived and it was subsequently re-established as an agreement with the Russian Federation in 1992. This Agreement was renewed for additional five-year terms in 1997 and 2002.

In October 1992, the United States and Russia signed an Implementing Agreement for the Shuttle-Mir Program, under which 9 missions were flown to the Mir Space Station by the Space Shuttle, including 7 docking missions and 7 long duration visits on orbit by NASA astronauts. Discussions on broadening NASA's cooperation with Russia took place in 1993 in the context of the Space Station redesign effort. A December 1993 Protocol to the Agreement, laid the foundations for U.S.–Russia cooperation in the development of the ISS. NASA's cooperation with the newly formed Russian Space Agency (now known as the Russian Aviation and Agency or Rosaviakosmos) on the ISS program was formalized in June 1994 with the signing of an "Interim Agreement" for the Station's design, development and assembly. In the following years, the U.S. State Department and NASA worked with the existing ISS partner countries and Russia to negotiate and conclude an overarching set of agreements on the ISS. This effort culminated with the signature of a multilateral Inter-Governmental Agreement (IGA) and bilateral Memoranda of Understanding (MOU) on the ISS program in January 1998.

Current Human Space Flight Cooperation

International Space Station: In the 1990s, Rosaviakosmos struggled to meet Russia's commitments to the ISS due to a shortage of Russian Government funding. These funding deficiencies had a negative impact on the ISS program's assembly schedule. The first element of the ISS, the U.S.-funded, Russian-built and launched FGB (*Zarya*) was successfully completed under a contract with Boeing. However, the launch of the first Russian-funded element, the Service Module (*Zvezda*), was delayed by approximately two years before it was successfully launched in July 2000. Since that time, Russia has been meeting its obligations under the ISS agreements. Permanent human presence on ISS began on November 1, 2000, with the arrival of the Expedition One crew, commanded by U.S. astronaut Bill Shepherd. Russian and U.S. crew members have alternated command of the joint ISS expedition crews for the last two and a half years. Following the loss of Space Shuttle *Columbia* on February 1, 2003, the ISS partnership has relied on Russian logistics and crew transportation capabilities to sustain operation of the ISS in accordance with the partnership-agreed plan for operations. This circumstance has prompted the Russian Government to adjust its funding plans for 2003 and review plans for 2004. On June 1, 2003, at the U.S.–Russia summit in St. Petersburg, Russia, Presidents Bush and Putin released a joint statement that emphasized our mutual commitments to International Space Station and our aspiration to complete this world-class research facility together with our international partners.

Current Earth Science Cooperation

NASA has cooperated with the USSR and Russia for over 30 years in the fields of Earth science, global change research and environmental monitoring. The overall goal of this cooperation is to advance our understanding of the Earth's systems through the use of space-based sensors, which make quantitative measurements of the state and behavior of the Earth's atmosphere, ocean, land surface, biology and interior.

NASA's cooperation with Russia is coordinated through the joint U.S.–Russia Earth Sciences Joint Working Group (ESJWG). NASA and the Russian Academy of Sciences (RAS) are the co-chairs of the ESJWG, and other representatives participate from various U.S. and Russian Government agencies, universities and insti-

tutes, including Rosaviakosmos. In between formal meetings of the ESJWG, scientists continue cooperative activities and initiate ideas for future collaboration to be brought forward to the next ESJWG meeting. The ESJWG has met twelve times since 1998, with the next session scheduled for fall 2003, in Washington, D.C. Examples of the activities coordinated through the ESJWG include:

Stratospheric Aerosol and Gas Experiment (SAGE III)/Meteor 3M mission: The SAGE III/Meteor 3M mission is NASA's major space flight mission and highest priority cooperation with Russia in the area of Earth science. The mission is providing long-term, global measurements of key components of the Earth's atmosphere and conducts important scientific investigations of the state of the ozone layer. The satellite was launched December 2001 on a Zenit-2 rocket from the Baikonur Cosmodrome in Kazakhstan. Several Russian researchers are full members of the SAGE III Science Team.

High Resolution Picture Transmission (HRPT) Stations and Advanced Very High Resolution Radiometer (AVHRR) data: This cooperative research effort is focused on the study of boreal forests and to provide data to international programs, such as the International Geosphere Biosphere Program (IGBP). In this cooperation, three NASA-loaned HRPT stations are installed in Siberia for the collection of 1-km image data from the AVHRR instrument on the National Oceanic and Atmospheric Administration's (NOAA) polar orbiting satellites. The raw, processed and analyzed data is available to the international science community on a full and open basis.

U.S. Sea-viewing Wide Field-of-view Sensor (SeaWiFS) program: Russia is participating in the SeaWiFS program, which observes the world's oceans from space to measure ocean color (phytoplankton) in efforts to understand the role of the oceans in the global carbon cycle. A representative from the RAS Shirshov Institute of Oceanology (SIO) is a principal investigator on NASA's SeaWiFS mission and a member of the science team.

Space Geodesy: NASA is currently cooperating with RAS and the Ukrainian Academy of Sciences in a trilateral cooperative effort in Very Long Baseline Interferometry (VLBI) geodetic experiments. This cooperation encompasses the use of a NASA-loaned data acquisition system installed in St. Petersburg, and of the radiotelescope of the Crimean Astrophysical Observatory in Simeiz, Ukraine. The experiments focus on improved accuracy in VLBI measurements required for studies of Earth orientation, angular momentum and crustal dynamics. In addition, Russia and the U.S. are cooperating on the laser tracking of satellites of mutual interest, including U.S., Russian and Italian geodetic satellites, Russian GLONASS satellites, U.S. Global Positioning Satellites, and the U.S./French TOPEX/Poseidon oceanography satellite.

Aerosol Robotic NETwork (AERONET): NASA has loaned several sun photometers to various Russian institutions in support of the global AERONET program. The sun photometers measure vital aerosol optical properties and water vapor, which contribute to a more detailed understanding of global atmospheric change phenomena with a particular focus on the assessment of air quality.

Current Space Science Cooperation

Mars Exploration: NASA has cooperated with Russian space scientists on Mars exploration since the 1980s. Recent collaboration has centered on the Russian High Energy Neutron Detector (HEND) instrument, launched on the NASA 2001 Mars Odyssey spacecraft. Since Odyssey arrived at Mars, the HEND device has returned significant data regarding possible water on Mars.

Astrophysics: NASA-Russia astrophysics cooperation has centered on two Russian missions: Spectrum-X-Gamma (SXG) and Radioastron. SXG is a Russian high-energy astrophysics observatory under development since the late 1980s and originally conceived with a launch date of 1991. NASA and Rosaviakosmos signed the MOU on SXG cooperation in June 1995. Due to continuing Russian Government funding constraints, Russia has terminated development on the baseline mission and is currently redesigning the project.

In March 2002, Rosaviakosmos announced that SXG was no longer its top priority in astrophysics and that Radioastron (a radioastronomy mission) had assumed this role. Like SXG, this mission was conceived in the 1980s, with a planned launch in the mid-1990s, but continual shortfalls in financial resources have also left Russian obligations on this mission incomplete. NASA and Rosaviakosmos signed the MOU on Radioastron cooperation in February 1997. NASA was originally slated to provide a series of four ground tracking stations to support this mission, but with Radioastron far from completion, the stations have been decommissioned.

Scientific Balloon Flights: NASA-Russia scientific balloon cooperation began in 1992 with the establishment of a Balloon Implementation Team. Two successful flights were held in the mid-1990s before over-flight clearance was denied by Russia. The two sides have negotiated a long-term Scientific Ballooning Implementing Agreement (IA) for future flights over Russia and possible Russian science participation on NASA missions. It is expected that this new agreement will be finalized later this summer.

International Living With A Star: Russia is participating in the ongoing Office of Space Science (OSS) Living With a Star Program, including participation in the International Living With a Star Executive Steering Committee that held its first meeting in January 2003. The goal of this endeavor is to stimulate, strengthen and coordinate space research in order to understand the physical processes that govern variability in the connected Sun-Earth system.

(1) in every appropriate case, to contact in a timely fashion each foreign person identified in each report submitted pursuant to section 2(a), or the government with primary jurisdiction over such person, in order to afford such person, or governments, the opportunity to provide explanatory, exculpatory, or other additional information with respect to the transfer that caused such person to be identified in a report submitted pursuant to section 2(a); and

(2) to exercise the authority in subsection (a) in all cases where information obtained from a foreign person identified in a report submitted pursuant to section 2(a), or from the government with primary jurisdiction over such person, establishes that the exercise of such authority is warranted.

(c) **SUBMISSION IN CLASSIFIED FORM.**—When the President considers it appropriate, the determination and report of the President under subsection (a), or appropriate parts thereof, may be submitted in classified form.

SEC. 6. RESTRICTION ON EXTRAORDINARY PAYMENTS IN CONNECTION WITH THE INTERNATIONAL SPACE STATION.

Russian
Federation.
President.

(a) **RESTRICTION ON EXTRAORDINARY PAYMENTS IN CONNECTION WITH THE INTERNATIONAL SPACE STATION.**—Notwithstanding any other provision of law, no agency of the United States Government may make extraordinary payments in connection with the International Space Station to the Russian Aviation and Space Agency, any organization or entity under the jurisdiction or control of the Russian Aviation and Space Agency, or any other organization, entity, or element of the Government of the Russian Federation, unless, during the fiscal year in which the extraordinary payments in connection with the International Space Station are to be made, the President has made the determination described in subsection (b), and reported such determination to the Committee on International Relations and the Committee on Science of the House of Representatives and the Committee on Foreign Relations and the Committee on Commerce, Science, and Transportation of the Senate.

(b) **DETERMINATION REGARDING RUSSIAN COOPERATION IN PREVENTING PROLIFERATION TO IRAN.**—The determination referred to in subsection (a) is a determination by the President that—

(1) it is the policy of the Government of the Russian Federation to oppose the proliferation to Iran of weapons of mass destruction and missile systems capable of delivering such weapons;

(2) the Government of the Russian Federation (including the law enforcement, export promotion, export control, and intelligence agencies of such government) has demonstrated and continues to demonstrate a sustained commitment to seek out and prevent the transfer to Iran of goods, services, and technology that could make a material contribution to the development of nuclear, biological, or chemical weapons, or of ballistic or cruise missile systems; and

(3) neither the Russian Aviation and Space Agency, nor any organization or entity under the jurisdiction or control of the Russian Aviation and Space Agency, has, during the 1-year period prior to the date of the determination pursuant to this subsection, made transfers to Iran reportable under section 2(a) of this Act (other than transfers with respect to

- which a determination pursuant to section 5 has been or will be made).
- Deadline. (c) **PRIOR NOTIFICATION.**—Not less than 5 days before making a determination under subsection (b), the President shall notify the Committee on International Relations and the Committee on Science of the House of Representatives and the Committee on Foreign Relations and the Committee on Commerce, Science, and Transportation of the Senate of his intention to make such determination.
- (d) **WRITTEN JUSTIFICATION.**—A determination of the President under subsection (b) shall include a written justification describing in detail the facts and circumstances supporting the President's conclusion.
- (e) **SUBMISSION IN CLASSIFIED FORM.**—When the President considers it appropriate, a determination of the President under subsection (b), a prior notification under subsection (c), and a written justification under subsection (d), or appropriate parts thereof, may be submitted in classified form.
- (f) **EXCEPTION FOR CREW SAFETY.**—
- (1) **EXCEPTION.**—The National Aeronautics and Space Administration may make extraordinary payments that would otherwise be prohibited under this section to the Russian Aviation and Space Agency or any organization or entity under the jurisdiction or control of the Russian Aviation and Space Agency if the President has notified the Congress in writing that such payments are necessary to prevent the imminent loss of life by or grievous injury to individuals aboard the International Space Station.
- Deadline. (2) **REPORT.**—Not later than 30 days after notifying Congress that the National Aeronautics and Space Administration will make extraordinary payments under paragraph (1), the President shall submit to Congress a report describing—
- (A) the extent to which the provisions of subsection (b) had been met as of the date of notification; and
- (B) the measures that the National Aeronautics and Space Administration is taking to ensure that—
- (i) the conditions posing a threat of imminent loss of life by or grievous injury to individuals aboard the International Space Station necessitating the extraordinary payments are not repeated; and
- (ii) it is no longer necessary to make extraordinary payments in order to prevent imminent loss of life by or grievous injury to individuals aboard the International Space Station.
- (g) **SERVICE MODULE EXCEPTION.**—(1) The National Aeronautics and Space Administration may make extraordinary payments that would otherwise be prohibited under this section to the Russian Aviation and Space Agency, any organization or entity under the jurisdiction or control of the Russian Aviation and Space Agency, or any subcontractor thereof for the construction, testing, preparation, delivery, launch, or maintenance of the Service Module, and for the purchase (at a total cost not to exceed \$14,000,000) of the pressure dome for the Interim Control Module and the Androgynous Peripheral Docking Adapter and related hardware for the United States propulsion module, if—
- (A) the President has notified Congress at least 5 days before making such payments;

(B) no report has been made under section 2 with respect to an activity of the entity to receive such payment, and the President has no credible information of any activity that would require such a report; and

(C) the United States will receive goods or services of value to the United States commensurate with the value of the extraordinary payments made.

(2) For purposes of this subsection, the term “maintenance” means activities which cannot be performed by the National Aeronautics and Space Administration and which must be performed in order for the Service Module to provide environmental control, life support, and orbital maintenance functions which cannot be performed by an alternative means at the time of payment.

(3) This subsection shall cease to be effective 60 days after a United States propulsion module is in place at the International Space Station. Termination
date.

(h) EXCEPTION.—Notwithstanding subsections (a) and (b), no agency of the United States Government may make extraordinary payments in connection with the International Space Station to any foreign person subject to measures applied pursuant to—

(1) section 3 of this Act; or

(2) section 4 of Executive Order No. 12938 (November 14, 1994), as amended by Executive Order No. 13094 (July 28, 1998).

Such payments shall also not be made to any other entity if the agency of the United States Government anticipates that such payments will be passed on to such a foreign person.

SEC. 7. DEFINITIONS.

For purposes of this Act, the following terms have the following meanings:

(1) EXTRAORDINARY PAYMENTS IN CONNECTION WITH THE INTERNATIONAL SPACE STATION.—The term “extraordinary payments in connection with the International Space Station” means payments in cash or in kind made or to be made by the United States Government—

(A) for work on the International Space Station which the Russian Government pledged at any time to provide at its expense; or

(B) for work on the International Space Station, or for the purchase of goods or services relating to human space flight, that are not required to be made under the terms of a contract or other agreement that was in effect on January 1, 1999, as those terms were in effect on such date.

(2) FOREIGN PERSON; PERSON.—The terms “foreign person” and “person” mean—

(A) a natural person that is an alien;

(B) a corporation, business association, partnership, society, trust, or any other nongovernmental entity, organization, or group, that is organized under the laws of a foreign country or has its principal place of business in a foreign country;

(C) any foreign governmental entity operating as a business enterprise; and

(D) any successor, subunit, or subsidiary of any entity described in subparagraph (B) or (C).

(3) EXECUTIVE ORDER NO. 12938.—The term “Executive Order No. 12938” means Executive Order No. 12938 as in effect on January 1, 1999.

(4) ADHERENT TO RELEVANT NONPROLIFERATION REGIME.—A government is an “adherent” to a “relevant nonproliferation regime” if that government—

(A) is a member of the Nuclear Suppliers Group with respect to a transfer of goods, services, or technology described in section 2(a)(1)(A);

(B) is a member of the Missile Technology Control Regime with respect to a transfer of goods, services, or technology described in section 2(a)(1)(B), or is a party to a binding international agreement with the United States that was in effect on January 1, 1999, to control the transfer of such goods, services, or technology in accordance with the criteria and standards set forth in the Missile Technology Control Regime;

(C) is a member of the Australia Group with respect to a transfer of goods, services, or technology described in section 2(a)(1)(C);

(D) is a party to the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction with respect to a transfer of goods, services, or technology described in section 2(a)(1)(D); or

(E) is a member of the Wassenaar Arrangement with respect to a transfer of goods, services, or technology described in section 2(a)(1)(E).

(5) ORGANIZATION OR ENTITY UNDER THE JURISDICTION OR CONTROL OF THE RUSSIAN AVIATION AND SPACE AGENCY.—(A) The term “organization or entity under the jurisdiction or control of the Russian Aviation and Space Agency” means an organization or entity that—

(i) was made part of the Russian Space Agency upon its establishment on February 25, 1992;

(ii) was transferred to the Russian Space Agency by decree of the Russian Government on July 25, 1994, or May 12, 1998;

(iii) was or is transferred to the Russian Aviation and Space Agency or Russian Space Agency by decree of the Russian Government at any other time before, on, or after the date of the enactment of this Act; or

(iv) is a joint stock company in which the Russian Aviation and Space Agency or Russian Space Agency has at any time held controlling interest.

(B) Any organization or entity described in subparagraph (A) shall be deemed to be under the jurisdiction or control of the Russian Aviation and Space Agency regardless of whether—

(i) such organization or entity, after being part of or transferred to the Russian Aviation and Space Agency or Russian Space Agency, is removed from or transferred out of the Russian Aviation and Space Agency or Russian Space Agency; or

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(ii) the Russian Aviation and Space Agency or Russian Space Agency, after holding a controlling interest in such organization or entity, divests its controlling interest.

Approved March 14, 2000.

LEGISLATIVE HISTORY—H.R. 1883:

HOUSE REPORTS: No. 106-315 Pt. 1 (Comm. on International Relations).

CONGRESSIONAL RECORD:

Vol. 145 (1999): Sept. 14, considered and passed House.

Vol. 146 (2000): Feb. 22, 24, considered and passed Senate, amended.

Mar. 1, House concurred in Senate amendments.

WEEKLY COMPILATION OF PRESIDENTIAL DOCUMENTS, Vol. 36 (2000):

Mar. 14, Presidential statement.



Chairman ROHRABACHER. We have a distinguished panel with us today to provide their unique perspectives on this issue. Unfortunately, we don't have all of the members of the distinguished panel who could provide us a perspective. One was unable to join us, and we will talk about that later, but we have asked our witnesses to, if possible, to summarize their testimony to five minutes. And we will have a robust discussion thereafter.

One of the reasons we have a hearing panel is so that we can have an interchange of ideas that will benefit the Members of Congress as well as add to the national debate. Unfortunately today, the Administration, or at least the State Department, has determined that if it has a witness to present to Congress, or at least to this subcommittee, that it—that that witness must testify independently, not sitting next to or part of a panel of other witnesses. This was a demand made upon this Chairman by the State Department. And let me note, having worked in the Executive Branch, and now having been elected to a position in the Legislative Branch, it is not my reading of the Constitution that the Executive Branch will dictate to the Legislative Branch the format of our hearings.

And I think that this is an issue that concerns all of us on both sides of the aisle. I think that the Administration should think very thoroughly this issue out before they decide to try to force this policy upon the Congress. It does not speak well of any Administration that is committed to openness and transparency and an honest discussion of the issues to try to put restrictions on the type of exchange that witnesses—their witnesses before Congress can participate in.

So I would hope that we can work this little issue out, but it must be worked out with due respect to both the rights of the Executive Branch and the rights of the Legislative Branch. And I find this format to be the most informative. I have never had objection from the other side of the aisle on this. I don't know of any party who has ever objected to this format. I happen to share the same party as the person now who heads the Executive Branch. There—I don't see why this is an issue, but it will be if we continue to have this type of—

Mr. BOEHLERT. Mr. Chairman, if I may.

Chairman ROHRABACHER. Yes. Yes, Mr. Chairman.

Mr. BOEHLERT. Just let me say that I wish to associate myself with your remarks. It is not clear to me. I think it is somewhat hazy whether this is an Administration policy or one department responding in this manner. And I hope we can get some clarification on that.

Chairman ROHRABACHER. I will—it will be up to all of us to work together to get that clarification and to try to work something out where we respect the rights of both parties and both the Executive Branch and the Legislative Branch.

So our first witness was to be Ambassador Steve Pifer, the Deputy Assistant Secretary of State for Europe and Eurasian Affairs. That meant that he oversees our relationship with Russia.

As you see before us today, Ambassador Pifer is not here to answer questions, not here to participate in the discussion and I regret that. And that is unfortunate.

Our second witness is John Schumacher, who is in charge of NASA's external relations and NASA's lead negotiator with the Russian Space Agency. I am glad to welcome him here today, and you may proceed with your testimony.

Mr. BOEHLERT. Mr. Chairman, if I may, I would observe that Mr. Schumacher is a very valuable member of this Administration. So that would indicate that this is not an Administration policy, at least at this juncture, as far as we are aware of, not to let Members testify in the manner in which you have indicated is most helpful to the Congress.

Chairman ROHRABACHER. Yes, sir. And make sure that the record is straight on that. There was a serious negotiation as to whether he would be here and be on the panel. And Administrator O'Keefe wisely decided to send him and to be part of the regular format that we have here in the Subcommittee. And I would applaud Administrator O'Keefe for demonstrating that he wants to take the extra step in order to work in cooperation with this subcommittee.

Mr. Schumacher, you may proceed.

STATEMENT OF MR. JOHN D. SCHUMACHER, NASA ASSISTANT ADMINISTRATOR FOR EXTERNAL RELATIONS

Mr. SCHUMACHER. Thank you very much, Mr. Chairman and Mr. Boehlert. I will make sure that your very clear remarks are conveyed.

Thank you again for having this hearing. I greatly appreciate the opportunity to testify before the Committee on U.S.-Russia cooperation in space. It is an important topic.

Mr. Chairman, with your permission, I will submit a copy of my full testimony for the record and make a brief oral statement to summarize the testimony.

Chairman ROHRABACHER. Without objection.

Mr. SCHUMACHER. First of all, and not exactly a topic of this hearing, it is great to report to you that Mars Exploration Rover named "Spirit" just this Sunday launched successfully yesterday afternoon from Cape Canaveral Air Force Station on its way to a January 4 arrival date at Mars. The second Mars exploration Rover named "Opportunity" is scheduled for launch on the 24th. They join an Express mission and a Japanese mission all on the way to Mars for dates later this year and early next year.

And exactly in line with the subject of this hearing, a Russian Progress successfully docked with the International Space Station this morning. I talked to the program office a little while ago. The hatch is open and they are getting ready to unload cargo, so another good news piece. I will speak to that Progress launch and what it involved in the relationship to the partnership later in my remarks.

I think everyone is pretty much aware that during the last decade, NASA has engaged in cooperative activities with Russia in the fields of aeronautics, Earth science, space science, and human space flight. The accomplishments have included historic steps forward in human space flight by our astronauts and cosmonauts as well as important projects such as our joint work on the study of

the Earth's ozone layer, coordination of research on the Sun-Earth system, and cooperation on the study of Mars.

Building a strong human space flight partnership with our colleagues in Russia has yielded many benefits. This has been particularly evidenced since the loss of *Columbia* on February 1 of this year. The redundancy and unique capabilities provided by Russian spacecraft have made it possible for the International Space Station partnership to maintain a crew aboard the Space Station despite the grounding of the Space Shuttle fleet. This has also allowed the ISS partnership to continue ISS operations and scientific research and to prepare for a resumption of construction of the Space Station once the Space Shuttle fleet returns to flight status.

The concrete results of this unprecedented cooperation with Russia were clearly evident on April 26 when NASA astronaut, Ed Lu, and Russian cosmonaut Yuri Malenchenko launched aboard a Russian Soyuz spacecraft to begin their ongoing six-month mission. This success was followed on May 4 with the landing of the ISS Expedition 6 crew, Ken Bowersox, Don Pettit, and Nikolai Budarin, ending their 5½-month mission.

I am also pleased to be able to report to this committee that the Progress launch was successful and is proceeding. The vehicle was launched on June 8 and carried 5,300 pounds of food, fuel, water, and other supplies to support the Expedition 7 crew and continued ISS ops. This Progress mission is the eleventh Progress flight to the International Space Station.

The challenges of the last four months since the tragic loss of *Columbia* have drawn the ISS partnership, which also includes participation from Japan, 11 European nations, and Canada into an effective and very integrated team. At the start of 2003, the partnership was well on its way to achieving ISS Core Complete on schedule in early 2004. In 2003, we had talked about a lot that it was to be a very demanding year technically and managerially, as the partnership planned to execute five Russian and five U.S. missions to the ISS and closeout multilateral work on selecting an ISS configuration. Within hours of the tragic loss of the Space Shuttle *Columbia*, the ISS partners offered their full support and began work to address our new challenges. By the end of February, the partnership had a new plan for interim operations while the Space Shuttle remain grounded.

The partnership has continued to implement this plan and update it as necessary. In particular, the Russian Aviation and Space Agency, Rosaviakosmos, has demonstrated a steadfast commitment to the ISS program by assuming increased responsibility for operational support of ISS. The Progress that just docked is a great example of that and how fast people move when—with the use—the switch from crew rotation, which was supposed to be on Space Station to two, the Soyuz, that was done in a couple of months. The crews were retrained. The vehicle was made safe, and launched on time, and brought another crew home. At the same time, work was made across the partnership. And Mr. Gordon, in response to your comments, I will get into that in more detail later, if that is acceptable, a lot of work, very hard work and a lot of hours between U.S., Russia, and other partners on these very detailed technical looks at what was needed to sustain human presence on Station, conduct

research, and keep Station safe and operational until a shuttle returns to flight.

On this Progress, the Russians, again, in this short time period, installed an internal water tank, so water could be carried up. This was not the configuration of Progress that was to carry water. They also actually literally strapped in, literally, five gallon cans of water into there. We had a cooling pump fail on one of the U.S. cooling systems. The Russians went in and installed the hard components that allowed that cooling pump to be hard-wired, if you will, you know, locked into the Progress and carried up. The food, they—the Russians—looked and worked a way where they could double the amount of food that was brought up on this Progress. All things at a fast turnaround, we are going to make this work is the type of great cooperative effort between the two of us. So I highlight those types of things, because that is not easy to do. That is a lot of engineering, a lot of work on center of gravity, all types of things that—to get that Progress and get some—as much backup on the Station as we can for our two astronauts that are up there.

In summary, our relationship with the Russian space program is strong and effective. President Bush and President Putin highlighted the importance of this cooperation, the Joint Statement both Chairmen have referred to. And it is really significant that both Presidents—I mean, they picked several key issues they wanted to highlight, and one of them was space cooperation and, in particular, the importance of sustaining and moving ahead with the completion of assembly and the operation and use of the Space Station.

We greatly appreciate the willingness of Russia, as with all of our ISS partners, to act decisively to address the challenges faced in the wake of the *Columbia* tragedy.

Mr. Chairman, this completes my oral statement. Mr. Gordon, I ask for indulgence, and I will get into those in more detail after the other gentlemen get to do their opening comments. I would very much be glad to, and I look forward to any other questions.

[The prepared statement of Mr. Schumacher follows:]

PREPARED STATEMENT OF JOHN D. SCHUMACHER

Mr. Chairman and Members of the Subcommittee:

Thank you for the opportunity to address the Subcommittee today on the subject of NASA's cooperation with the Russian Federation in civil space. As highlighted by President Bush and Russian President Putin during their discussions on the first of this month in Saint Petersburg, "The loss of the Space Shuttle *Columbia* has underscored the historic role of the United States and Russia as partners in space exploration, who have persevered despite tragedy and adversity. During this challenging time, our partnership has deepened and the International Space Station (ISS) Program remains strong."

During the last decade, NASA has engaged in cooperative activities with Russia in the fields of aeronautics, Earth science, space science, and human space flight. The accomplishments have included the historic steps forward in human space flight by our astronauts and cosmonauts, as well as important projects such as our joint work on the study of the Earth's ozone layer, coordination of research on the Sun-Earth system, and cooperation on the study of Mars. For example, the Russian High Energy Neutron Detector (HEND) is an instrument on the NASA 2001 Mars Odyssey spacecraft. Since Odyssey arrived at Mars in October 2001, the HEND device has returned significant data regarding possible water on Mars.

Building a strong human space flight partnership with our colleagues in Russia has yielded many benefits. This has been particularly evident since the loss of *Columbia* on February 1, 2003. The redundancy and unique capabilities provided by

Russian spacecraft have made it possible for the ISS partnership to maintain a crew aboard the Space Station despite the grounding of the Space Shuttle fleet. This has also allowed the ISS partnership to continue ISS operations and scientific research, and to prepare for a resumption of construction of the ISS, once the Space Shuttle fleet returns to flight status.

The challenges of the last four months have drawn the ISS partnership, which also includes participation from Japan, Europe and Canada, into an even more effective integrated team. At the start of 2003, the ISS partnership was well on its way to achieving ISS Core Complete on schedule in early 2004. 2003 promised to be a demanding year technically and managerially, as the partnership planned to execute five Russian and five U.S. missions to the ISS, and close out multilateral work on selecting an ISS configuration. Within hours of the tragic loss of Space Shuttle *Columbia*, the ISS partners offered their full support and began work to address our new challenges. By the end of February, the partnership had a new plan for interim operations while the Space Shuttle remained grounded. The partnership has continued to implement this plan and update it as necessary. In particular, the Russian Aviation and Space Agency (Rosaviakosmos) has demonstrated a steadfast commitment to the ISS program by assuming increased responsibility for operational support of the ISS.

In early May, the partnership executed the first ISS expedition crew exchange using Soyuz vehicles. Despite the necessity to re-train the crew for launch on Soyuz instead of on the Space Shuttle, the launch of Soyuz TMA-2 (ISS Flight 6S) was successfully accomplished on schedule. A week later the Expedition 6 crew executed the first return of U.S. astronauts on a Soyuz vehicle. During reentry the Soyuz TMA-1 executed a back-up reentry profile. Rosaviakosmos appointed a Commission to investigate this anomaly. The Commission reported on May 26, 2003, that the guidance system on the vehicle erroneously detected a malfunction and, in accordance with safety protocols, the system "failed safe" to the back-up re-entry profile. As another indication of our close partnership with Rosaviakosmos, NASA has been regularly briefed on the progress of the Soyuz investigation. Later this summer, a joint Russian-American team, led by Thomas Stafford, Lt. Gen. USAF (Ret.) and his Russian counterpart Nikolai Anfimov, will review the findings of the Russian Commission and report to the NASA Administrator and the General Director of Rosaviakosmos on the implications for ISS operational readiness. We are continuing to work closely with Russia in preparation for the next Soyuz crew exchange planned for October 2003.

The unwavering support of the ISS partners has reaffirmed the strength and depth of our partnership. NASA has conducted frequent consultations with its Partners as the *Columbia* accident investigation proceeds. These consultations are being held at all levels, including at the programmatic and technical level, through the Space Station Control Board; at the program management level, through the Multilateral Coordination Board; and at the Heads of Agency level. The ISS partners have scheduled a Multilateral Coordination Board and Heads of Agency meeting for the end of July.

To date, near-term ISS operational plans and decisions taken by the partnership have not resulted in a need for NASA to seek an exception to, or request an amendment of, the Iran Nonproliferation Act of 2000.

Mr. Chairman, NASA has conducted a broad range of cooperative civil space programs with Russia over the last decade. At present, our relationship with the Russian space program is strong and effective. We greatly appreciate the willingness of Russia, as with all of our ISS partners, to act decisively to address the challenges faced in the wake of the *Columbia* tragedy. Moreover, we look forward to resuming Space Shuttle operations so that we can continue the construction of the ISS and make full use of its remarkable capabilities.

Chairman ROHRBACHER. Well, we appreciate you being here to present that to us. Thank you very much.

Mr. SCHUMACHER. My pleasure, Mr. Chairman.

Chairman ROHRBACHER. Our next witness is Bob Davis, who will represent the United States industry perspective on cooperative ventures with the Russians in space. And while Mr. Davis is the President and CEO of the California Space Authority, his testimony before the Committee today is based on his own experience in working U.S. industry deals with the Russians. And the opinions he expresses are his own today, but he is a man whose opinions have been shaped by his own experience.

So with those caveats, Mr. Davis, you may proceed.

**STATEMENT OF MR. ROBERT M. DAVIS, PRESIDENT AND CEO
OF THE CALIFORNIA SPACE AUTHORITY**

Mr. DAVIS. Thank you, Mr. Chairman. Mr. Chairman, honorable Members of the Subcommittee, thank you for addressing this matter of considerable importance to the future of our U.S. space enterprise community.

As you have heard, my name is Robert M. Davis. I am the President and Chief Executive Officer of the California Space Authority, a member-supported, California-based, non-profit corporation that exists to retain, grow, and create U.S. space enterprise in an intensively competitive global market that is highly coveted by all space-faring nations, current and future. Our constituents have little choice but to compete sometimes on unequal footing in these tough markets.

As you have heard, the comments and viewpoints expressed today are my own. They do reflect extensive experience gained throughout the 1990's for the number of U.S.-Russian company-to-company and company-to-Russian government dealings and ongoing monitoring of these projects, most of which continue today.

With several provisos, I support U.S.-Russian cooperative space enterprise initiatives and strongly encourage U.S. Government support of company-to-company projects, particularly when they contribute to a strong U.S. industrial base. Overall, aerospace projects performed with Russian entities have been a positive experience for U.S. companies.

Many companies view the Russians as good, positive partners. Strong and positive relationships have developed in a number of instances, and a number of these business ventures have become very successful over time. Tangible, specific benefits occur to those companies who enter these arrangements, from which the United States Government also benefits significantly, including ostensibly from reductions of Russian missile technology proliferation elsewhere. Cooperative aerospace projects gainfully employ Russian companies and individuals, thereby creating positive behavioral incentives.

U.S. companies have gained highly productive access to Russian technology and know-how. The opportunity to leverage technology, particularly in propulsion, metallurgy, ceramics, optics, and other select areas has significantly advanced U.S. interests.

Aerospace endeavors have helped bring about Russia's transition toward a true market economy. A number of early U.S.-Russian company-to-company dealings broke new ground in adoption of western business approaches, financial thinking, and judicial practices. Projects with Russian aerospace entities expose and teach market-oriented Western economic philosophy, practices, and operations to Russian entities and citizens. In kind, we have gained far better understanding of Russian interests, viewpoints, and objectives.

On the subject of undesirable technology proliferation, it is difficult to know what else a Russian partner company may be doing. The Russians are very proud, by their nature, can be very suspicious, even of one another, and secretive. Their cultural behaviors

and motives can create uncertainty as to what they are doing, as to whether what they are doing is or not in the interest of the U.S., particularly as interpreted by U.S. citizens doing project work.

That said, Russians can be quite trustworthy. After a failed first deal, my second undertaking built first on gaining each other's trust and thereafter enacting a relatively simple contract that became a true, enduring partnership, even when subjected to extreme Russian Government pressures to abandon it. That partnership endures and every tenet of the agreement has been upheld to date. That said, the Russians are tough, able competitors who have their own needs to satisfy and will invariably do so.

There are significant U.S. industrial base downsides that result from U.S.–Russian space cooperative endeavors. Given the weak, worldwide commercial launch demand, U.S. companies, particularly in propulsion, are working at 50 percent of capacity and far worse. A real tangible downside is the loss of work done in Russia that could be done here. Comparatively meager and unsustainable United States Government space propulsion investment, as one case in point, is what stimulated, originally, strategic alliances with Russian propulsion entities at the probable cost of some U.S. jobs. While not their preference, perhaps, U.S. company employment and investment losses are somewhat offset by access to and selective use of Russian technology, know-how, and U.S. development projects. Projects such as Sea Launch, Orbital Space Plane potentially launched on an EELV, or other known ISS access concepts, do or could make highly productive use of said Russian capabilities, albeit at some U.S. employment cost.

Absent U.S.–Russian cooperative aerospace endeavors, Russia will fill the vacuum. If projects are stopped or slowed, Russia will likely turn to China or increase its dealing with Russian—excuse me, with European interests. The U.S. would also lose access and insight into Russian aerospace plans and technological capabilities, which we may later come to regret. The U.S. Government should clearly articulate and steadfastly support policy that enables U.S. Government—excuse me, U.S.–Russian company to company transactions. I urge the policies, laws, and regulations be implemented in a fashion that minimize business disruption.

Mr. Chairman, honorable Members of the Committee, thank you again for the opportunity to speak with you today.

[The prepared statement of Mr. Davis follows:]

PREPARED STATEMENT OF ROBERT M. DAVIS

Mr. Chairman, and Honorable Members of the Subcommittee, I would like to thank you for taking time from your busy schedules to look into a matter that is of considerable importance to and impact on the future of our U.S. space enterprise community.

My name is Robert M. Davis. I currently serve as the President and Chief Executive Officer of the California Space Authority, a member-supported California-based non-profit corporation, whose purpose is to Retain, Grow and Create California Space Enterprise. Our membership is comprised of individuals and entities from industry, academia, labor and workforce developers, and local government. Our membership includes a number of companies, large and small, from whom you hear frequently in behalf of their and our nations' aerospace interests. The name of my corporation implies that we are interested only in the well being of California Space Enterprise. However, Space Enterprise is an intensely competitive, internationally coveted industry, and many of our constituents compete in tough global markets. The California Space Authority is therefore keenly attentive to policy positions

taken by the U.S. Government that bear on the future competitiveness of our industry and nation and therefore do not limit our interests and voice solely to the confines of the borders of the State of California.

While I appear before you today as an employee of the California Space Authority, *the comments and viewpoints today are my own.* They are drawn from and reflect extensive earlier experience that I gained throughout the 1990s with a number of U.S.–Russian company to company and company to Russian government dealings and to which I continue to pay ongoing attention. I am flattered to have been invited to appear before you today, and thank you for the opportunity to offer and share my views as a U.S. space enterprise industrialist.

With several provisos that I will define in my subsequent remarks, I support U.S.–Russian Space Cooperation and initiatives, and strongly encourage that our policy-makers and policies support company to company cooperative pursuits, in particular where they contribute to a strong U.S. industrial space enterprise base, and compliment our National Security interests.

In support of the aforementioned statement, I offer the following points for the Committee's consideration:

- **Overall, U.S. industry dealings with Russian space entities have been a positive experience for U.S. companies.** Many U.S. entities have found their Russian partners to be good partners. It is fair to say that strong and positive relationships have developed over the years in a variety of areas. A number of these business ventures have grown to be very successful and they have gained use of technologies that are beneficial to U.S. space enterprise companies' interests. Later in my remarks, I will underscore what my own experiences have taught me as to how Russians become good partners, which is quite different than how such relationships occur and grow in a U.S. to U.S. business framework.
- **Those with whom I speak from across industry for the most part endorse company-to-company engagements with Russian aerospace industries.** There are tangible and specific benefits that accrue to the companies who enter into these engagements, from which the USG also benefits significantly. It appears that these dealings have reduced the likelihood of missile technology proliferation. Whether they have wholly stopped proliferation is not known. Company to company aerospace projects do keep Russians (companies and individuals) gainfully employed, thereby creating incentives to behave in ways that comply with U.S. ITAR and export/import requirements, which is beneficial to the interests of the U.S. and USG's objectives.
- **Dealing with Russian entities on development and production of aerospace products achieves other outcomes that are beneficial to the interests of the U.S. Government.** These dealings expose and demonstrate market-oriented/western economic operations and philosophies to Russian entities and citizens. Presuming the USG finds it desirable for the Russian Republic to continue in the direction of becoming a true market versus command economy, these relationships and ongoing business dealings do help in achieving the transition of Russia toward that end.
- **Aerospace endeavors appear to have been helpful in bringing about Russia's transition in the direction of a true market economy.** A number of early U.S.–Russian company to company dealings broke new ground in Russian adoption of western business approaches, financial thinking and juridical practices that did not broadly exist during the Cold War. Last year the USG recognized Russia as a Market Economy, which can only be helpful to U.S. global economic interests in the future.
- **Another real plus is the access U.S. companies have gained to Russian technology and know how through conduct of company to company projects.** The opportunity we thereby have to leverage technology, particularly in propulsion, which is selectively more highly performing and a high quality product, has been of specific benefit to U.S. propulsion interests, and thereby the USG and other U.S. companies that buy products that incorporate these technologies.
- **I do not have a specific answer to the question "How do U.S. companies ensure that Russian partner companies not proliferate?"** In my experience, which admittedly is somewhat dated, I think it very difficult to detect what a Russian partner may or not also be doing that is not in the

interests of the U.S. As professional relationships grow, particularly when U.S. people are operating *in situ*, it is reasonable to expect that if one has his or her eyes open and ears attuned, one might coincidentally witness circumstances that would give rise to suspicions about undesirable dealings the Russian partner may be conducting. In my own case and those of my past and current colleagues who have ongoing dealings with Russians, none with whom I have worked would allow business interests to cloud their view of U.S. interests and let some concern, if it were to arise, go ignored.

- **Cultural behaviors and motives can create an air of uncertainty about whether a Russian entity is conducting ancillary activities that are not in the interests of the U.S. national security and diplomatic interests elsewhere in the world.** The Russians are very proud, by their nature very suspicious even of one another, and secretive. They are deservedly proud of their aerospace accomplishments, highly protective of their technology, and behave diligently to ensure that their intellectual property remains theirs, and is not exploited, at least without specific offsetting gain. These behaviors can create concern over their underlying motives, which may not be warranted.
- **Russians can become very Trustworthy.** My personal experiences speak volumes about dealing with Russians. My and my earlier company's first "deal" with a Russian design bureau came apart in August 1991, after some months of joint activity, probably the result of a collision of expectations, and more importantly due to fundamental failures in communications borne out of vast initially indiscernible cultural differences. My second undertaking, which became a true, enduring partnership, even when the leaders of the Russian partner were subjected to extreme Russian government pressures to abandon it, have stayed the course. The fundamental difference between the two was the presence or absence of one-to-one trust on the part of the two leaders of the two entities. In the first case, we went at it as a standard business to business transaction, wrapped in typical Letters of Agreement, Contracts, payments, etc., which in the outcome didn't endure at the first moment of any pressure. The second was a partnership that was built first on gaining each other's trust, then jointly resolving how to meet our mutual business interests and objectives, and finally entering into a relatively simple "contract". That partnership endures yet today, and in the case of the Russian partner, has upheld *every* tenet of the agreements, even when it has been very financially painful for both partners to do so. I can also report that this has been the experience with many of my industrial colleagues who have entered into and continue to conduct business to business dealings with Russians and Russian entities today. That said, neither I, nor my many colleagues who have worked closely with Russian counterparts hold a Pollyanna view of the Russians—they are tough, able competitors, who have their own national and international needs to satisfy, and they will invariably seek to do so.
- **There are significant U.S. industrial base downsides that result from U.S.–Russian Space Cooperative Endeavors.** U.S.–Russian company to company (and government to government) dealings has and does displace U.S. company workers. Propulsion and other aerospace work that could be done by employees and U.S. companies is being done by Russian companies and workers. Given the recent and dramatic decline in demand worldwide for commercial launches, U.S. propulsion companies, in particular, are suffering, probably all working at something less than 50 percent of capacity, and worse. From first hand experience, our nation has not had an enduring space launch propulsion investment program, which is what compelled me, one of my former employers and other propulsion companies to look toward Russia as a means of expediently gaining a better domestic competitive position. Essentially, our nation's only enduring space propulsion investment has been in the Shuttle's main engine, which generally powers but a fraction of our national launch program needs and capabilities. The expense of large engine development, as a general rule, exceeds the financial capacity of essentially any of the U.S. propulsion companies or corporations. While not necessarily the choice or preference of U.S. propulsion companies, the comparatively meager USG investment in space propulsion is what has helped create the gradient or incentives that stimulated strategic alliances with Russian propulsion developers and producers. In order to achieve the access and workable alliances, a number of those U.S. companies have heavily invested private capital in order to achieve productive agreements; in some cases those agreements have

not been particularly lucrative, especially in light of the downturn in the worldwide commercial launch market. To somewhat offset their losses (and domestic technology investments) in propulsion base, those same alliances have gained access to and use of technology and know how developed by the Russians in the course of their space program. The Russians took different technology and production routes than those of the U.S., and produced, selectively, more highly performing, very durable rocket engines; several of those different approaches are being incorporated into future U.S. engine technology development. In fact, in the era of a future Orbital Space Plane, potentially launched on a US EELV, powered by an engine of Russian technology origin, U.S. ISS access interests are likely to be served. Other such projects such as Sea Launch, arrangements and possibilities exist that could enable routine ISS access in yet different beneficial ways, again selectively using Russian aerospace technologies and capabilities.

- **On the subject of U.S.–Russian cooperative interests, nature abhors a vacuum, which absent U.S.–Russian cooperative aerospace endeavors, Russia will seek to fill.** If the U.S. were to take the route that future dealing with Russian aerospace developers and producers is undesirable, and cause their discontinuation, several things will or could occur. First, a part of our current expendable launch stable will be disrupted for a period of time. That will result in a loss of competition and in the long run, quite possibly a loss of technological innovation and progress. Absent competition, the flow of innovative juices is eventually stunted. Absent government to government, company to company dealings, Russia will be forced to seek new markets for its capabilities and products. China appears headed in a direction that some U.S. aerospace leaders feel could seriously threaten U.S. space enterprise leadership. Russia may well be induced to turn to dealing with China in order to keep its aerospace community productively employed and earning, something that the U.S. may not find in its longer-term best interests. The same outcome may occur between European and Russian interests. The U.S. would also lose access to and insight into the ongoing evolution of Russian aerospace interests and capabilities, which we might later come to regret.

In closing, it is therefore my viewpoint that the U.S. should clearly articulate and steadfastly support policy that enables U.S.–Russian company to company (and government to government) undertakings. I urge that these and our Administration's deliberations produce policies and accompanying laws and regulations that are implemented in a fashion that minimizes the potential for business disruption. Many U.S. companies have invested considerable sums of private capital in joint U.S.–Russian aerospace endeavors. From time to time they find their partnership and financial expectations disrupted, or relations with their investors imperiled because of a temporary diplomatic position taken by the USG in order to produce a behavioral modification on the part of Russia. Most companies enter into these business partnerships with a prudent appreciation of the potential for instability and possibility of disruption. However, whatever actions the USG can take to insulate these U.S. companies, particularly those that are entrepreneurial, and often thinly capitalized, from contemporary diplomatic issues, should be further explored and implemented.

Mr. Chairman, Honorable Members of the Committee, thank you again for the opportunity to appear before you today. I will be delighted to answer any questions that you may in regards to my remarks.

Chairman ROHRBACHER. Thank you, Mr. Davis.

Our final witness is Henry, and it looks like Skoloski.

Mr. SOKOLSKI. Sokolski.

Chairman ROHRBACHER. Okay. Now say that again. Let me hear it.

Mr. SOKOLSKI. Sokolski. Sokolski.

Chairman ROHRBACHER. There it is.

Mr. SOKOLSKI. There it is.

Chairman ROHRBACHER. I mean, with a name like Rohrabacher, I—

Mr. SOKOLSKI. Yeah.

Chairman ROHRBACHER [continuing]. Shouldn't ever complain.

Mr. SOKOLSKI. I know. We are afflicted with this.

Chairman ROHRBACHER. But he is the Director of the Nonproliferation Policy Education Center and has testified before our committee when we were considering the Iran Nonproliferation Act. And just last week, you testified before the International Relations Committee. And I welcome you. I understand that you are a witness who is a little bit more cautious about this, and we are very interested in these relations with the Russians, and we are very interested in your opinion. So you may proceed.

STATEMENT OF MR. HENRY D. SOKOLSKI, EXECUTIVE DIRECTOR, NONPROLIFERATION POLICY EDUCATION CENTER

Mr. SOKOLSKI. Thank you for letting me testify here today, Mr. Chairman.

Conventional wisdom has it that the more we and our allies cooperate with Russia on civil space projects and show them that we can profit from peaceful trade—show them that they could profit from peaceful trade, the less they will be inclined or need to sell this sensitive technology to nations that would use it for military purposes. According to this view, the more U.S.–Russian civil space cooperation and commerce one has, the more the cause of nonproliferation will be served. Unfortunately, I don't think things are quite that simple.

In fact, two of Russia's most important incentives to proliferate have nothing at all to do with profit. The first of these is the foreign political access and influence Russia gains when it sells militarily useful space technology to others. It isn't just the few hundreds of millions of dollars a year in sales in dangerous technologies that keeps Moscow cooperating with Iran and China, to name two, it is also the leverage it affords Russia with these nations on a host of other diplomatic, trade, and security issues. Second, for cultural and political reasons, Russia is still anxious to maintain its outmoded military-related industries, including its oversized space and missile sectors. Because this infrastructure is still—despite downsizing—too large to be either profitable or fully employed supplying legitimate demand, efforts to maintain it continue to drive Russia toward risky exports in the mistaken belief that cornering this illegitimate market might keep it from having to further downsize its space and missile sectors.

These proliferation motivations are really quite important. As long as they are in play, U.S.–Russian space cooperation and even commerce and our efforts to curb dangerous missile proliferation, will be at odds on at least three counts.

First there is an immediate tension, which I am sure this committee is seized with, between the U.S. funding work on the International Space Station and our desire not to have U.S. taxpayers support Russian entities that are proliferating missile technology to Iran and others. The original idea behind the U.S.–Russian cooperation on Space Station, an idea, I might add, that I first remember raising with our delegation in 1992 when we visited Russia, was to get Moscow to fully comply with the Missile Technology Control Regime. This deal was subsequently struck under President Clinton. When it became clear that Russia was not living up to this understanding, the nonproliferation requirements, however, the Iran Nonproliferation Act of 2000 was finally enacted. Its aim

was to assure that, at the very least, U.S. taxpayers would not pay to have Russian entities engage in such proliferation.

Now one of the issues is whether or not President Bush should invoke the Act's safety waiver. Invoking the waiver would require stretching the law quite a bit. The Act reads that one can only invoke the waiver to prevent the imminent loss of life or grievous injury to those aboard the Station. So long as the Station's current crew can be returned to Earth, and it can, this condition is not present. Then, there are the politics of making such a waiver, which again are awkward. Making the waiver certainly would set quite a precedent. What parts of the Space Station aren't important to safety? There aren't many. Yet if you waive for one without meeting the law's clear language, why or where would you ever stop? More important, nobody really thinks our intelligence agencies can give Russia a clean bill of health on Iranian missile proliferation.

This, in turn, raises a host of difficult questions. Is keeping the Space Station's schedule on track, even though we have already let it slip year after year, and on budget, even though we have already paid billions and billions and billions over the project's original cost estimate, a priority that should now trump our security and that of millions of people who will live downrange from Iran's missiles? Is slowing the project down until Moscow can get a clean bill of health from our intelligence agencies, or until we can develop an alternative to the Soyuz, more than we can afford? The President certainly spoke up in support of the Space Station, but he and Putin also warned the world about Tehran's worrisome development of strategic weapons, and it was this announcement, not Bush's statement on the Station, that got the world's attention.

Second, there is a tension between U.S. civilian Russian space commerce and cooperation and peaceful Russian space-related transfers that Moscow knows are being diverted for military purposes in Iran, Pakistan, Libya, India, and China—nations either primed to proliferate or that already have a track record of doing so. President Bush only increased this tension with his announced desire recently to work with friendly states, including Russia, to interdict the export of weapons of mass destruction, including illicit missiles and the means to make them. If Russia fails to cooperate fully in this effort, including Russian space and nuclear help to Iran's suspect nuclear weapons program, this failure will only work to expose U.S.–Russian space cooperation and commerce to increased political scrutiny and skepticism.

Let me conclude, I would ask that the entire statement be placed in the record, by stating that until Russia's space industry is downsized to accord with legitimate private and domestic military demand, continued space cooperation and commerce with Moscow at current or higher levels, I am afraid, is doomed to encourage at least as much Russian missile and space proliferation as it might prevent.

Thank you very much, Mr. Chairman.

[The prepared statement of Mr. Sokolski follows:]

PREPARED STATEMENT OF HENRY D. SOKOLSKI

Conventional wisdom has it that the more we and our allies cooperate with Russia on civilian space projects and show them that they can profit from peaceful trade, the less they will be inclined or need to sell this sensitive technology to nations that would use it for military purposes. According to this view, the more U.S.–Russian civilian space cooperation and commerce one has, the more the cause of non-proliferation will be served. Unfortunately, things are not so simple.

In fact, two of Russia's most important incentives to proliferate have nothing at all to do with earning a profit. The first of these is the foreign political access and influence Russia gains when it sells militarily useful space technology to others. It isn't just the few hundreds of millions of dollars a year in sales in dangerous technologies that keeps Moscow cooperating with Iran and China; it's also the leverage it affords Russia with them on a host of other diplomatic, trade, and security issues. Second, for cultural and political reasons, Russia is anxious to maintain its outmoded military-related industries—including its oversized space and missile sector. Because this infrastructure is still too large ever to be either profitable or fully employed supplying legitimate demand, efforts to maintain it continue to drive Russia toward risky exports in the mistaken belief that cornering this illegitimate market might keep it from having to further downsize its space and missile sector.

These proliferation motivations are important: As long as they are in play, U.S.–Russian space cooperation and our efforts to curb dangerous missile proliferation will be at odds on at least three counts.

First, there is an immediate tension between U.S. funding work on the International Space Station (ISS) and our desire not to have U.S. taxpayers support Russian entities that are proliferating missile technology to Iran and others. The original idea behind U.S.–Russian cooperation on the Space Station—an idea I remember first raising as an option in talks with the Russians in 1992—was to get Moscow fully to comply with the Missile Technology Control Regime (MTCR). This deal was subsequently struck under President Clinton. When it became clear that Russia was not living up to this deal's nonproliferation requirements, the Iran Nonproliferation Act of 2000 was finally enacted. Its aim was assure that, at the very least, U.S. taxpayers would not pay to have Russian entities engage in such proliferation. Now, one of the issues is whether or not President Bush should invoke the act's safety waiver. Invoking the waiver would require stretching the law quite a bit. The act reads that one can only invoke the waiver “to prevent the imminent loss of life or grievous injury” to those aboard the Station. So long as the Station's current crew can be returned to Earth—and it can—this condition is simply not present. Then, there are the politics of making such a waiver, which, at best, are awkward. Making the waiver certainly would set quite a precedent. What parts of the Space Station aren't important to safety? There aren't many. Yet, if you waive for one without meeting the law's clear language, why or where would you ever stop? More important, nobody really thinks our intelligence agencies can give Russia a clean bill of health on Iranian missile proliferation. This, in turn, raises a host of difficult questions. Is keeping the Space Station's schedule on track (even though we've already let it slip year after year) and on budget (even though we've already paid billions and billions over the project's original cost estimate) a priority that should now trump our security and that of millions of people who live down range from Iran's missiles? Is slowing the project down until Moscow can get a clean bill of health from our intelligence agencies or until we can develop an alternative to the Soyuz more than we can afford? The President certainly spoke up in support of the Space Station in Moscow. But he and Putin also warned the world about Tehran's worrisome development of strategic weapons and it was this announcement, not Bush's statement on the station, that got the world's attention.

Second, there is a tension between civilian U.S.–Russian space commerce and cooperation and “peaceful” Russian space-related transfers that Moscow knows are being diverted for military uses in Iran, Pakistan, Libya, India, and China—nations either primed to proliferate or that already have a track record of doing so. President Bush only increased this tension with his announced desire to work with friendly states, including Russia, to interdict the export of weapons of mass destruction including illicit missiles and the means to make them. If Russia fails to cooperate fully in this effort, this failure will only work to expose U.S.–Russian space cooperation and commerce to increased political scrutiny and skepticism. Russia is helping to build missiles for India; India has just signed a military cooperation agreement with Iran and is talking about exporting its own missile technology. Iran, meanwhile, is not just getting covert missile assistance from Moscow. It is also overtly buying Russian satellites and earth tracking stations that could help it and others

target their missiles against our friends and forces abroad. Moscow knows this but continues to claim that all of its space commerce is peaceful.

Finally, there is a tension between the lack of domestic military and civilian call for Russian space related goods and services and U.S.–Russian space transfers, which tend to keep Russia’s space infrastructure larger than legitimate demand can support. U.S. and European cooperative space efforts and commerce with Russia are too modest to keep all of Russia’s oversized space and missile industry fully employed. But they are not small enough to force Russia to make the painful political decisions to further downsize their industry so it will not be so prone to proliferate. In the U.S., whatever surplus of space-related capabilities we have is maintained with the federal funding of space related projects. Russian government funding of its space industry, however, is much smaller. As such, there is constant pressure on many of its space enterprises to sell militarily useful technology to foreign customers who might use or sell this technology to proliferate. Until Russia’s space industry is downsized to accord with legitimate private and domestic military demand, continued U.S. space cooperation and commerce with Moscow at current or higher levels is doomed to encourage at least as much Russian missile and space proliferation as it might prevent.

BIOGRAPHY FOR HENRY D. SOKOLSKI

Henry D. Sokolski is the Executive Director of the Nonproliferation Policy Education Center, a Washington-based nonprofit organization founded in 1994 to promote a better understanding of strategic weapons proliferation issues for academics, policy-makers, and the media.

He served from 1989 to 1993 as Deputy for Nonproliferation Policy in the Office of the Secretary of Defense under Paul Wolfowitz and received the Secretary of Defense’s Medal for Outstanding Public Service. Prior to his appointment to this post, Mr. Sokolski worked in the Secretary’s Office of Net Assessment on proliferation issues.

In addition to his Executive Branch service, Mr. Sokolski served from 1984 through 1988 as Senior Military Legislative Aide to Senator Dan Quayle and as Special Assistant on Nuclear Energy Matters to Senator Gordon Humphrey from 1982 through 1983. Mr. Sokolski also served as a consultant on proliferation issues to the intelligence community’s National Intelligence Council. After his work in the Pentagon, Mr. Sokolski received a Congressional appointment to the Deutch Proliferation Commission, which completed its report in July of 1999. He also served as a member of the Central Intelligence Agency’s Senior Advisory Panel from 1995 to 1996.

Mr. Sokolski has authored and edited a number of works on proliferation related issues including, *Best of Intentions: America’s Campaign Against Strategic Weapons Proliferation* (Westport, CT: Praeger, 2001), *Beyond Nunn-Lugar: Curbing the Next Wave of Weapons Proliferation Threats from Russia* (Carlisle, PA: Strategic Studies Institute, 2002); *21st Century Weapons Proliferation: Are We Ready?* (London: Frank Cass, 2001); *Planning for a Peaceful Korea* (Carlisle, PA: Strategic Studies Institute, 2001); *Prevailing in A Well Armed World* (Carlisle, PA: Strategic Studies Institute, 2000) and *Fighting Proliferation* (Maxwell AFB: Air University Press, 1996).

Mr. Sokolski has been a resident fellow at the National Institute for Public Policy, the Heritage Foundation, and the Hoover Institution. He currently serves as an adjunct professor at the Institute of World Politics in Washington and has taught courses at the University of Chicago, Rosary College, and Loyola University. Mr. Sokolski attended the U. of Southern California and Pomona College and received his graduate education at the University of Chicago.

STATEMENT OF AMBASSADOR STEVEN PIFER, DEPUTY ASSISTANT SECRETARY OF STATE, BUREAU OF EUROPEAN AND EURASIAN AFFAIRS, STATE DEPARTMENT

While not appearing before the Space and Aeronautics Subcommittee, Deputy Assistant Secretary Steven Pifer provided the following written testimony and agreed to answer questions for the record.

[The prepared statement of Mr. Pifer follows:]

PREPARED STATEMENT OF STEVEN PIFER

Introduction

Mr. Chairman and Members of this committee. It is an honor to appear before you with my colleague from NASA. We at the State Department consider it a privilege to work together with John Schumacher and his colleagues at NASA to further one of America's loftiest goals—the mission of human space flight. At State, our contribution to this mission is to facilitate relations with our international partners in space exploration while safeguarding our broader national security interests. Although we cooperate closely with many space agencies around the world, any conversation about the U.S. space program would be incomplete if it did not note the unique and historic partnership we share with Russia in the field of human space flight. Space cooperation between the United States and Russia remains one of the most visibly successful elements of the U.S.–Russian bilateral relationship.

U.S.–Russian Space Cooperation

In recent months, this partnership has had to face tragic and unforeseen challenges. In the wake of the loss of the Shuttle *Columbia*, we have turned to our Russian colleagues for their assistance in sustaining the operations of the International Space Station (ISS). Considering our mutual experience in space exploration, Russia has undertaken important additional efforts to maintain the viability of the ISS. With the Shuttle fleet grounded, the Russian Aviation and Space Agency (Rosaviakosmos) readily accepted its role as provider of the world's only physical link to the Station.

When the International Partners became concerned about the supply of water and other critical provisions to the Station, Russia made every effort to ensure that its Progress resupply vehicle would be available to provide support for the Station. The unmanned Progress vehicles are critical workhorses for delivering supplies to the Station. When the International Partners were faced with the possibility of mothballing the Station, Russia utilized a previously planned Soyuz launch to ferry a fresh crew to the Station, a mission that had been slated to be carried out by the Shuttle. This kind of cooperation, in the aftermath of the loss of the *Columbia*, has strengthened further our space partnership.

Underscoring the depth of this partnership, President Bush and President Putin reaffirmed U.S.–Russian cooperation in space at their June 1 meeting in St. Petersburg. In their joint statement, the Presidents extolled the role our two countries have played in the field of human space flight and confirmed their mutual aspiration to ensure the continued assembly and viability of the International Space Station as a world-class research facility. Looking to the future, the Presidents agreed to explore ways to enhance our cooperation in the field of space technology and techniques.

The Iran Nonproliferation Act of 2000

As our space partnership proceeds and explores new areas of cooperation, both the State Department and NASA have been rigorous in enforcing the legislative requirements of the Iran Nonproliferation Act (INA) of 2000. With the International Partners and separately with Russian officials, the Administration has consistently made clear that all activity with Russia must be conducted within the bounds of U.S. law and our nonproliferation policy.

Bolstering nonproliferation remains a core issue on the U.S.–Russia security agenda. The State Department and other U.S. officials in the Administration have engaged the Russian government at the most senior levels to seek an end to sensitive cooperation between Russian entities and state sponsors of terrorism, such as Iran.

In the context of our diplomatic engagement, Russia has taken steps, though not yet sufficient, to implement stronger export controls and improve oversight at Russian facilities. In the case of Iran, we have made clear our very strong concern that Russian cooperation with Iran not facilitate Iran's acquisition of nuclear weapons or long-range ballistic missiles. While we cannot go into great detail in an unclassified forum, we can affirm that Russia has taken actions in response to specific cases related to the proliferation of sensitive nuclear technology in the course of our dialogue on nonproliferation. We continue to monitor the issue of ballistic missile technology assistance, and continue to be committed to Russia's cessation of any assistance that could help Iran with the delivery of WMD.

Iran's nuclear program was a key issue addressed by Secretary Powell with President Putin in their May meeting in Moscow and by President Bush with President Putin in St. Petersburg on June 1. We have stressed our concerns about the recent revelations of hidden Iranian efforts to develop a nuclear fuel cycle capable of supporting a nuclear weapons program, such as the centrifuge facility at Natanz. Given

what this new information says about Iran's nuclear ambitions, we have again urged the Russians to reconsider their nuclear cooperation with Iran and believe they are actively doing so.

President Putin made clear at the G-8 Summit in Evian that all Iranian nuclear programs must be under IAEA safeguards. The IAEA Director General is conducting an investigation of the Iranian nuclear program, and his report will soon be taken up by the IAEA Board of Governors. Until Iran has fully satisfied the IAEA's examination and fully addressed the international community's concerns and questions, including full implementation of the Additional Protocol, no country should be engaging in nuclear cooperation with Iran. The Administration will continue to press the Russian government not to engage in nuclear cooperation with Iran until Iran signs an Additional Protocol and verifiably abandons its pursuit of nuclear weapons.

Although it would be difficult to quantify the INA's impact on the Russian government's export control policy, I assure you that the pressure applied by the INA is palpable in any dialogue with Russia on space. Mr. Yuriy Koptev, General Director of Rosaviakosmos, has been particularly active in promoting reform throughout the Russian government, and frequently notes the constraints imposed by the INA on U.S.-Russian space cooperation. Other Russian officials also regularly express their concern about the INA constraints. While the Administration acknowledges Rosaviakosmos' sincere efforts to reform and to maintain a good record on nonproliferation, we remain concerned about Russia's broader nonproliferation record. We will continue our high-level diplomatic dialogue with Rosaviakosmos and other relevant Russian agencies to address this issue.

The U.S. Export Control Process

Domestically, State's Directorate of Defense Trade Controls in the Bureau of Political-Military Affairs ensures that our own export control policy is sound and is implemented effectively, including in our space cooperation with Russia. The Directorate is charged with controlling the export and temporary import of defense articles and defense services covered by the United States Munitions List (USML). The Directorate's mission is to advance national strategic objectives and U.S. foreign policy goals through timely enforcement of defense trade controls and the formulation of defense trade policy. It carries out its mission by enforcing the law and reviewing export license applications for defense articles and services, ensuring that exports approved are consistent with this mission and that companies comply with defense trade laws and regulations. Through the licensing process, relevant U.S. Government agencies have the opportunity to review individual export license applications and advise whether proposed exports would be consistent with our national security and foreign policy. The State Department makes licensing decisions accordingly. This extensive procedure applies not only to exports to Russia, but to all U.S. exports, and helps ensure that federal agencies such as NASA and U.S. aerospace firms do not, even inadvertently, contribute to the proliferation of sensitive technology around the globe.

U.S.-Russia Relations

A word about our overall bilateral relationship with Russia. Our two countries are working hard to move past our recent disagreement over Iraq. In St. Petersburg, Presidents Bush and Putin made clear their determination to reinvigorate the partnership. Expanding cooperation in the security dimension remains at the top of the agenda, and this includes pressing the Russians to improve their performance on key nonproliferation issues. Likewise, the Administration will persist in its efforts to enhance U.S.-Russian cooperation in counterterrorism, strategic stability, and missile defense. We also hope to broaden our cooperation in space and expand the economic component of our relations, particularly in the energy field. We intend to continue working closely with our colleagues at NASA to implement the Presidents' commitment to enhance our cooperation in space, while remaining fully consistent with our security and nonproliferation goals for the bilateral relationship.

DISCUSSION

Chairman ROHRBACHER. Thank you for your words of caution. And before we get into the question and answers, I would ask a Member of my Staff, we happened to find a little matryoshka doll here. We were talking about not knowing what is inside and not being able to ask any questions, so we just have this little matryoshka doll to remind us that Ambassador Pifer is not here to

answer any questions and to let us get any deeper insight into this issue. So he will just sit there like a little wooden dummy instead of being here to answer questions and to express—explain to us the policies of the Administration.

Thank you.

Mr. BOEHLERT. Mr. Chairman, apparently the State Department—the Administration is represented by Mr. Schumacher.

Chairman ROHRABACHER. Well said, Mr. Chairman. Thank you. With that said, I would like to start the questions and answers off with just—I think we need to go to Mr. Schumacher first. Right.

IRAN NONPROLIFERATION ACT

To what degree does NASA believe that the—and of course, this is the crux—one of the major issues here today is whether the Iran Nonproliferation Act restricts U.S. contractor to Russian contractor relationship. And is a congressional clarification needed on that account?

Mr. SCHUMACHER. Yes, sir. I can tell you for the Iran Nonproliferation Act, and specifically Section 6 with—which is titled International Space Station, but in the definitions talks about all human space flight-related goods or purchases in kind transfers. We have worked closely with State on that. I can tell you the view from State to us is that they express serious concern about any contemplation of a contract—what—in short version, contractor to contractor meaning U.S. funds to a U.S. contractor. U.S. contractor goes out and buys from a Russian contractor.

Chairman ROHRABACHER. Um-hum.

Mr. SCHUMACHER. Any entity under the Russian Aviation and Space Agency that that might well be violative of the Act, and if it is not violative of the black letter law of the Act, it is, at a minimum frustrates and deemed violative of the intent and the spirit of the Act. So the short version would be—

Chairman ROHRABACHER. Okay. I have the law in front of me here, and it doesn't seem to mention private companies. It talks about the Russian Government.

Mr. SCHUMACHER. Well, in the definition, it defines any entity under the jurisdiction or control of Rosaviakosmos. And then it even says even an entity where the Russian Rosaviakosmos had a joint stock ownership and then got rid of that.

Chairman ROHRABACHER. Well, it says here neither the Russian Aviation and Space Industry nor any other organization or entity under the jurisdiction or control of the Russian Aviation Space Agency. Now that seems to be pretty definitive in terms of if you have an American company, would you say that—and that same restriction was placed on NASA, would you say that that applied and that that then related to all American companies?

Mr. SCHUMACHER. No, sir; I sure wouldn't.

Chairman ROHRABACHER. All right. I am sorry that the—as you are relaying the position of the State Department, I am just sorry the State Department couldn't come here and express that to us themselves. And Mr. Woodenhead here isn't going to tell us, so we will just have to have this discussion based on what we have here today. So but you believe that then if we are going to be in compliance with nonproliferation, you—it is your reading, and for what

you know, the Administration's position that that also relates to private companies?

Mr. SCHUMACHER. Yes, sir. And if I could take you in the—in Section 7 of the definitions of the Act, it is a sub—let me see. It is number 5, organization *or entities* under the jurisdiction or control of the Russian Aviation Space Agency. And then in there, it goes through a whole bunch of subsets, but it—any entity—basically, it is any entity that was under the jurisdiction or control of Rosaviakosmos, which covers, the way the Russians are structured, some 450 aerospace enterprises. And then a little later on, it even says that—let us see, any entity that the Russian Aviation and Space Agency or Russian Space Agency had a holding or controlling interest and then divested it, it would still be subject to the Act.

Chairman ROHRABACHER. Now I—it seems to me, now I was around when this happened, in fact, I was one of the supporters. And I still support the concept of this. We should make sure that we keep the pressure on. And I know that Mr. Sokolski, no, whatever it is, anyway, sorry about that, what—I understand the concerns that you have, and we cannot just ignore the fact that the Russians are building a nuclear power plant for the Iranians and Iran happens to be a—you know, an oil and gas rich country. So, is this a threat to our national security along with missile development? The answer is yes, it is. How we can, perhaps, instead of using a punitive attempt, and maybe I should open this up to the panel, would not a more carrot rather than a stick be more appropriate in getting the Russians to have their—to judge their decisions in something—in a more positive way?

Mr. SCHUMACHER. Mr. Rohrabacher, I can tell you we, as we have talked with you and with the Committee over these years about this, certainly nonproliferation issues are the threshold. That is where we start. And the people we work with, and we look to State in their interaction in the other parts of the government, to certify that people do meet those nonproliferation orders before we can work with them. We think that is a very positive and high standard to set, and then we get into a cooperative relationship with them. So, in particular, if you are trying to work with a nation or work with companies, it is an encouragement for them to have to adhere to these laws.

PARTNERSHIPS BETWEEN U.S. AND RUSSIAN COMPANIES

Chairman ROHRABACHER. Well, if we show—Mr. Davis, if we could show them that they are going to make hundreds of millions if not billions of dollars in doing partnerships with American companies doing something positive, isn't this something that you think that would lead them to use their resources in the right direction rather than building missiles and nuclear weapons?

Mr. DAVIS. It has been my experience that—that the possibility and the prospects for them, indeed, being engaged by former companies prevent—potentially resulting in millions of dollars of work certainly moderated or modified their behavior. Yes.

Chairman ROHRABACHER. Here you go, Mr. Sokolski.

Mr. SOKOLSKI. Sokolski.

Chairman ROHRABACHER. Okay. Got it. And you have to speak a little into the mike.

Mr. SOKOLSKI. I forgot to turn it on.

Chairman ROHRABACHER. Okay. There you go.

Mr. SOKOLSKI. I hope my job isn't to be ogre, but let me suggest something. I can remember quite well why the Iran Nonproliferation Act laid off the U.S. vendors that were doing space launches, because if you remember correctly, the first charge up to the Hill was, "Let us go after the space quota." Remember that? Boy, did I get called in by an awful lot of people in that business asking for advice. I suggested, "Well, maybe we should just all agree that the U.S. Government should not use taxpayer money to make progress payments to entities that are in the Russian press being identified as proliferators." And everyone said, "Oh, what a relief. Let us do that."

Now if what you do is say, "Well, but we have got a problem. They are still proliferating, and we want to do business with Russian companies that we think are cleaner, or perhaps totally clean." If you shift all of the contracting from the dirty entities to the clean ones, you do two things. You get around the law, in a sense, without breaking it, because you can interpret this thing differently, quite clearly. You have seen that. But I think you are going to do something else that you may not intend, and that is when Russia's continued cooperation on Iranian rockets and nuclear activities gets to be really bad, and it is going to get bad, and we don't do something much more dramatic with our European allies than we are doing. There is going to be a spotlight turned right on the contractors that you focused on, much like we wanted to avoid when we originally focused on the Space Station. So there is no free lunch here. If there is proliferation, getting around the legal issues won't get you around the political ones is my hunch.

Chairman ROHRABACHER. And so you are suggesting that if we are going to have a more expanded cooperative effort with the Russians on—in these space efforts, that we do have to come down and face this hard decision and not try to hedge, just face it head on? Unless there is an agreement made, we just cannot expand our cooperation any further with the Russians in space?

Mr. SOKOLSKI. I guess I am Shrek here. Yes.

Chairman ROHRABACHER. All right. I—let me just note before we go on to Mr. Gordon, we are not talking about a country, when we talk about Russia, as the same being that we are talking about Communist China. In Communist China, there has not been one inch of political reform. They have no opposition parties. It is a totally totalitarian state. I believe that the people who run Communist China still harbor some evil designs on the United States of America and other Western democracies.

However, in Russia, in contrast, over the last 10 years, there has been tremendous reform. And while there are still undercurrents that we are talking about today that are very serious and we—and affect our national security, the Russians have opposition in newspapers. They have got opposition parties. They are well on a way toward an evolution, toward a more democratic and free country. They haven't reached it yet, and we owe it to them, you know, it is a tough-love type of thing, to be very solid and serious about what they must do.

Mr. SOKOLSKI. I think this was the reason why we made a distinction originally when we tried to pass this law between commerce—between companies that aren't government-funded indirectly, which is—you know, you could get a contract from NASA and then give it to an American firm. And then an American firm could then do a bankshot to a Russian firm. That is not really private industry to private industry. That is a Federal Government contract to a private firm to a Russian company.

We made a distinction between what was going on between entities that wanted to try to make a go at making a profit and those that, like those that are underneath the agency of the Government of Russia, that really are still too large in number and not really up to making a profit yet.

Chairman ROHRABACHER. Okay. Mr. Gordon, you may proceed.

Mr. GORDON. Thank you.

First let me concur with Chairman Rohrabacher and Chairman Boehlert in their concerns with State. Assured goodness, this is going to get worked out and we can move forward. We all need to do our job.

Mr. Schumacher, thank you for being here today. As I said earlier, I had submitted some questions to Administrator O'Keefe at our NASA posture hearing in February and haven't heard from them yet. And but I also—my staff put your staff on notice that we would be talking about some of that today, so I would hope that you would be able to get us started.

RUSSIAN SUPPORT FOR THE INTERNATIONAL SPACE STATION

So let me start with you. What specific financial arrangements are in place to ensure that all needed Soyuz and Progress vehicles will be available to support the International Space Station for a period up to 32 months that the Shuttle fleet was grounded after the *Challenger* accident? And specifically, how much will it cost to provide the necessary Soyuz and Progress vehicles and who will be paying that expense?

Mr. SCHUMACHER. Yes, sir. And I did not pass off lightly on your first issue. Part of my first action as Chief of Staff is to make sure your questions get answered and up here very quickly.

So with regard to your questions, a couple things. First, the partnership has really responded to the tragedy of *Columbia* in a way that really emphasized how strong it is. And we went to the partners, and we said this will really be a test of the partnership, no doubt about it. Yes, we have had a tragedy. We need to go and take care of that. And we are going after it, you know, as hard as we can. In the meantime, we hope we can look across partnership solutions to resupply and maintain human presence on the Station, keep the ops and the science going. And as a matter of fact, that was one of the strengths in the partnership we always talked about was the redundancy and that type of thing.

We went into the partnership, and we have, through the partnership, as I talked about, late February, early March, laid out a plan. It is really—and it is approved at the—through the SSCB, which is a technical Space Station Control Board level to multilateral control, which is really the heads of the program. It is endorsed by the heads of agency. So a long winded way of saying the—all of the

space agencies in the partnership have signed up to this. What it is is a plan for Soyuz and Progress coverage, both human and cargo resupply of the Station through 2003 and 2004. That plan is being iterated. You might have seen some comments this morning from Mike Kostelnik, the ISS program head here in Washington, where he said the Progress we were looking to accelerate from the beginning of 2004 into 2003, it looks like we may well be able to back off that, because watching six weeks of consumables with a two partner crew has allowed us to start looking at pushing back. Both teams are working that really hard and keep a very careful watch on that. And that is looking good.

In—so in response to your question about do we have a plan and do we have a schedule, yes, we have a partnership—

Mr. GORDON. Do you have any commitments?

Mr. SCHUMACHER. Yes, sir, I will get to that, if I could. We have a partnership plan for those vehicles in that sequence. And the sense of commitments to the Station, I think first and foremost, you have seen the strong support of both Presidents to make the Station fly, remain crewed, and move forward to assembly and completion. You see the commitment from the Russian President, himself, that Russia will do what it takes to sustain Station until we return to flight.

Mr. GORDON. Excuse me. What it takes or what it can?

Mr. SCHUMACHER. Well—

Mr. GORDON. They are two different matters.

Mr. SCHUMACHER. Yes, sir. And I will be glad to get into that. The Russian Government itself, and I will through each of the parties, but Russia itself, Russia has taken the funding for Rosaviakosmos for the full year—

Mr. GORDON. Yeah, I understand that. I mean—if I could—you have—answer the question that way you don't have to repeat it—

Mr. SCHUMACHER. Yes, sir.

Mr. GORDON [continuing]. I mean, because we have got a short time here. I know it is really that the Russians want to help. I know that they have moved their next year's funding to this year's funding. I also know that our—some of our partners have taken up some of the additional slots, but that was done before the accident. And so where I think we are now is that NASA has finally admitted what we have all known and that is the Shuttle, in all likelihood, is not going to fly this year. And we are pretty much, I think, hopeful covered this year by virtue of the Russians taking next year's funds and moving them here and by commitments that our partners had already made. The question is what—you know, the *Challenger*, we were down for 32 months, so what happens next year?

Now my concern is that it is just—I have to say—I mean, it is inconceivable to think that our partners, who think that they are less wealthy and have tough budget problems like we do, are going to say, "Sure, we are going to pay for NASA's responsibilities next year." Maybe they will, but I think that is going to be a hard sell, and it would be irresponsible for us not to think that they might think that the U.S. has more money than they do and maybe they—you know, and the U.S. should go forward. So I think if really, you know, we—they think about this.

Now obviously one concern is just the mechanical aspect; can the Russians—how long can they do this? Let us assume that they can continue to. I would like to know that question, but I still don't see what the funding is for next year, other than maybe goodwill. Have any of the partners agreed for next year? Who and give me specifically, and for how much?

Mr. SCHUMACHER. Yes, sir. With regard to the Russians, Rosaviakosmos, first, their funding for this year has been phased forward six months.

Mr. GORDON. Yeah. Right.

Mr. SCHUMACHER. They will have a government level meeting again early in the fall to decide on the increased funding for their budget for this year. They will also decide on an augment to next year's budget.

Mr. GORDON. And when will that be?

Mr. SCHUMACHER. In the September timeframe. They are looking at that. They are—again, they are assessing, like we are, over the summer looking at the Progress and all of that type of thing. The Soyuz vehicle flow remains, as before, to a year. This is really about the increase and the acceleration of Progress. Originally, we were operating very conservatively right after the loss of *Columbia* looking at a Progress this year and another next year.

Mr. GORDON. Okay. Let me—because my time is—

Mr. SCHUMACHER. Yes, sir. Yes, sir.

Mr. GORDON. In case the Russians, in September, say, "We can't afford to do this next year," are we going to wait until September to come up with our plan or are we going to come up with an alternative before that?

Mr. SCHUMACHER. No, sir. Well, two parts. First, they have said just the opposite. They have said they will do—they are not—when they say they will do it, it takes—it is not just a wishful—the government level administrative finance, the President said they are looking at what the budget increases are necessary to cover their part.

Mr. GORDON. I don't mean to be—and I have really got a joint statement.

Mr. SCHUMACHER. Yes, sir.

Mr. GORDON. And it is still a little loosey goosey to me and that they want to—they hope to—it is important, but I could read you a number, if you want me to, examples in past years where they said they were going to do things and they didn't do it. So again, I just don't think that it is the responsible thing, looking at their past history and looking at the lack of real definitive statement here, for us not to plan for an alternative.

Mr. SCHUMACHER. Yes, sir.

Mr. GORDON. But don't we—are we planning for an alternative, if they say they can't do it?

Mr. SCHUMACHER. Certainly. First of all, we watched, obviously the statements and the discussions as well as vehicle flowing. I know you are aware, we have people on the ground that—we have people that interact with these folks every day. As you talked about for crew slots, that also plays into next year. Japan has stepped forward. Canada is talking to Russia about a crew opportunity. So there are a number of different activities that are going forward in

the partnership to look at additional support in this area. But I would say, first and foremost, the Russian Government has stepped up to this. And I think you are certainly right, and I just—

Mr. GORDON. Are we not worried about it? So should we just—I mean, you know, the Members of this committee just not worry? You are going to take responsibility to say this is going to be paid for. We don't have it on the dotted line, but it is for us not to worry about it, not to be asking for alternatives and just worry—we should worry about other things?

Mr. SCHUMACHER. We worry about these things everyday, Mr. Gordon. I can assure you. And it is something we have to watch, and we will be the first to—

Mr. GORDON. Are you going to do any planning? Besides watching, are you going to make any plans, alternative plans?

Mr. SCHUMACHER. Well, the alternative plans would be we know the Europeans are going to come on line with ATV in the fall of next year. Other than that, it is Russian vehicles in the near-term and the alternatives would have to be alternative funding mechanisms if we got to that.

Mr. GORDON. Okay. So are you going to present any of those to us?

Mr. SCHUMACHER. No, it is not, because this time we don't think we need to. I mean, we can move forward quickly if we have to.

Mr. GORDON. How quickly can you—how quickly then?

Mr. SCHUMACHER. How quickly?

Mr. GORDON. How quickly will you have a plan after they say they are not going to be able to pay for this?

Mr. SCHUMACHER. I think that would be very fast, because it is a pretty straight forward issue of watching if they—

Mr. GORDON. Okay. So how fast can you be then? Would it be a day? Would it be a week? Would it be a month?

Mr. SCHUMACHER. It would certainly—

Mr. GORDON. Would it be a day?

Mr. SCHUMACHER. I would say within a week of knowing.

Mr. GORDON. Okay. Well, then if that is the case, it must be pretty easy if you can do it that quickly. So you can just go ahead and tell us what it is.

Mr. SCHUMACHER. The alternative?

Mr. GORDON. Yes, sir.

Mr. SCHUMACHER. It would be some form of funding other—with other partner contributions or us. And we would have to come forward to you for relief on the Act, should that ever be the case.

Mr. GORDON. Okay. So the—so you would feel like—would that—I mean, that is a pretty simple, sane suggestion.

Mr. SCHUMACHER. Thank you. Thank you.

Chairman ROHRBACHER. Thank you very much, Mr. Gordon. And with the Chairman's prerogative here, that would be, that type of cooperation and expanded cooperation would be within keeping of the Iran Nonproliferation Act, correct?

Mr. SCHUMACHER. It would have—to start on, it would have to be.

Chairman ROHRBACHER. All right.

Mr. SCHUMACHER. We could do it one or two ways.

Chairman ROHRBACHER. Mr. Sokolski, I am sorry. Mr. Sokolski, there it is. Mr. Sokolski is nodding his head yes, and he is the skeptic here, so I would take it that that means that it probably is well within the definition of the Russian Nonproliferation Act and the Iranian Nonproliferation Act. Let me note that there are many other areas of cooperation that we could do, but that you are suggesting now that would be limited by the Nonproliferation Act. And we will discuss that in the second round of questions.

And then I will turn to distinguished Co-Chairman in the National Security Committee, who is probably one of the greatest—well, not probably, one of the—he is the foremost expert on Russian-American relations in the United States Congress, Curt Weldon.

Mr. WELDON. Well, thank you, Mr. Chairman. Thank you for the compliment. Thank you for the foresight to hold this hearing. Thank you all for coming.

And I want to take a little different tact here, and I would ask my colleagues to listen to this, because it is important as we discuss violations of arms control agreements and proliferation. First of all, we do have some other successful programs with the Russians involving space. There was a brief allusion, I believe by Mr. Davis, to the Lockheed Martin-Khrunichev Initiative. That has been an extremely successful initiative involving billions of dollars that has benefited both the Russians through the Khrunichev organization and Lockheed Martin and—as an example of how the private sector can work together in developing space launch opportunities.

There has also been a very successful effort funded by the Department of Defense on the RAMOS program, which is fostered in—on the U.S. side, the Utah Russian Institute, and on the Russian side where we are building two joint satellites to build some confidence in the area of understanding when launches occur around the country.

We are also, at the—again, at the suggestion of President Bush and President Putin, moving forward on missile defense. And there is currently a study by our Missile Defense Agency looking at the parameters of missile defense cooperation.

PROLIFERATION ISSUES

But I am going to talk for a moment about proliferation. And I want to remind my colleagues of some facts. We talk about the Iran Missile Sanctions Bill. I would remind my colleagues, the first time that bill passed the House and the Senate with veto-proof margins in both bodies, the President vetoed the bill. We had 398 votes in the Senate, 98 votes in the—398 votes in the House, 98 votes in the Senate, and President Clinton vetoed the bill. In fact, I got called down to the White House twice by Vice President Gore, both before the House voted and before the Senate voted. And with Senate and House colleagues from both parties, we were lectured that we shouldn't pass the bill, and we did.

Unfortunately, the blame doesn't all lie with the President, because Newt Gingrich wouldn't let us override the veto. We had the votes. We had the votes in the House and the Senate, and for reasons as yet unknown, in the fall of the year that Newt Gingrich

went down, we could not issue the veto override, and we had the votes to do it. And Henry Sokolski knows that. So the bill was vetoed the first time by the President. And we came back the following year and President Clinton said, "Okay, I will support it." And he came out at the beginning. In fact, the bill passed a second time.

But I want to make the case that some of our own actions have caused the very proliferation that we rail about. In fact, Mr. Chairman, I did a—had a Congressional Research Service do a study in 1998, which I have put in the record probably five times. And I would be glad to put it in the record here. From 1991 to 1998, there were 38 violations of arms control agreements by China and by Russia: 38 times, 20 by Russia and 18 by China. Of the 38 times that we had evidence, according to the Congressional Research Service, of violations of arms control agreements, and our responsibility as a signatory is to let that country know that they are in violation and take action. We imposed the required sanctions less than 10 times. Now Mr. Sokolski knows this, because his group did a study looking at some possible options, less than the full requirements of treaty compliance or treaty requirements that could, in fact, be considered, but the Administration didn't want to hear that.

So by our very inaction of not enforcing arms control agreements, when we knew there were violations, we encourage the problem. In fact, I carry around an accelerometer and gyroscope when I give speeches that we caught being transferred from Russia to Iraq three times. We had the evidence. The Administration knew about it and never imposed the required sanctions under the MTCR. So I would make the case that we, by our own actions, and in my opinion is it because we were trying to reinforce the status of Boris Yeltsin as President. And we didn't want to publicly acknowledge violations of arms control agreements in the '90's, because the Administration's overriding policy was to keep Yeltsin in. Even though we had evidence, time and again, of violations, we pretended that we didn't see it. We pretended we didn't see it with the missile—with the gyroscopes and accelerometers, which I have examples of and which I asked Tom Pickering about when he was the Ambassador of Moscow. And he said, "Congressman, you have got to go ask the President." And I did. And the President wrote me in March of that year, and he said, "We have no evidence." And at the same time he wrote me, one of our intelligence agencies had over 100 sets of accelerometers and gyroscopes that we intercepted three times going from Russia to Iraq.

So before we criticize, I think we have to understand that some of our own actions have, in fact, caused the problem. And the second example, I was on the Cox Committee, and I would ask Mr. Sokolski if he wants to respond to this. What about our own companies? I sat through seven months of closed briefings where I saw our own companies, again because the Administration lowered thresholds, sold technology to China. What kind of technology? Stage separation technology, technology for launching missiles. Now we are quick to blame Russia for all of the problems, and I am, too. I am Russia's toughest critic, but I also think we have to acknowledge that sometimes our own actions have sent very wrong

mixed signals. In the case of China, we had instance after instance where—and Boeing just paid a big fine, where those companies from California were illegally transferring sensitive technology or got special exceptions made by the Administration to lower thresholds that allowed technology to go to China.

So if you are in Russia and you see us not calling into play the violations that they know are taking place, and you see us on the other hand sending technology to China because our companies want to do that, even though that technology was, up until that time, prohibited, then I think we—certainly think you send a mixed signal. And talking about nuclear technology, Mr. Chairman, which you did, you are right. The Russians should not have helped Iran build the Bushehr nuclear power plant, but every time I raise that issue with the Russians, do you know what they say? “Well, wait a minute, aren’t you building one for North Korea?” And what is the answer? The answer is yes.

So the point is, when it comes to proliferation, yes, we ought to be critical of the Russians, and I am and will continue to be. And you are also, Mr. Chairman, but we are—also need to be willing to look at ourselves squarely in the mirror and say, “Maybe the problem is that we have a double standard ourselves.” And then we ought to take that into consideration in all of our dealings with Russia and other agencies involving space.

Thank you.

Chairman ROHRABACHER. You might want to just comment on Mr. Weldon’s eloquent statement, I might add.

Mr. SCHUMACHER. If I could, Mr. Chairman, what I would offer is that whole—about how we push on compliance. You know, we talked a little bit earlier about for space cooperation, the threshold that—it is very important. We have—every time we go into one of these agreements, the Space Station is a great example of it, a very rigorous export control regime put in place. Our partners understand that when you put the lines in place and people understand that, they respond. And you really—you can get into even some very involved and high-tech cooperatives as long as you have clean lines and people are watching what they are doing and you enforce those.

Chairman ROHRABACHER. Mr. Davis, did you—Sokolski—Mr. Sokolski, Mr. Davis.

Mr. DAVIS. The only thing I would comment on but in the early days circa 1990 and through the 1997 time frame, I think both sides of this were learning. I can tell you that it was exceedingly difficult as an industrialist to stay abreast of the law and our approach to interpretation of the law. My company went to extraordinary lengths, as do I know another of other—a number of other companies go to extraordinary lengths to place some technology transfer control regimes for their own companies so as to protect our employees first and our company second from being—becoming violators of all of the export control issues under ITAR and so forth. Sometimes it is a little hard to tell whether or not you are being completely compliant because those regulations are subject to some level of interpretation.

Chairman ROHRABACHER. Mr. Sokolski.

Mr. SOKOLSKI. We work together, though what I am going to say is just going to amplify what was said. First, two wrongs make two wrongs. The only difference now is the price of two wrongs is getting much steeper. I think this country honestly is going to be facing some security problems, the likes of which are actually going to be making me very, very worried. I was a happy camper for a long time, because things were getting better. But they are not getting better. And they are about to get a lot worse. So one thing we could do is listen to Congressman Weldon and stop simply being hypocritical and start taking these things seriously. I, and others, have recommended that Congress follow through on the Markey-Cox bill and unplug those damn reactors and ask the President to do it without legislation. Let us get on with that.

In addition, I think it is very important that we set a good example with sanctions. And I am happy to say that most recently there is a tougher line. I have to speak on behalf of the State Department. They are taking a tougher line. It is very important that they not over-interpret or be malicious in how they interpret the law, but in some cases, they are right on target, and they are sanctioning even China now.

Chairman ROHRABACHER. Well, thank you very much, Mr. Sokolski. I got it right this time. Let me note that Curt Weldon has been just personally involved and so focused on this relationship that he really makes a major contribution. When he talks about sending the wrong signals, we probably did send wrong signals. There is no doubt about that. We now face decisions that—of how to proceed from here. And we have got—there are ways that we can benefit greatly by cooperating with the Russians. And the question is can we do that in space and still remain consistent with our law? And if—and is that law still important for us to enforce? And that—so far, we are not necessarily saying that that law isn't important for us to enforce.

And with that, there is a very active Member of this subcommittee who even has some legislation dealing with the particular issue of the day. And Mr. Lampson, you may proceed.

RELIANCE ON RUSSIA WHILE THE SHUTTLE FLEET IS GROUNDED

Mr. LAMPSON. Thank you, Mr. Chairman.

We know that while the Shuttle fleet is grounded that, obviously, we are dependent—the United States is dependent on the Russian Soyuz and Progress spacecraft operating with a crew on board. And we believe that NASA needs to have as much flexibility as it possibly can have while the Space Shuttle fleet is grounded to ensure astronaut safety, and that is why I introduced H.R. 1001. And my bill amends the Iran Nonproliferation Act of 2000 to allow NASA to purchase additional Soyuz and Progress vehicles if the President notifies Congress that they are needed to ensure the safety of the crew aboard the International Space Station and to maintain its operational viability while the Space Shuttle fleet is grounded.

With that being said, we will very likely talk about that some more. I still don't know what extent there is going to be support elsewhere, particularly among NASA. But let me go back to what Mr. Gordon was asking a few minutes ago and help me with some

of my assumptions right now. Is NASA assuming, what I am getting out of this, that you and the other international partners will subsidize NASA and pay for Soyuz vehicles on their own? They are going to do this and we are not?

Mr. SCHUMACHER. I wouldn't call it subsidizing, Mr. Lampson. It is getting pretty involved, but I will try and make it as simple as I can, because it—we get into all of these agreements and it gets very, you know, bounded. So please—I am in the weeds on this a lot, so pull me back out if you need to.

Basically, if you start with the intergovernmental agreement between the nations and you get all the way down through the space agencies to the implementing agreements, there is an implementing agreement between us and Rosaviakosmos that deal—we call it the balance agreement for shorthand. And what this is that between we and Rosaviakosmos at the end of the day, at the end of the program, what we cross between us in propellant, in power, take your pick, should be equal. And we went forward with some assumptions for the first five years of that program about what that arrangement would be, what—how much we would bring up on Shuttle, what they would bring up on Soyuz, how many Progress, and that type of thing. We work to keep things in balance.

And so right now, we had been bringing up more than the Russians had using Shuttle. While we are on hiatus of Shuttle flights, we are counting on Progress. So the Russian side on that balance will start increasing. So at the end of the day, we are working across the balance over a several year period. They are not subsidizing us. They are meeting their commitment to that balance arrangement, as we will—as we go forward with the program.

Mr. LAMPSON. Well, you are at—hold on a second. That is over time, and paying right now, paying between now and next year or the year after, they are going to carry that cost?

Mr. SCHUMACHER. Yes, sir.

Mr. LAMPSON. And we are not going to be putting anything in it in—between Europe and Russia, the dollars necessary to perform those services will come from them, period?

Mr. SCHUMACHER. Yes, sir. Rosaviakosmos, the Russian Government phase their—we, in December of last year, in Tokyo, the partners met and decided on the plan for Space Station assembly for the coming year. Russia was committed to a certain number of Soyuz and Progress, and they had actually gotten a governmental budget to do that. Their budget for that whole year has now been phased forward to the first six months of the year. The government will meet again in the fall to decide on an increase for that budget in '03, and then they will look at an increase for '04 that is necessary. They are certainly waiting to see what happens with us when the *Columbia* Accident Investigation Board reports out and what it looks like for us to return to flight, as—

EUROPEAN PARTICIPATION AND CONTRIBUTIONS TO THE ISS

Mr. LAMPSON. The agreement—or there is agreement that precludes Europe participating in that is not necessary?

Mr. SCHUMACHER. No, it is not. No. That is—forgive me if I am more opaque than usual. Europe, the way Europe comes in, Europe

is committed to providing a laboratory and a number of other things. What they have done to actually help overall and to get more astronauts, their astronauts flying, they have actually purchased two seats at present, they may purchase more, from the Russians. One of those seats was to fly in this last Soyuz and another in the fall. What the Europeans have committed to, they stepped up and said, "We will keep the money on track as if our astronauts were flying on—right now and in the fall. We will keep the money on track for that, but we will slip them six months." So Pedro Duque will now fly in October, and then a second astronaut will fly next spring. So the Europeans are keeping that money phased.

Likewise, the Canadians are talking about a Soyuz flight opportunity, purchasing one from Russia in '04 or '05.

Mr. LAMPSON. But is there a signed agreement that says how much Europe, Japan, Russia will pay?

Mr. SCHUMACHER. Well, the Europeans have signed agreements with Russia for those flights. The Canadians are in the initial discussion phase on that.

Mr. LAMPSON. Old money or is that a new agreement? Old money? The old—is that something past or is that—

Mr. SCHUMACHER. No, this is—

Mr. LAMPSON. Are those new agreements?

Mr. SCHUMACHER. Well, again, it is a bilateral agreement between the European Space Agency and Rosaviakosmos. These are agreements that are—have been signed this year, though. They are new agreements.

Mr. LAMPSON. Thank you, Mr. Chairman.

Mr. SCHUMACHER. Yes, sir.

Chairman ROHRBACHER. And we have with us Ms. Bernice Johnson, who would like to join us. You may proceed.

Ms. JOHNSON. Thank you very much, Mr. Chairman. I apologize for being late. I was on the Floor with the bill. And I would like to ask unanimous consent to have my opening statement put in the record.

Chairman ROHRBACHER. So ordered.

[The prepared statement of Ms. Johnson follows:]

PREPARED STATEMENT OF REPRESENTATIVE EDDIE BERNICE JOHNSON

Thank you, Mr. Chairman for calling this hearing today. I would also like to thank our other invited guests for agreeing to testify here today on exploring the benefits and risk of U.S.–Russian cooperation on space programs.

In years past, cooperation and competition between the United States and the former Soviet Union attracted much attention. In 1993, President Clinton made an historic decision to merge NASA's Space Station program with the Russian space programs.

This symbolic change in policy had the potential to revolutionize the space program.

The *Columbia* Shuttle disaster has handed Russia a crucial role as the sole nation capable of providing needed supplies to the International Space Station. But cash strapped Russian space officials say additional funding is needed to build new rockets. They also warn astronauts they may have to stay in space longer because of a lack of ships ready to fly.

Because of the *Columbia* tragedy, many are concerned that NASA might choose to leave the Space Station unoccupied once the current crew comes down—a move that could possibly doom the 16-nation project.

With prospects for future shuttle flights unclear pending the outcome of the investigation into the *Columbia* Shuttle disaster, Russia's Soyuz crew capsules and

Progress cargo ships are now the only link to the Space Station and the three-man crew currently in space.

Research and analysis has revealed that at current levels of support, Russia cannot sustain its space program in its present form. Since the dissolution of the Soviet Union in 1991, the Russian space effort has been coasting on strategic reserves, winding down from the higher energy levels of former times and cannibalizing the last pieces of redundant equipment. Yet Russian space officials hope that such measures can bridge the gap until the country's current political, social, and economic crises pass and funding becomes healthier.

Russian officials and cosmonauts say leaving the International Space Station empty could doom the celestial outpost.

With Russia's economic problems and the future of their space program left in doubt, the operation of our multinational program is threatened. The present and long-term stability of the Nation's space program has profound implications for the future health of the American space program.

The space exploration research program has been one of the most successful research programs in the history of this country. Because of what we have learned through this research, many lives have been saved, weather catastrophes have been averted, businesses have flourished and economies have boomed. I am hopeful that we will have the foresight to continue this type of research and continue to support the international space program.

STATUS OF RUSSIAN ECONOMY

Ms. JOHNSON. Many years ago, I traveled to Russia to talk about this very issue with the Russians and members of the Duma with Mr. Sensenbrenner. And at that time, the economy was so bad, as a matter of fact, they were having demonstrations from scientists who had not been paid in this program. The economy was supposed to be so bad until they were asking us to fill in until the economy got better. What is the situation now? Mr. Schumacher.

Mr. SCHUMACHER. Yes, ma'am. I will be glad to answer.

There are two parts. Understanding first on the economy, there are still problems and issues with the economy, but I think it certainly better than when you were there with Chairman Sensenbrenner. With regard to funding for the agency and through the government, they have established a track record of a very lean budget for Rosaviakosmos and other Russian organizations under the government, but they have met those budgets. And so we've seen when they—what President Putin, when they say, "Here is the Russian Space Agency budget for 2003, they get that money. And that is why we have a—obviously, as always, will wait and see that it really occurs, but the money is being phased forward. They are talking about an increased budget for this year, and the President has committed to that. So those are all pretty sound indicators of where they are going.

RUSSIAN POLITICAL CHANGES

Ms. JOHNSON. It was my understanding that one of the reasons why it was important to keep Mr. Yeltsin in office is that he was strongly for democracy, and they were teetering on whether they wanted to go forward or go backward. What is your opinion of that?

Mr. SCHUMACHER. On democracy? I certainly vote democracy. I certainly always defer to State for the official answer. I can tell you, though, as we watch, we can—we watch a continual evolution of people that get more and more vibrant about contracting, about wanting to do contracts with, especially, American companies, with people that want to interact on a scientific level. I mean, the push

just seems to continue, and it is a very gratifying thing to watch. Are there stumbling blocks? Are there problems? Sure, there are. But it is a great thing, and I have been fortunate to watch. It is the first—really, the first cooperative steps in a while in the '91/'92 time frame that we have had. And sure, we have had some tough times in different places, but it is a very gratifying thing to see everything from, you know, demonstrations to different religious groups out there, to people coming and saying, “Why do you do a contract like that? We think this is a better way to do one.” Where before they would just nod because you handed them all of your contract clauses and that type of thing. A long way to go, but it—you know, I think the signs are positive.

Ms. JOHNSON. Do you think—in your opinion, is there a relationship between Saddam Hussein and Russia since his family was supposed to go to Russia just before Baghdad was bombed?

Mr. SCHUMACHER. Well, I have my own opinion on that, but—

Ms. JOHNSON. I have mine, too.

Mr. SCHUMACHER [continuing]. I can certainly provide that to State, though, and get you an answer.

DEPENDENCE ON RUSSIAN SUPPORT TO ISS

Ms. JOHNSON. Um-hum. I do have some security concerns. And I wonder about the opinion of any of you as to whether—not whether it is wise, I think it is wise to continue the program. But how far do we go into our dependence with the Russian Government while we are waiting to get all of the answers over the *Columbia* crash?

Mr. SCHUMACHER. Well, the redundancy we always claim for Space Station was we were there if Russian Soyuz and Progress couldn't go, and likewise, they were there if we couldn't. So right now, we are dependent on the Russian Soyuz and Progress until we return to flight.

Ms. JOHNSON. But we have enough safeguards in place that we are not too worried about any security?

Mr. SCHUMACHER. Yes, ma'am. We—yes, ma'am, I thank you for that question, because there were a lot of concerns expressed early on, and we actually got an interagency group together to say, “Here is an interactive program with 15 and 16 nations building, many more countries are going to do research. We need to put in place a rigorous export control tech transfer regime force for Station on the U.S. side.” And we have done that. And we continually monitor that, and we bring in other folks to look at it. So I think we are good there.

Ms. JOHNSON. Thank you, Mr. Chairman. My time is expired.

Chairman ROHRABACHER. And we are joined by Ms. Sheila Jackson Lee and who is always very articulate and involved, and we would welcome you to proceed with your questions.

Ms. JACKSON LEE. Mr. Chairman, I cannot thank you enough for holding this important hearing and of course to the Ranking Member for collaborating on the important points.

Might I ask the unanimous consent to include my statement, my opening statement, into the record?

Chairman ROHRABACHER. Without objection.

[The prepared statement of Ms. Jackson Lee follows:]

PREPARED STATEMENT OF REPRESENTATIVE SHEILA JACKSON LEE

Mr. Chairman,

Thank you for calling this hearing. Obviously, we all are anxious to hear the Gehman Report on the *Columbia* disaster and what the *Columbia* Accident Investigation Board recommends for the future of the Space Shuttle program. It is tempting to just wait for the report, and maybe start making decisions after we read it. But that could be a grave mistake. I applaud you and Ranking Member Hall for keeping the dialogue active—for seeking alternatives and contingency plans, so that no matter what the Gehman Report reveals—we can ensure that the U.S. vital investment and progress in space exploration can continue.

Since the Apollo and Soyuz spacecraft docked in 1975, the United States and Russia have had a wonderful collaboration in space that has been a great benefit to both nations and to the world. Although that initial collaboration was mostly an act of diplomacy between the U.S. and the former Soviet Union, today's interactions have much broader significance for the advancements of science, our economy, and even our health care. The most obvious symbol of our great collaborative effort is the International Space Station. We have invested decades in planning, and billions of dollars to make this great dream a reality. Now we are poised to start harvesting the great potential of that facility.

But, unfortunately, the Space Shuttle *Columbia* tragedy has put the future of the ISS at risk. The Space Shuttle serves as an agile craft for delivering delicate instruments and crew to the ISS, and also a powerful device for lifting heavy equipment and components into orbit. *I hope that the Gehman Board will give us some definite answers, and quick-fixes for getting the shuttles up and running. However, we cannot bet the future of the International Space Station on that hope.* If the Shuttle fleet is grounded for 32 months, as it was after the *Challenger* accident—or indefinitely—we must be ready to step up with all the creativity and ingenuity that NASA and the world have to offer to keep the mission going.

The Soyuz craft seems to be the most likely choice for filling the potential void in the near future. As I, and many of my colleagues here, have been saying consistently—we need to see a thoughtful vision for the future of the NASA mission, from the NASA Administrator. Once that vision is articulated, I feel that the technology and innovation, projects, and funding will fall into line. But until they develop the big picture for the future, we need to use the tools we have at hand to keep critical programs moving forward. The Soyuz may be one of our most important tools for the next decade.

I look forward to hearing from our distinguished panel today to learn about the U.S.–Russian collaboration in space. Specifically, I hope to hear about how NASA is working with Russia and our other international partners to ensure that if we need a Soyuz craft or its services, that we can get it. Maybe this is not a crisis today, but we should have agreements and understandings in place, so that we can avoid a crisis in the future.

My greatest concern is that if we put off making contingency plans now, that we may be rushed to do so later. *If we are in a rush to get a Soyuz funded and manufactured, after we become faced with the prospect of abandoning the ISS—we may not have enough time to give due attention to safety issues. If there is a chance that we are going to end up counting on the Russians exclusively to provide transportation to and from the Space Station, I believe we should have agreements in place that would allow us to collaborate on monitoring the quality and safety of the product we are purchasing. Our Russian colleagues have done an admirable job in the past, but ultimately it is we that are responsible for American astronauts and their safety.*

That is why I feel we should be laying the groundwork for that collaborative work now. We should be exploring funding mechanisms, purchasing agreements, and the implications for the Iran Nonproliferation Act, now. *We must cover our bases, so that if we do not get the answer we hope for from Admiral Gehman, we can move forward expeditiously to get a safe Soyuz craft ready, if deemed appropriate.*

I hope progress is already being made on this front, since we have been inquiring for months now. I look forward to the testimony. Thank you.

RUSSIAN COMMITMENTS TO SUPPORT THE ISS

Ms. JACKSON LEE. Let me also acknowledge, Mr. Chairman, that I was in some additional meetings in my office and on the Floor, and I accept the fact that I have had the opportunity to review the testimony. I apologize for not hearing the testimony.

I think that we have sort of mountains to climb. And one of them, of course, is that we hope we can impress upon the State Department the importance of their witnesses being present in hearings that have a lot to do with the International Space Station and our relationships with our neighbors and our partners. And so I hope between the Ranking Member and the Chairman that we can impress upon them the importance of that fact.

We are all waiting on the Admiral Gehman's Report on the *Columbia* investigation. And I think, learning through newspaper releases, of course, more than we thought we might learn, but more importantly, we are probably learning a lot on what many Members had suspected, that we have some very serious problems as it relates to safety, serious problems as it relates to funding, serious problems as it relates to analyzing what, in fact, the Shuttle's capacity happens to be and how we can ensure the safety of our astronauts.

But let me focus on the U.S.–Russian cooperation, which I think partly goes to the question of safety, because it certainly has a lot to do with resources and a lot to do with the stability of the space program. Might I acknowledge, of course, the help that Russia has given us in the past? Might I also acknowledge that we realize the economic conditions in Russia and some of the problems that they have had?

But let me bring to your attention, Mr. Schumacher, a quote by the President and President Putin just recently. "The Russian Federation is committed to meeting the U.S. crew transport and logistics resupplying requirements necessary to maintain our joint American and Russian cosmonaut teams on board the ISS until the Space Shuttle returns to flight." My question to you, does that statement mean that Russia has formally agreed to pay for all of the Soyuz and Progress flights needed to support the International Space Station while the Shuttle fleet is grounded? Has Russia agreed that it will not seek compensation from NASA, or any of the other international partners, for those Progress and Soyuz flights? And if not, what, in specific terms, does the release mean?

We have challenges before us, so we certainly—I know you have already offered your appreciation for the last return that was assisted by Russia, but exactly what does that statement mean? And is the Administration prepared to make good on that commitment, meaning are they prepared to press the Russians to make good on that and to remain engaged so that we can have that assistance?

Mr. SCHUMACHER. Yes, ma'am. Thank you very much for that question. If I could start with your last point. Certainly, to us, we, at NASA, were very impressed that both Presidents, when they look at a limited number of issues that they are going to address in joint statements, the civil space and in particular, the commitment to Space Station is something to be highlighted at the summit. So that was impressive to both of us.

I can tell you with regard to Russia's plans, what will Russia do and how does it work out with cost and that type of thing, we have a balance arrangement with Russia as part of the Space Station agreements, all of the implemented agreements. We looked throughout the overall program that we and Russia will balance what we provide in the sense of logistics, electricity on board the

Station, all of the types of things that make the Station operate, up-mass, downmass, all of those types of things. While we are in a hiatus of Shuttle flights, Russia will supply using Soyuz and Progress both crew and robotically, you know, crew and then other supplies.

Ms. JACKSON LEE. So that is a yes that they will provide that in the interim?

Mr. SCHUMACHER. Yes, ma'am. They are planning that, and we have a partnership-approved plan through the rest of '03 and into '04 that lays out Soyuz and Progress. Now they, like we, await the results of the *Columbia* Accident Investigation Board and the planning for return to flight to look at how long we will be in hiatus with Shuttle. Certainly, we could get well to the point where Russia is supplying and supplying so their side of the balance goes beyond what we have provided. But we would look to work that out in the overall context of the whole program, not by near-term funding.

Ms. JACKSON LEE. Well, they have a deficit to us at this point, don't they? I imagine that we could utilize their services for quite a period of time without having to pay them. Is that what you are telling me that you are going to be balancing out?

Mr. SCHUMACHER. Yes, in the sense of logistics and crew, the balance is, if you did a scale, our scale is heavy right now. That is correct.

Ms. JACKSON LEE. And I see my light is on. It says you are going to be working out the specific terms of the agreement, and so I can assume this will go forward?

Mr. SCHUMACHER. We keep on looking at how much we are consuming on Station and what that Progress flow needs to be in the time when the Shuttle is down.

Ms. JACKSON LEE. Mr. Chairman, this is to you and the Ranking Member. I say this at every Space and Aeronautics Subcommittee is safety, safety, safety. And I assume we are trying to follow protocol with respect to the Gehman Report. But I believe that it is long overdue for this committee and the Science Committee to investigate thoroughly what occurred to *Columbia's* seven crew quickly and to not be fearful of citing those and the procedures that may be at fault in that tragedy.

I thank you very much, Mr. Chairman. Hopefully we will have that hearing very soon.

Chairman ROHRBACHER. Thank you very much. I might also add that you not only talk about safety, safety, safety, but inclusion, inclusion, inclusion. So that is another one of your battle cries. So we appreciate that.

Now we have—for a question—or for a period of time, Mr. Burgess, who is a new Member who actually heard the sonic boom of the Shuttle when it was coming down, the Space Shuttle *Columbia*. Also, he was active in trying to work with those people who were putting together the wreckage after this catastrophe. And he now is a Member of our committee. We are very happy to have him with us.

SAFETY OF THE RUSSIAN SOYUZ VEHICLE

Mr. BURGESS. Thank you, Mr. Chairman, and thank you for holding this hearing today.

Mr. Schumacher, if I could go back, perhaps, to Ms. Jackson Lee's concern about safety, and of course, with the loss of the *Columbia*, we have had our astronauts from the Space Station return to Earth via the Soyuz capsule. And it didn't get a lot of press here, but as I understand it, there was a fairly harrowing return to Earth, and they did land somewhat off the mark and it took awhile to locate them. Are we putting any procedures in place for the contingency of that maybe having to happen again and perhaps providing some type of locating beacon, satellite telephone, GPS receiver, any of that technology that may facilitate the location of our astronauts when they land?

Mr. SCHUMACHER. Yes, sir. I can tell you I was over there with the Administrator and other Members of the NASA delegation, and it certainly was a very tense period until we were really clear that the crew was there and safe and they were returned and we met with them. To your point, several things, and I think this speaks to—on the cooperative aspects and how close we have become in the way we operate. The Russians have done an internal review on what anomalies occurred on that Soyuz return. And it—you are exactly right. It did not come in on exactly the path they had. They had three, pick your term, of off-nominal loads, and it came in on one of those. They have identified what they think is the source of that. Now they are going to a review group on that, and then they will share those results with a U.S. task force led by Lieutenant General Tom Stafford. And he works—he has a U.S. task force set up that works closely with it. A task force set up by, on the Russian side, by Anfimov, and they will review those results, both for what went wrong to understand it, corrective action, as well as the very types of things you are talking about. What other things we—should we need giving to the crew so they are easily located, improve safety, that type of thing. And General Stafford will be over there at the end of this month.

TECHNOLOGY TRANSFER

Chairman ROHRBACHER. All right. Well, thank you very much. I am going to have a final round of questions here, because we—several of us have a couple more questions to ask, and then we will bring this to a conclusion.

I would like to just focus a little bit on—we know now that there is a hurdle that we must jump over in order to expand the type of cooperation that we have with Russia. Let me note, especially in regard to some of the comments that Mr. Weldon made, yes, our companies did a great disservice to our country. And I believe that they—some of our major corporate leaders—betrayed our country's national security interests when we transferred rocket technology to the Communist Chinese. That was wrong. But as I mentioned earlier, let us note that the Communist Chinese, there has not been one inch of political reform in China. And the Chinese Government is still controlled by a hard core clique of authoritarians. And in Russia, Russia has been going through a very—a time of

uncertainty. And to the degree—and also let me note, there is very little reason, and you might—and I might throw this to the panel. In terms of the transfer of American technology to the Russians, our cooperation, actually, opens up the door for us to receive more technology from them than they do from us. Is that not the case? Mr. Davis or whoever wants to—

Mr. DAVIS. I would be happy to address that one, and I will speak in the realm of propulsion.

If you go back in '93, we were reluctant after the power plant fire to entertain engine cycles that had anything to do with an oxidizer rich—I don't want to get too technical here.

Chairman ROHRABACHER. That is very technical.

Mr. DAVIS. The consequence of that is, however, that the Russians, who had different experiences, developed engine cycles that selectively provide about 15 percent better performance than what has been enjoyed by the United States. To that extent, it was a scientific, technical, philosophical different of approach—different approaches. And as a result of the work that was undertaken beginning back in 1990 were the United States have technologically benefited by having gained a lot of insight into what the Russians did. Their engines are, in certain cases, more highly performing.

Now the consequence, or the consequential benefit to us today is we, having now gained the insight into some of their approaches, system approaches, and the ways in which they accomplished those outcomes and have then thereby built fairly reliable, meaning quite reliable, safe engines, has been, in fact, a benefit to us. And we see, routinely, the incorporation of some of those viewpoints and technologies being incorporated into our own engine aspirations.

Chairman ROHRABACHER. Well, that is my reading. And Mr. Sokolski, maybe you have a different reading of that.

Mr. SOKOLSKI. No, I think that is true. Unfortunately, there are other things that are true, too. That is the problem. Russia is helping build missiles for India. India just signed a military cooperation agreement with Iran and is talking about exporting its missile technology. Iran, meanwhile, is not just getting covert missile assistance from Moscow, it is also overtly buying Russian satellites and Earth tracking stations that could help it and others target their missiles against our friends and forces abroad. Moscow knows this but continues to claim that all of its space commerce is peaceful. So I mean, the problem is that we don't gain, it is that others gain.

Chairman ROHRABACHER. Okay. Let us note, then, that what we are talking about here is fundamentally different than the tech transfer problem with China. Transferring technology—we—with the China relationship, we are concerned about an American gyroscope, for example, that we spent hundreds of millions of dollars in developing, ending up in the hands of the Communist Chinese for almost nothing. We are worried about, for example, the other stage separation technology and the multiple payload technology that we have now in the possession of the Communist Chinese. They didn't pay a cent to develop it.

U.S.—RUSSIAN ROCKET ENGINE TECHNOLOGY INVESTMENT

However, with the Russians, what we are really talking about is technology that they invested a great deal in back during the Cold War and it is helping us whether or not we are going to be taking advantage of that, considering that they have some policies and some other trade policies that are detrimental to us. So it is a—that is—it is not an exactly juxtaposed national security issue. I would suggest—and let me ask Mr. Schumacher this, NASA is, for example, planning to spend, is it not, up to \$350 million over the next five years in developing a new rocket engine that is arguably less efficient than a rocket engine already available and available to us at a very cheap price from the Russians. And why is it that we should be spending \$350 million of our development money to develop what the Russians already have? Should we be using that money on newer technology?

Mr. SCHUMACHER. Yes, sir. Thanks for that question. If I could clarify. First, if I could just touch real quickly on your other question, because—

Chairman ROHRBACHER. Right.

Mr. SCHUMACHER [continuing]. I think it feeds right into it.

Chairman ROHRBACHER. Go right ahead.

Mr. SCHUMACHER. We have got a tremendous amount of benefit from the cooperation with Russia. One of the key things I would highlight, there are a lot of things like the Universal Docking Adapter that we use on Station now for the different vehicles and the Europeans are using. We got it from the Russians. One of the most important things is the—very much what you talked about. They developed on a whole different path, and they have a lot of dissimilar systems for safety, for propulsion, for ops. They just come at it a different way. And so it provides redundancy, but redundancy for a function in a different manner than we would have. And I can give you a bunch of examples, but I won't eat up the time now. But it is a great add to the program.

Also, a lot of experience in human long duration space flight. And there are other things, like—that we think and we will come forward and work very carefully through. But there are other parts of our program that we don't think are precluded under Section 6, because they are non-human space flight related. For example, in response to an RFP, for Project Prometheus, our nuclear systems initiative, Stanford has come forward with a proposal to buy thrusters from a Russian entity that they think can help in that program. We think we have to vet it through the interagency process. We think that may well be allowable and in accord with the INA, both the letter and the spirit of the law. Again, something Russia has that we think will be of benefit to our program in technology.

With regard to the rocket program, though, it is a great question, because it shows all of this push and tug we are talking about. The Russians have some tremendous capabilities in rocket engine propulsion, and I think Mr. Davis has talked a lot about that.

And certainly, there have been some great marriages of joint venture types of things with American companies to make those work. Rosaviakosmos has really worked with some of the Russian

agent manufacturers, such as those teaming with American companies to try and come forward and successfully compete for contracts, including NASA contracts. The one in particular you are talking about, I believe, and I will double check when I go back, but there are a series of contracts. And a Russian-American joint venture competed in two of those and was unsuccessful. The third phase of this actually comes this fall. When the—these were technology looks and technology developments. The actual development of the engine contract will come later this fall. And they are welcome to bid, as is any other joint venture or American company that meets all of the other criteria for export—

Chairman ROHRABACHER. But would they be precluded because of the nonproliferation legislation?

Mr. SCHUMACHER. Again, sir, we would have to—on the facts of the contract, go forth, but because it doesn't appear to be human space flight related, we would think they could compete and go forth. And it would be—but I am working with—

Chairman ROHRABACHER. That is fascinating. That is interesting. All right. I—let me just note that, again, the Chinese and that whole scenario were the recipients of American technology, and thus, we upgraded their ability to hurt the United States. In this case, we are talking about limiting the United States of our ability to take or partake of Russian technology for our financial benefit and our ability to get the job done.

I would now like to turn to Mr. Gordon and Mr. Lampson, if they have some other things to finish this off with.

Mr. GORDON. Thank you, Mr. Chairman.

RUSSIAN BUDGET COMMITMENTS FOR PROGRESS AND SOYUZ VEHICLES

First, let me say I think that NASA has done a good job of cobbling together a Soyuz/Progress program for the rest of this year. Everything has to go perfectly, but, you know, at least you have got a plan there. And hopefully it will go perfectly. Once again, I am concerned about next year. And I want to try to get some clarification on our earlier conversation.

Now as I understand it, in September, the Russians will make a—their budget decision as to whether or not they are going to allocate funds for this next year. I am just going to go ahead, just for brevity, go through it. And Mr. Schumacher, if you think I am off somewhere, then just let me know, otherwise, I am assuming you are concurring.

Mr. SCHUMACHER. Yes, it is—that is—the objective is for—we understand, is for increased funding for this year and then what increase would be made on top of the budget already planned for 2004.

Mr. GORDON. Okay. Now come September, I think it would be reasonable, or not unreasonable, to look at history and see where the Russians have reneged on past promises. It would not be unreasonable for them to come forward and say, "We want to help. We think it is important to help, but we have a lot of hungry people at home, and I may lose my, you know, constituency here if I don't give them food rather than a spacecraft." So I think that is,

you know—hopefully that won't happen, but that is not an unreasonable thing to consider.

Now as I understand, if that occurred—earlier, you stated that—if that were to happen, you would seek relief.

Mr. SCHUMACHER. What I believe NASA would do is go first and foremost to the partnership, because we have had great success with solving these things within the partnership.

Mr. GORDON. You say great success. All I know is they have bought some additional seats, but they already did that before this accident occurred. So I am not seeing a lot of great success here.

Mr. SCHUMACHER. Well, again, certainly it might be the perspective we have on it, but for the Russian Government to step in and forward fund—increase funding coming next year—

Mr. GORDON. All right. Well, that is being done, but again—

Mr. SCHUMACHER. Yes, sir. For the Canadians to come forward and look to buy a seat that they had not planned or seats, Europe to look at—to sign—

Mr. GORDON. But they would not have done anything.

Mr. SCHUMACHER. Well, they have signed the contracts, and then they are looking at additional seats beyond—

Mr. GORDON. But the ones they have done, though, weren't they before the accident, so this is nothing new?

Mr. SCHUMACHER. The two European seats, it is correct that they were contemplated before the accident. But what they have done is they have signed the contracts and kept the funding on track as if the people were flying in April and in October when they are flying in October and—

Mr. GORDON. Right. Right. But it is no new money. So you know, again, if you don't want to look at this, then just don't. But I mean, we—somewhere, we have got to be responsible here. I mean, it may—sure, the goodness you recognize that there is a—you know, a fairly good chance that this fall the Russians are going to say, "We can't afford to do this." The Europeans are saying—well, could say, "We have stepped up already. We don't feel like that we can subsidize NASA any longer." Now if that occurs, then, as you said, you are going to have to seek some kind of relief. Now again, that relief may be trying to get the partners to do even more, but if they choose not to, then you are stuck with the situation of the Iran Nonproliferation Act in terms of us having to help the Russians pay for this.

Now either the President has to certify that there is no proliferation, which I think could be tough, not necessarily because there would be, but it might be hard to have the intelligence to say that, or you are going to have to come to Congress for, as you said, relief. Now I just want to sort of—you know, hopefully you know these things, but let us get them out on the table. If these decisions are going to be made in September, even in September, they may say they are going to do it, but wind up not having the money next year, then by our calendar, we are supposed to be out of here October the 3rd.

Now we were also supposed to have been out October the 4th last year. Nobody really thinks that we are going to get out on October 3. So I mean, I have about as much confidence of getting out on October 3 as I have confidence that the Russians and the Euro-

peans, you know, are going to pay or underwrite NASA. So I mean, I think that we all need to think of these contingencies. So you know, the deadline really isn't October the 3rd, but hopefully we are going to be out of here, you know, by the end of October. So you really get a pretty narrow window. And somewhere, you have to—you know, and I don't think Congress is going to be too happy with you coming up here and saying that you have got to go through the full legislative process and—in a week or something to give us this waiver. So there really has to be, I think, some type of a contingency plan put in place.

Mr. SCHUMACHER. Yes, sir. First, it is not government meeting in September to watch. I mean, the flow on these vehicles starts 20 to 24 months out. So we can see the Progress is in flow. We can see the Soyuz is in flow. And the Progress and Soyuz, to meet that plan, are in flow. Now if they need—if we need—

Mr. GORDON. For this year?

Mr. SCHUMACHER. Yes, sir. And—

Mr. GORDON. I am talking about next year.

Mr. SCHUMACHER. No. Yes, sir, and '04, too, because their flow is there now. If they need to add those additional Progress in '04 like we are talking about, you are going to have to start to see that flow start, too. And we will watch for that. So if there is a funding—if they don't come through with the funding they are talking about in September, that is the first thing we would watch, and then we would have to go forth with that. But it is—

Mr. GORDON. Yeah. What would you do? Okay. I mean, what is your plan? What would you do?

Mr. SCHUMACHER. What would be the plan? Normally, we would have the time, because we are talking almost—

Mr. GORDON. You plan to do what? I mean, you tell them to do what?

Mr. SCHUMACHER. Again, I would go to the partnership first.

Mr. GORDON. Okay. Then if that—

Mr. SCHUMACHER. Talk to the partnership, and then if—the last resort, and we would look at different operational things, again, when do we return to flight. We would then, the last step or the last thought we would have is come to the Congress and ask for relief on INA. And I think that would be a judgment we would have to really consider before we do.

Mr. GORDON. Yeah. I don't think that is unreasonable. I just want you to think about it. And I will quickly close by this saying that once this crisis is over with, then we get to the fact that in 19—whether—in 2006, we have to do the whole works. And at which time, we, once again, get to the situation of either changing the nonproliferation pact or we are going to have to hope that our partners are going to subsidize NASA, you know, for four or five years. You know, I just don't think that is reasonable to assume. And I just want all of this on the record. I want it all, you know, there so that we don't play in kind of, you know, games. You know, at home—well, I won't get—I guess—

U.S.—RUSSIAN RELATIONS

Chairman ROHRBACHER. Mr. Gordon, I would suggest that there is another alternative. And that is if we send the Russians the

right kind of signals that they will change their behavior. And that—as Mr. Weldon suggested, maybe some of these agreements that they got into could have been either because of economic necessity, they were really starving when they got into some of these agreements with Iran, or it could be mixed signals that we sent them in policies for the last 10 years where our own people were upgrading Chinese missiles, et cetera, et cetera. And the other alternative that would make this happen and would make it work and really launch this—a great relationship that would be beneficial to both, if the Russians could change their basic behavior and not be proliferators and decide that they are going to make more profit from dealing with the United States and our Western allies as partners in a space enterprise rather than trying to build rockets for the Indians or the Iranians.

Mr. GORDON. Okay. But Mr. Chairman, are we going to say, then, that we are prepared to let the Space Station not have any Russian support, which means that the Space Station, then, would be unmanned if they don't act right?

Chairman ROHRBACHER. That is a very tough challenge, isn't it? And you are right. No, no. This is something we have got to pay absolute attention to, and it is not something that we can take for granted. But it is something that we all have to work together on. And I am just sorry that our State Department representative was not here to participate in this discussion.

Mr. Lampson is, again——

Mr. SCHUMACHER. Could I have just a moment just to respond to that——

Chairman ROHRBACHER. Sure, go right ahead.

Mr. SCHUMACHER [continuing]. Just very quickly? And I know we are at a rush for time.

First of all, when we talk about subsidizing the United States program, I can tell you, it is a welcome change from talking about subsidizing the Russian program, but still, it is just as worrisome. Because again, we do this a lot. We get into this whole conversation, and then when we step back, we say, "Look at how much America is putting into this Space Station program." We are a huge player. We are the biggest partner in this program, and we don't trump around and push that around, but the fact of the matter is——

Mr. GORDON. But are we doing more than we said we would?

Mr. SCHUMACHER. Are we doing—in different areas we are, and in different areas——

Mr. GORDON. Right now, are we doing more than we said we would?

Mr. SCHUMACHER. In—overall, in the agreements? You mean the overall——

Mr. GORDON. Yeah. I mean, you say we were doing so much, but are we doing more than we said we would?

Mr. SCHUMACHER. I think we are doing what we contemplated.

Mr. GORDON. Okay. So we are not really doing more than we said we would. You know, if we are doing that much, then I guess that means we have more to lose than anyone if the Space Station is not manned. And so it would seem that our negotiating position, then, is less with everyone else, if we have the most to lose.

Mr. SCHUMACHER. Well, I want to be the—but what I would say, though, on that is, again, I would not underestimate this partnership and—for example, crew—in 2006, crew beyond three. There is no reason that we can not adjust what each partner is bringing. Russian—Russia could step up and provide the second Soyuz, if they wish. We could provide more up-mass or downmass—

Chairman ROHRABACHER. Well, let me know, Mr. Schumacher. You are looking at the number one Cold Warrior that you will ever meet. I mean, I was the speech writer for Ronald Reagan, and I am not going to go into any details about which speeches I wrote, but they were pretty raw meat compared to what most people put out at the time.

The bottom line is, however, times have changed. And we have tremendous opportunity to work with the Russians and—but we have to do it realistically. And we cannot hedge, Mr. Sokolski, I am sorry. I have a, you know, road block right in your name there, a block about your name. But no, you have been very—you have been—what you are saying is very reasonable. We have got to be responsible, and we have got to be realistic, but the potential is tremendous—

Mr. SOKOLSKI. Right.

Chairman ROHRABACHER [continuing]. If we can convince the Russians to live in a responsible way.

I have to go to Mr. Lampson now.

CLARIFICATION ON RUSSIA'S COMMITMENT TO ISS

Mr. LAMPSON. I feel like I am sort of getting the impression that we are not getting everything. And we are having a terrible perception that, in my opinion, is being left through this kind of discussion. Somehow, you all have to find a way to help, at least people like myself, clearly and easily understand where the money is coming from and where it is going. I believe the people of this country want to support programs like this. We—you have heard it a thousand times from the folks that sit on this panel up here how much we want to support NASA, how much we want to do because we believe in what we can learn by being in space. It is almost as if somebody is trying to play a game, use artful words, cheat, lie to us. And that is very angering and frustrating. And there is no need for it. We are on the same team. But let us play. So come to us with simple answers. And tell us that the dollars are coming.

How can you explain this statement that came out in the NASA bimonthly Russian performance report that got here on June the 10th? It says, "Although European, Japanese, and Canadian partners have proposed new limited commercial arrangements," those flights, "Russian Aviation and Space Agency officials have said that the funding is not sufficient to address all of the proposed resupply activities." You didn't answer the question of where those dollars are going to come from for Russia. You didn't answer Ms. Jackson Lee's question: has Russia agreed that it will not seek compensation from NASA or any of the other international partners for those flights while Shuttle is grounded? Give us the simple answers so that we can understand, and we don't have to try to fight or sit here and look stupid or silly.

Mr. SCHUMACHER. I am not communicating well.

Mr. GORDON. You can come out in the audience to do it, too.

Mr. SCHUMACHER. Not a problem. I guess I am trying to think of the way to describe this, because I think I understand it, but I am not saying it very well. Maybe if I start with there is a baseline of the Soyuz and Progress for this year and next. There is an approved plan of what the upper limit might be, of what we might need. When I see a statement—when you see a statement like that, that is a conservative statement that says if we have got to go to an upper end, additional resources may be needed. Now we would look to Russia to provide those, and we would look to the assurances of the Presidents and that type of thing. But there is a baseline program, which we are on path which we think meets the needs to keep the Station manned and operating. That is a partnership-agreed plan—

Mr. LAMPSON. You think that. But if it doesn't happen, you are going to have to come here and take a long period of time for this body to go through a process to get you the permission, the okay, to do it. And that is why we asked for a simple support for our legislation that would give the flexibility for our government to be able to do what was necessary to keep those people safe.

Chairman ROHRABACHER. And it would be on you, that legislation?

Mr. LAMPSON. I just happen to—

Chairman ROHRABACHER. He just happens to—

Mr. LAMPSON. It is not hard to see whose names are on it.

Mr. GORDON. Mr. Schumacher, some of the questions we have asked are in the ones that I have presented to Mr. O'Keefe earlier, and once we get these, maybe we—a lot of this is—it will be less complicated and maybe we can better understand it. And that will be a good way to start this—or continue the dialogue.

Mr. SCHUMACHER. Yes, sir. We would be glad to come up and talk.

Chairman ROHRABACHER. Well, let me congratulate everyone here and thank you, Sokolski—Mr. Sokolski. I have had a block all day about that name. And thank you very much, Mr. Davis. Thank you, Mr. Schumacher. And Ambassador Pifer, there you are. I am sorry you didn't make it, because this was a wonderful discussion.

And let me note, just in final for everyone is that everything isn't—reality isn't cement right now. There are a lot of creative new ideas that could come up, a lot of new alternatives that could come up. And we would be—we just need the flexibility to be able to take advantage of new alternatives and creative approaches. And the Russians, a good relationship with the Russians give us—gives us those things that we can't even perceive right now, but tomorrow we might come up with an idea that will solve some of the financial challenges that we face ahead.

And with that said, I would like to thank the witnesses, yes, and please be advised that Subcommittee Members may request additional information, for the record. And I would ask other Members who are going to submit questions to do so within one week of this date of the hearing.

That concludes this hearing. The hearing is now adjourned.

[Whereupon, at 4:04 p.m., the Subcommittee was adjourned.]

Appendix 1:

ANSWERS TO POST-HEARING QUESTIONS

ANSWERS TO POST-HEARING QUESTIONS

Responses by John D. Schumacher, NASA Assistant Administrator for External Relations

Questions submitted by Chairman Dana Rohrabacher

Q1. Under NASA's interpretation of the Iran Nonproliferation Act, would NASA be allowed to purchase or enter into a contract with a U.S. company for a good or service for the Space Station that the U.S. company had jointly developed with a Russian company?

A1. NASA has not had a baselined ISS requirement that would necessitate procurement of jointly developed ISS goods or services; the agency has not directly addressed this question and is reluctant to do so in a hypothetical context. To some extent, the answer may depend upon the nature of the good or service and the degree of Russian involvement. However, an important policy consideration bearing upon any such determination is the fact that the Iran Nonproliferation Act has been a source of pressure on Russia to improve the proliferation record of companies in the aerospace sector. NASA is concerned that its procurement activities not diminish this pressure. The agency would need to ensure full consistency with the legal and policy objectives of the INA before authorizing any such transaction.

Q2. Would your response to (1) above differ if the good or service would also be marketed for other applications not specific to the Space Station?

A2. Again, while NASA has not addressed this issue directly and is reluctant to do so in a hypothetical context, the policy background noted in the response to Question 1 above must be considered.

Q3. Would your response to (1) or (2) above differ if the good or service was jointly developed with a Russian company not under the jurisdiction or control of the Russian Aviation and Space Agency defined in Section 7 of the Iran Nonproliferation Act and the State Department determined that the company has not been involved in any proliferation activities with Iran?

A3. Please see the response to questions 1 and 2 above.

Q4. During your response to questions during the hearing, you referred to "the black letter of the Act" and "the intent and spirit of the Act." Is each of your responses to the case situations in questions 1-3 above based on "the black letter of the Act" or based on the "intent and spirit of the Act"?

A4. NASA has sought to comply with both the "letter" and "spirit" of the Act in transactions involving Russian entities.

Q5. Is NASA concerned about the long-term viability of the Russian's Soyuz and Progress production capability, given U.S. reliance on Soyuz and Progress vehicles until U.S. Orbital Space Plane and Alternate Access capabilities are developed?

A5. Since the loss of the Space Shuttle *Columbia*, Russia has demonstrated a steadfast commitment to the ISS program by assuming increased responsibility for operational support of the ISS. President Putin reaffirmed this commitment in a joint statement with President Bush on June 1, 2003. At the ISS Heads of Agency meeting held in California on July 29, 2003, the ISS Partnership noted Russia's commitment to continuing critical support for general ISS operations, logistics and crew transportation and rescue capability until the Space Shuttle returns to flight and beyond.

NASA recognizes that Rosaviakosmos' ability to continue to fulfill its ISS obligations are dependent upon sustained adequate funding from the Russian Government, as well as Rosaviakosmos's ability to continue to secure adequate "off-budget" funding, such as the funding it receives from customers who pay for seats on Soyuz flights. NASA will continue to monitor this situation and will continue to work closely with Rosaviakosmos and the other International Partners to address and resolve in advance any issues that arise that could affect ISS operations.

Q6. Are the Russians obligated to provide Soyuz support for American astronauts past 2006?

A6. Under the ISS Agreements, the Rosaviakosmos has committed to provide crew rescue capability for the entire international crew after its initial obligation if the NASA crew rescue capability is available later than planned, for agreed compensa-

tion from NASA. The ISS Partnership is addressing the requirements for accommodation of crew rescue capabilities after 2006 as part of the ISS Program Action Plan, which was established at the Tokyo 2002 Heads of Agency meeting and is currently being updated. All Partners recognize that any solution related to ISS crew rescue must be consistent with U.S. law.

Questions submitted by Representative Bart Gordon

Q1. The June 11, 1996 Space Station Protocol between NASA and the Russian Space Agency states that:

“NASA will provide crew rescue capability following completion of assembly. In the event the NASA crew rescue capability becomes later than is currently planned. . . .RSA [the Russian Space Agency] agrees to provide the capability to rescue the entire international crew using the Soyuz for agreed upon compensation from NASA” [Emphasis Added].

NASA’s responsibility to provide Space Station crew return starts in 2006. Under NASA’s own proposal, the Orbital Space Plane would not be available as a crew return vehicle until about 2010. Since OMB canceled the U.S. crew return vehicle in 2001, the Soyuz is the only crew return vehicle that will be available as of 2006.

Q1a. Given the Iran Nonproliferation Act’s prohibition against NASA purchasing Soyuz vehicles or services, how is NASA planning to meet its crew return commitment in 2006 and beyond?

Q1b. Is NASA assuming that the Europe and the other International Partners will assume NASA’s responsibility and pay for the Soyuz vehicles on their own?

Q1c. If not, who will pay for the Soyuz, and have they agreed to do so?

A1a,b,c. NASA been working closely with its International Partners to fully assess the implications of the loss of *Columbia* on ISS operations and to develop and implement an appropriate near-term plan of action. The ISS Partnership is also addressing the requirements for accommodation of crew rescue capabilities after 2006 as part of the ISS Program Action Plan for Selection of an ISS Configuration. This Program Action Plan was established by the ISS Heads of Agency during their meeting in Tokyo in December 2002. The implementation of the Program Action Plan was delayed by the loss of *Columbia*. A revised implementation schedule is now under development by the ISS Partners. All of the ISS Partners recognize that any solution related to ISS crew rescue must be consistent with U.S. law. Meanwhile, NASA is working with its contractors to create an option to accelerate acquisition of the Orbital Space Plane (OSP) with the goal of initial operational capability of a crew return vehicle as early as 2008.

Q1d. Alternatively, are you planning to seek a change in the Iran Nonproliferation Act to allow such purchases by NASA?

A1d. NASA currently has no plans to request any changes to the Iran Nonproliferation Act in order to meet ISS crew rescue responsibilities. The INA clearly outlines the responsibilities and procedures upon which NASA can act should circumstances change in the future.

Q1e. Does NASA believe that the “in-kind” and “third party” transaction prohibitions in the Iran Nonproliferation Act would prohibit one or more of the other Space Station International Partners from purchasing Soyuz spacecraft or crew return services from Russia in exchange for some compensation from the United States? Why or why not?

A1e. The Iran Nonproliferation Act has been a source of pressure on Russia to improve its proliferation record. If NASA provided compensation to another ISS International Partner “in exchange for” that partner purchasing spacecraft or services that NASA could not purchase directly from Russia due to the restrictions in Section 6 of the INA, this pressure would be diminished or eliminated altogether. Such arrangements would raise legal questions under Section 6 of the INA and would likely be viewed by many as an evasion of the law.

Q2. Even if NASA is allowed to proceed with the Orbital Space Plane project, the only means other than the Shuttle of getting U.S. astronauts into space for the next ten years will be the Russian Soyuz spacecraft.

- Q2a. *In light of the Columbia accident, what specific steps is the Administration taking to ensure that the U.S. will be able to make use of the Soyuz as a backup to the Space Shuttle for the next ten years?*
- Q2b. *Will any modification to the Iran Nonproliferation Act be required to ensure that the U.S. can make use of the Soyuz if needed?*
- Q2c. *If the Administration is not taking any particular steps to ensure that the Soyuz is available as a backup to the Shuttle, why not?*

A2a,b,c. NASA has been working closely with its International Partners to assess fully the implications of the loss of *Columbia* on ISS operations and to develop and implement an appropriate near-term plan of action. The ISS Partnership is addressing the requirements for accommodation of crew rescue capabilities after 2006 as part of the ISS Program Action Plan for Selection of an ISS Configuration. This Program Action Plan was established by the ISS Heads of Agency during their meeting in Tokyo in December 2002. The implementation of the Program Action Plan was delayed by the loss of *Columbia*. A revised implementation schedule is now under development by the ISS Partners. All of the ISS Partners recognize that any solution related to ISS crew rescue must be consistent with U.S. law. The ISS Program Action Plan for Selection of an ISS Configuration does not depend on the modification of the INA, use of an exemption, or its repeal. NASA currently has no plans to seek an exception to, or request an amendment of, the INA. Meanwhile, NASA is working with its contractors to create an option to accelerate acquisition of the Orbital Space Plane (OSP) with the goal of initial operational capability of a crew return vehicle as early as 2008 and a system for crew transfer approximately two years later.

- Q3. *In NASA's April 2003 bimonthly status report on Russian participation in the Space Station program, concern was expressed over the ability of the Russians to continue to provide Soyuz and Progress vehicles, stating that "Russian performance appeared to depend on the receipt of 'off budget' funds from the sale of flight opportunities on the Soyuz missions. . ." and going on to conclude that "The grounding of the Space Shuttle fleet and the subsequent Multilateral Coordination Board-agreed-upon interim operations plan have put additional financial strain on Rosaviakosmos." In addition, the head of the Russian Space Agency has stated in recent months that the Russian Space Agency did not have sufficient funding to provide the needed Soyuz and Progress vehicles beyond this year. And a recent edition of Aerospace Daily reported that the vice president of the company that builds the Soyuz and Progress vehicles said that the company had to borrow money to begin building an extra Progress vehicle to support the Space Station while the Shuttle fleet is grounded.*

- Q3a. *How much money do the Russian Space Agency and contractors need to build the necessary Soyuz and Progress vehicles?*
- Q3b. *Do you or anyone at NASA know what fraction of the needed funds is actually being provided to the Russian contractors?*

A3a,b. Specific cost figures and contractual allocations for Russian-provided elements are not available. Earlier in the year, however, Rosaviakosmos officials asserted that Rosaviakosmos required approximately \$100 million USD to successfully implement a near-term operations plan adopted by the ISS Multilateral Coordination Board in February 2002. To date, without significant additional funding from the other ISS international partners, the Russian Government has continued to implement the agreed near-term operations plan. The Russian government has recently indicated that it is also moving ahead with plans to increase its funding of the ISS program in 2004 and is continuing to assess a potential augmentation to the Rosaviakosmos 2003 budget to support ISS operations.

- Q3c. *From the time a decision is made to proceed, how long does it take to build and ready a Soyuz vehicle for launch? What is the time required for a Progress vehicle?*

A3c. Officials from Rosaviakosmos and Energia, the company which builds the Soyuz and Progress spacecraft, have indicated that it takes approximately two years to build a Soyuz or Progress spacecraft and ready them for launch.

- Q4. *One of my questions to NASA Administrator O'Keefe for the record of the February 27, 2003 NASA Posture hearing was "Have you ever discussed either using one of the exemptions permitted under the Iran Nonproliferation Act (INA), modifying the INA, or seeking repeal of the INA with any White House officials up to and including the President? If so, when, with whom, what was*

the nature of the discussion, and what was the response by the White House officials?)” The response from NASA, which was received on June 18, 2003, stated: “NASA has discussed various aspects of INA with other Agencies and Departments within the Administration.” Unfortunately, that answer does not respond to the specific questions asked for the record of the February 27th hearing. Therefore,

Q4a. Has NASA Administrator O’Keefe ever discussed either using one of the exemptions permitted under the Iran Nonproliferation Act (INA), modifying the INA, or seeking repeal of the INA with any White House officials up to and including the President?

Q4b. If so, when, with whom, what was the nature of the discussion, and what was the response by the White House official(s)?

A4a,b. It would not be appropriate for NASA to disclose the specific nature or content of the Administrator’s discussions with the White House. As previously indicated, NASA officials, including the Administrator, have consulted a variety of experts within the Executive Branch, including the White House, concerning the Act’s application to ongoing and potential NASA actions relating to the ISS.

Questions submitted by Representative Curt Weldon

Q1. NASA has begun a new space nuclear power system program that is estimated to cost approximately \$9 billion over the next 10 years. The Russian Space Agency has a great deal of experience in space nuclear power systems, and in the early 1990s, the Department of Defense purchased a Russian Topaz space nuclear reactor. Cooperation presents an opportunity for NASA to build on the progress already made and lessons-learned in Russia and save billions of dollars by not having to develop its own space nuclear power program.

A1. Project Prometheus, the nuclear systems program (formerly the Nuclear Systems Initiative), is comprised of three major components: 1) the development of radioisotope power systems; 2) the development of nuclear fission power and electric propulsion systems; and 3) the first mission to use nuclear-electric power and propulsion, the Jupiter Icy Moons Orbiter (JIMO).

The President’s FY 2004 budget request runout through FY 2008 includes roughly \$3 billion for Project Prometheus, of which just over \$2 billion would be for JIMO. Because NASA is in the early stages of planning key aspects of Project Prometheus, we are not in a position to establish a definitive cost projection over the next 10 years for the entire program. Such projections are particularly dependent on the mission approaches and costs for JIMO, which are being studied in-depth by industry (three teams are participating) and the government. When these mission studies are concluded, JIMO life cycle cost estimates will be developed and finalized.

Q1a. To what extent does NASA plan to utilize Russia’s nuclear experience? If not, under what circumstances would the United States be willing to take advantage of this opportunity?

A1a. The two areas for potential international participation in Project Prometheus are the development of science instrumentation and spacecraft system technology development. At this time, NASA envisions potential partnerships in developing science instruments for JIMO and future Prometheus missions. Regarding the second area of possible interaction, which would include the development of nuclear-related technologies, NASA does not have any definitive plans for such collaborations at this time. At this early stage of the program, we believe our efforts to establish the most appropriate technologies for near-term development can be best-managed and implemented via U.S. Government, industry, and academia.

NASA recognizes the significant experience the Russians have in developing the TOPAZ and TOPAZ II (Enisy) space reactors. However, after conducting an in-depth analysis of technologies applicable to JIN40 and other similar space science missions, we determined that the Russian space reactor technologies were not suited to NASA’s current needs. In particular, the technologies employed by the Russians (specifically the power conversion system and fuel) have significant lifetime limitations that make them incompatible with the longer-term missions of interest to NASA.

It is worth noting, however, that foreign entities do have the opportunity to participate in Project Prometheus, as permissible by law, by cooperatively contracting with proposers for NASA grants. As future opportunities present themselves, within the context of competitively awarded contracts, we will evaluate each on a case-by-case basis for their applicability to the program.

Q1b. What has been the funding history of space nuclear power since the purchase of the Russian Topaz? What funding level is necessary to sufficiently develop a U.S. space nuclear program?

A1b. NASA is not in a position to quantify the funding history of space nuclear power, or for that matter any specific space nuclear reactor work prior to the proposal of the Nuclear Systems Initiative in FY 2003, because several agencies other than NASA were involved in the various programs, including the TOPAZ II-related work. As for the second question, please see our response to the opening statement accompanying the questions for the record.

Q1c. Have there been cooperative efforts to work with the Russians on further space power development since the Topaz reactor?

A1c. NASA has not been involved in any cooperative activities with the Russians involving space nuclear power during this time period.

Q1d. What is the timeline for development, testing, and deployment of NASA's space nuclear power systems? What mission is driving this schedule?

A1d. Project Prometheus' two space nuclear power system development efforts—radioisotope power systems and fission reactors—are on separate development schedules, which are driven by very different applications.

Project Prometheus's radioisotope power system program is supporting two near-term missions: the New Horizons mission to Pluto, scheduled for 2006, and the Mars Science Laboratory, planned for 2009. The New Horizons mission is to be powered by the last Radioisotope Thermoelectric Generator (RTG) in our inventory.

Because of the need expressed by mission planners for radioisotope power systems, NASA has begun development of the next generation of systems that will operate not only in space (as is the case with the most recent RTG systems) but also within an atmosphere, such as on the surface of Mars. Two technologies are under development—the Multi-Mission Radioisotope Thermoelectric Generator (MMRTG) and the Stirling Radioisotope Generator (SRG)—for possible use on the 2009 Mars mission. The MMRTG is a smaller, more advanced version of the RTG. The SRG produces a comparable amount of electricity as the MMRTG by converting the heat from radioisotope decay to electricity through a dynamic power conversion system (the Stirling free-piston engine). The SRG system is more complex than the MMRTG, but this technology promises to be up to four times more efficient in converting heat to electricity than the MMRTG, requiring less fuel per watt of power produced.

The nuclear fission electric power and propulsion components of Project Prometheus are supporting the development of technologies for science missions that would be uniquely enabled by these technologies—in the near-term the Jupiter Icy Moons Orbiter (JIMO). Initial planning estimates call for launch of the JIMO spacecraft no earlier than 2011.

Q1e. What missions need space nuclear power to be successful? When are these missions scheduled? What funding will be necessary to achieve this schedule?

A1e. NASA is making a strategic investment in both radioisotope and fission space power systems because they can uniquely enable a range of near- and long-term NASA missions. Such missions would take advantage of these systems' ability to provide NASA mission planners "all weather, anytime, anywhere" capabilities. That is, they are capable of providing continuous power, from milliwatts to 100s of kilowatts, in hostile environments, irrespective of the availability of the sun (generally speaking, once further out into the solar system than Mars, the Sun is not a very effective source of power with today's solar power technologies). Thirty years of experience in the design and use of radioisotope power sources have also demonstrated the ruggedness and reliability of these systems, some of which have now operated for well over 20 years. While we cannot identify specific missions beyond JIMO at this point, we do envision follow-ons in the next decade.

Beyond these inherent benefits of both space radioisotope and fission power systems, space nuclear fission systems offer NASA space science mission planners unprecedented levels of power for use in space or on the surfaces of planetary bodies. Access to power levels up to 1,000 times greater than those available today would enable revolutionary capabilities in the areas of spacecraft maneuverability and scientific exploration.

In the area of radioisotope power systems, the Mars Science Laboratory (MSL) science return would be significantly enhanced by a power system that would enable increased observation time on the planet, and a greater range of potential destinations that could be explored. Rather than being limited to the equatorial sector of

Mars (to optimize solar power), MSL could be sent, independent of seasonal variations, to those areas that hold some of the greatest potential for scientific return, i.e., high latitude areas where water has been detected. Also, the MSL would function for an extended period of time—one to two years, rather than several weeks—and this would not be possible with solar power.

Making use of this power, NASA can now begin to plan close-range, months-long orbits of multiple destinations for optimal science observation. Throughout such a mission, power could be directed to an entirely new class of scientific instruments the likes of which are currently only available to satellites in near-Earth orbit. Even at great distances (e.g., the orbit of Jupiter and beyond), the increased power from a space nuclear reactor would enable transmission of more data to Earth daily than would be returned by the Pioneer, Voyager, Galileo, and Cassini over their entire mission lifetimes combined. Moreover, this power would also enable the highly efficient propulsion systems under development (similar to that used on Deep Space-1) to transport significantly larger payloads to any final destination.

Taken in total, the benefits outlined above could open up a whole new range of missions, both robotic and human, in space and on the surfaces of planets and moons, to NASA and the scientific community. Because this is a new initiative for NASA, we are going to great lengths to identify, hand-in-hand with the science community, future missions, instruments, and technologies that can leverage the unique capabilities enabled by Project Prometheus technologies.

The first mission to make use of nuclear electric power and propulsion technologies from Project Prometheus is the JIN40 mission that would orbit three of Jupiter's moons—Callisto, Ganymede, and Europa—that are believed to have subsurface watery oceans; where there is water, there is the possibility for life. Exploration of Europa is the leading large mission candidate identified by the National Research Council in its Decadal Solar System Exploration Survey. JIMO's nuclear-powered electric propulsion system would enable it to orbit all three moons at close range for several months at a time, while its high-powered, active science instruments (e.g., ice penetrating radar) and high-powered communications equipment would enable unprecedented scientific return.

Q1f. How do other power systems compare with space nuclear power on the basis of safety, cost, or availability?

A1f. Non-nuclear power and propulsion systems currently available or under development will generally not be appropriate for the types of missions on which Project Prometheus technologies would be employed. Such considerations as safety, cost, and availability are balanced with the specific mission science objectives prior to the development of any NASA mission. Only when the science objectives are best achieved by the use of space nuclear power, and requirements for cost, safety, and availability are met, will these technologies be baselined into mission planning.

Q2. Is the technology for space nuclear power systems mature enough for testing or use at this time?

A2. The technologies under development by Project Prometheus are in various stages of development, ranging from research and development of high-temperature materials to life-testing of Stirling Radioisotope Generators. In the area of radioisotope power sources, we are confident that both near-term systems (MMRTG and SRG) will be ready for use on the 2009 Mars Science Laboratory. We are also confident that a fully tested nuclear fission power system will be ready for flight by the early part of the next decade in support of the JIMO mission.

Q3. What efforts are necessary to further develop the technology?

A3. Because the radioisotope power source technology is well established or very near demonstration, we will only address nuclear fission related space systems. Significant work was carried out during the 1980s and 1990s on technologies related to space nuclear reactors under the SP-100 program, and we intend to leverage these efforts in our work. It will be challenging to develop and test the various power generation and conversion technologies to the point of being flight ready, but many of the individual components under consideration have been tested in one form or another over the years, which is why we are confident in our ability to fly the JIMO mission in the early part of the next decade.

Q3a. Who has this task?

A3a. The Department of Energy (DOE), as mandated by U.S. law, is responsible for all nuclear materials-related tasks under Project Prometheus. Such activities will be carried out via a Memorandum of Understanding between the two agencies. As in the past, NASA will fund the RPS work, but DOE will maintain responsibility for

all RPS development. In addition, DOE will have responsibility for the fission reactor system. These activities will be supported by industry and academia as necessary or appropriate. The remaining, i.e., non-nuclear, systems and components of the program will be managed directly by NASA and will also involve industry, academia, and NASA and DOE laboratories.

Q3b. What are their current plans?

A3b. Plans for the RPS are well established, and we are on schedule to have systems ready for possible use on the Mars 2009 mission. Regarding the nuclear fission power system, NASA is currently funding internal government and external industry studies to determine the best configuration for the JIMO spacecraft and its primary systems, which will drive future development activities. This detailed mission and technology analysis should be completed in 2005. Once the final systems have been selected, detailed system development plans will be formulated. In parallel, NASA would continue to fund development work on a range of technologies applicable to the mission.

Q3c. What is the Russian involvement in these plans?

A3c. There is currently no Russian involvement in Project Prometheus activities.

Q3d. What is the private sector involvement?

A3d. Currently, there are over 60 private sector participants (including industry and academia from 20 states) participating in Project Prometheus-funded work, with between 60–70 percent of all program work competitively awarded. In addition, the final spacecraft integrator contract for JIMO will go to industry.

Questions submitted by Representative Nick Lampson

Q1. What would be the consequences if the International Space Station had to be abandoned [uncrewed] for an indefinite period of time (from months to years) because the Shuttle fleet was grounded and none of the Space Station partners could pay to provide the Soyuz and Progress spacecraft needed to keep it operating?

A1. The ISS is built to be human-tended and cannot be used to conduct meaningful science without human interaction. Without the crew to perform routine maintenance on the ISS, systems would begin to degrade, complicating the process of reactivation.

In the event that a de-crewing is necessary for any reason NASA has a plan in place for such a contingency. The ISS program has defined the best operational vehicle configuration (hardware, software and orientation) that will maximize the chances of vehicle survivability while operating without a crew.

Q2. If the Iran Nonproliferation Act (INA) would force abandonment of the International Space Station for an indefinite period, would NASA seek relief from the INA? If not, why not?

A2. Since the loss of *Columbia*, NASA has looked to the ISS Partnership to assist in sustaining human presence on orbit while NASA concentrates on the necessary actions to return the Shuttle safely to flight. NASA has been working closely with its International Partners to fully assess the implications of the loss of *Columbia* on ISS operations and to develop and implement an appropriate near-term plan of action. This plan of action does not depend on the modification of the INA, use of an exemption, or its repeal. Therefore, NASA currently has no plans to seek an exception to or request an amendment of the INA. The provisions contained within the INA clearly outline the responsibilities and procedures upon which NASA can act should circumstances change in the future.

Q3. Does NASA see the need to renegotiate the multilateral Intergovernmental Agreement (IGA) or any of the Space Station bilateral Memoranda of Agreement? If so, why? And if so, when would NASA like to have those negotiations begin?

A3. No, NASA has no plans at this time to seek to renegotiate the multilateral ISS IGA or bilateral MOUs.

ANSWERS TO POST-HEARING QUESTIONS

Responses by Robert M. Davis, President and CEO, California Space Authority

Questions submitted by Chairman Dana Rohrabacher

Q1. Is this shift in work from the U.S. to Russia a large contributing factor to the decline of the U.S. aerospace industrial base over the past 10 years?

A1. The shift primarily affects the U.S. commercial launch industry base, and does so in two ways, and has selectively contributed to U.S. aerospace industrial declines.

First, it can be qualitatively argued that launches of U.S. origin commercial satellites on Russian vehicles reduce the number of vehicles produced and flown by U.S. manufacturers. However, competition for provision of commercial launch services went global ten or more years ago, and of late has been greatly intensified by the reduction of satellite launches in this era of the telecom glut. The degree, then, to which the U.S. commercial launch industry has declined uniquely due to Russian launches of U.S. and foreign commercial satellites is difficult to enumerate. Unquestionably, however, as the number of U.S. vehicles produced and launched declines, it becomes increasingly difficult to avoid worker complacency, which leads to declines in flight reliability, and looking to the future, increasingly difficult to attract new entrants to the community as older workers retire. In the nearer-term, unreliability as measured in flight failures of all types, poses adverse economic consequence in a host of industry sectors (manufacturing, services, insurance, investment, satellite services, etc.). In the longer-term, a loss of industrial vigor will be experienced as the launch industry increasingly operates as a commodity market.

Second, the U.S. propulsion industry has been adversely affected by the use of engines of Russian origin on U.S. vehicles, and jobs have been lost that would have otherwise been performed by U.S. workers. As one example, in recent testimony before a Senate Science, Technology, and Space subcommittee hearing, Mr. Bryon Woods of Boeing Rocketdyne, cited that during 2002 the U.S. propulsion community provided a mere 14 percent of required launch engines, while the Russians provided over 60 percent, and Europe providing the remainder.

Q2. Do you have any analyses about how many U.S. jobs have been affected by this shift in aerospace work to Russia?

A2. As a consequence of the shift in supply of rocket engines, Rocketdyne has experienced a decline in the engine production workers, and of equal importance, a significant decline in its design and development staff (from a peak of slightly more than 800 in 1999 to about 260 in 2002). Aerojet and Pratt & Whitney reflect similar, if not significantly greater losses of production and design/development personnel for many of the same reasons.

Q3. Do you have any concerns about U.S. reliance on Russian aerospace industry to supply critical aerospace technologies rather than the U.S. developing its own capabilities?

A3. The world is less stable now than it has been for a number of decades. Orbits near the earth provide the high ground in terms of sensing and communications (as well as precise navigation), and if the U.S. intends to sustain its dominance in the realm, it is important that the U.S. also maintain its aerospace technological leadership. Within its borders, Russia still retains all strategically key natural resources; the U.S. does not, and therefore must rely on other nations for some of its strategically critical resources. Therefore, it remains of critical importance to the future welfare and well being of the U.S. to maintain its space enterprise leadership so as to be able to ensure ready sources of supply in this volatile era across the globe.

Q4. Do you have any recommendations to remedy these concerns [about reliance on Russian aerospace]?

A4. The U.S. Government and taxpayers need to recognize and accept that our aerospace industry is itself a critical strategic resource that must be sustained, including ensuring that it will have the workforce that is needed throughout the future. The answer to this question should address current investments by NASA and other agencies in the future of the U.S. aerospace community, including development of a sustainable workforce, and should be the exclusive subject of a separate hearing. These investments should stimulate early to advanced education, worker development, technology development, and operating proficiency needs across the board if this community is to be sustained at a level that will serve preservation of our national security and defense interests.

Q5. Are U.S. aerospace companies seeking to do business with Russian companies informed beforehand by the State Department about any proliferation concerns with certain Russian companies?

A5. I do not have any recent first hand experience on which to base an answer to this question.

Q6. Would such information be useful to U.S. industry before a U.S. company seeks a Technical Assistance Agreement from the State Department to work with certain Russian companies on particular programs?

A6. Some 450 aerospace entities in Russia have or in the past have had ties in one form or another with the Russian government. From time to time the U.S. evidences concerns about proliferation by various Russian entities, including some of these 450 companies. Developing an operable and productive relationship with a Russian aerospace entity is expensive, uncertain, and time consuming. Availability of information from the Department of State about select Russian entities that pose concerns for the interests of U.S. national security before making the investment to apply for a TAA would be highly beneficial to companies large and small. A second interest to be addressed is that from time to time U.S. Company to Russian Company commerce is put into limbo as contemporary U.S. Government to Russian Government issues play themselves out on the world stage. Companies that do not have a lot of cash to weather business disruptions would benefit by knowing beforehand which Russian companies are more likely than not to incur business delays so that they might be avoided if other choices exist with whom business might be undertaken.

ANSWERS TO POST-HEARING QUESTIONS

Responses by Henry D. Sokolski, Executive Director, Nonproliferation Policy Education Center

Questions submitted by Chairman Dana Rohrabacher

Q1. Your testimony highlights the need to stem Russian proliferation of all aerospace capabilities by shrinking the Russian aerospace industrial base. The Iran Nonproliferation Act stops all U.S. payments to Russia for any support they might provide for the International Space Station in order to induce the Russian Government to stop proliferation of weapons of mass destruction and ballistic missile technology to Iran. Would you recommend restricting or embargoing other U.S.–Russia aerospace trade and collaboration in other areas, such as launch vehicle engines and other capabilities, in order to stop Russian proliferation to Iran and other countries?

A1. If there was a way to leverage Russian behavior that would effectively stop Russia from proliferating illicit strategic technology to hostile states such as Iran I would favor it. I support simple notion that the U.S. taxpayer should not be asked to support Russian entities that do such proliferation because the U.S. loses moral authority to complain about Russian proliferation generally if it does not show this minimum of self-restraint itself. On the other hand, I am, like many other experts, skeptical about how much more can be done with new sanctions that would effectively stop Russian proliferation.

Q2. Why not simply restrict our trade and collaboration to those entities in Russia that the State Department deems as proliferators?

A2. This is what the current law effectively does by requiring the President to certify that the Russian Space Agency no longer has entities under its purview that do proliferate. Once the President certifies, it is my understanding that NASA is free to make progress payments to RSA.

Q3. Why are Russian companies that are not proliferators made to suffer from an embargo on U.S. trade and collaboration on the Space Station when they cannot control the actions of a few Russian companies despite the Russian Government making some efforts toward improved export control/nonproliferation?

A3. Russian entities working under the control of RSA benefit from this association through subsidies and so must be held accountable when entities under the RSA's authority misbehave. As I noted in my testimony, the best and perhaps only solution to this problem is to right-size the number of RSA space entities to smaller number that would include only the most responsible and profitable entities.

Questions submitted by Representative Bart Gordon

Q1. In your testimony, you appear not to favor granting any waivers to the Iran Nonproliferation Act. Would you oppose any exception to or modification of the terms of the INA even if the result was that the Space Station had to be abandoned on orbit for an indefinite period, with an increased risk that the entire Station might be lost?

A1. I think the current waiver for safety—i.e., to prevent the imminent loss of life or grievous injury to those aboard the Station—is entirely reasonable and should not be changed. The U.S. should fund the Station in such a fashion that the U.S. would not have to exercise this waiver. If that means funding an alternative means to rescue crews other than Soyuz, I would do this. Modifying the existing waiver on these points, I believe would only undermine the law's original intent, which was to keep U.S. taxpayers from paying money unnecessarily to entities the President believed were still proliferating strategic rocket related technologies to Iran. Forced to choose between making the Space Station's success less dependent on contracting taxpayers' dollars to proliferating Russian entities and being complicit in such commerce, I would prefer making the station less dependent every time.

Q2. Your testimony highlights the need to stem Russian proliferation of all aerospace capabilities by shrinking the Russian aerospace industrial base. The Iran Nonproliferation Act stops all U.S. payments to Russia for any support they might provide for the International Space Station in order to induce the Russian Government to stop proliferation of weapons of mass destruction and ballistic missile technology to Iran. Would you recommend restricting or embargoing other

U.S.–Russia aerospace trade and collaboration in other areas, such as launch vehicle engines and other capabilities, in order to stop Russian proliferation to Iran and other countries?

A2. If there was a way to leverage Russian behavior that would effectively stop Russia from proliferating illicit strategic technology to hostile states such as Iran I would favor it. I support simple notion that the U.S. taxpayer should not be asked to support Russian entities that do such proliferation because the U.S. loses moral authority to complain about Russian proliferation generally if it does not show this minimum of self-restraint itself. On the other hand, I am, like many other experts, skeptical about how much more can be done with new sanctions that would effectively stop Russian proliferation.

Q3. *Why not simply restrict our trade and collaboration to those entities in Russia that the State Department deems as proliferators?*

A3. This is what the current law effectively does by requiring the President to certify that the Russian Space Agency no longer has entities under its purview that do proliferate. Once the President certifies, it is my understanding that NASA is free to make progress payments to RSA.

Q4. *Why are Russian companies that are not proliferators made to suffer from an embargo on U.S. trade and collaboration on the Space Station when they cannot control the actions of a few Russian companies despite the Russian Government making some efforts toward improved export control / nonproliferation?*

A4. Russian entities working under the control of RSA benefit from this association through subsidies and so must be held accountable when entities under the RSA's authority misbehave. As I noted in my testimony, the best and perhaps only solution to this problem is to right-size the number of RSA space entities to smaller number that would include only the most responsible and profitable entities.

ANSWERS TO POST-HEARING QUESTIONS

Responses by Ambassador Steven Pifer, Deputy Assistant Secretary of State, Bureau of European and Eurasian Affairs, State Department

Questions submitted by Chairman Dana Rohrabacher

Q1. According to several news reports, the Russians are helping to train Chinese astronauts. When Chinese President Hu Jintao toured the Khrunichev Space Center recently, the Russians reportedly offered to build them a Space Station out of spare parts of the Zarya control module that the U.S. paid for during the 1990s.

- Did Russia offer to help the Chinese build a space station?*
- Would any U.S. owned parts or equipment be used to help build a space station for China?*
- Will the U.S. Government be reimbursed for the re-sale of any parts or equipment?*
- Is the State Department closely monitoring this exchange between Russia and China?*
- Does the State Department have any proliferation concerns with this exchange of technical capabilities and knowledge from Russia to China?*

A1. Based on past history, Russia would likely be involved in Chinese space efforts. But China is still attempting to launch its first manned space flight, and China's own estimates place the launching of any space station ten years into the future.

The intergovernmental agreement on the ISS, to which both the United States and Russia are parties, provides that each government's space agency shall mark with a notice technical data or goods that are to be protected for export control purposes, and that this notice shall indicate that (1) such technical data or goods shall be used only for the purposes of fulfilling the obligations of the receiving space agency and its contractors and subcontractors; and (2) that such technical data or goods shall not be used by persons or entities other than the receiving space agency, its contractors or subcontractors, or for any other purposes, without the prior written permission of the furnishing government.

The State Department would be concerned with any unauthorized Russian transfer of U.S.-developed space technology. The level of concern would depend upon the specific technology transferred, the potential military utility, and any relevant export licenses. The State Department monitors space issues that may involve the use or transfer of U.S. technologies.

Q2. Your written testimony states, "Russia has taken steps, though not yet sufficient, to implement stronger export controls and improve oversight at Russian facilities."

- What steps have been taken to implement stronger export controls?*
- What additional steps for stronger export controls would Russia need to make?*
- Has the State Department communicated to the Russian Government the steps that it thinks are necessary and sufficient for export controls?*

A1. U.S. bilateral cooperation with Russia has contributed to improvements in Russia's export control laws and implementing regulations over the past few years; it also supports Russia's outreach and internal compliance programs aimed at educating its industry on export controls.

Since the enactment of Russia's Federal Law on Export Control in July 1999, the Russian Federation has adopted new regulations to implement the law and create a more functional export control system. Russia's export control law now extends to intangible transfers of technology and includes provisions for catch-all controls. The Government of Russia has updated its seven control lists to bring them in closer harmony with the standardized EU international control lists and all of the international nonproliferation regimes. President Putin established the Export Control Commission in January 2001 to provide policy oversight on key export control and licensing issues. Russia's Administrative Code was revised in July 2002 to provide the Department for Export Control (DEK) under the Ministry of Economic Development and Trade with significant administrative enforcement authority. The DEK is now responsible for drafting export control regulations, processing export license applications, conducting industry compliance outreach programs, and administrative prosecution of export control violations.

Increased focus should be placed on the enforcement of Russian export control legislation and regulations. The Russian Government has not prosecuted enough export control violations to effectively demonstrate serious political will in enforcing its law or to establish the effectiveness of the catch-all provisions of the law. Industry outreach efforts are also seriously limited by scarce resources, including personnel.

The State Department maintains an ongoing dialogue with the Russian Government on export control issues and continues to communicate to the Russian Government the steps that it thinks are necessary and sufficient for an effective export control system.

Q3. *Your written testimony states, “Mr. Yuriy Koptev, General Director of Rosaviakosmos, has been particularly active in promoting reform throughout the Russian Government, and frequently notes the constraints imposed by the Iran Nonproliferation Act on U.S.–Russian space cooperation.”*

- *What proliferation reforms have been promoted or taken by Rosaviakosmos?*
- *Are these proliferation reforms only between Russia and Iran or between Russia and other countries?*
- *Does the State Department advise other U.S. Government agencies like NASA through reports, briefings, and communication about which Russian Government agencies, companies, and individuals are known proliferators?*
- *Does the State Department advise U.S. aerospace companies to any degree about U.S. Government proliferation concerns with particular Russian Government agencies, companies, and individuals?*

A3. In recent years, senior USG officials have had an open and productive dialogue on nonproliferation with Rosaviakosmos’ General Director Koptev. Under Mr. Koptev’s stewardship, Rosaviakosmos has implemented a number of reforms that safeguard against transfers and assistance to missile programs of concern, in Iran and elsewhere. These include:

- A Federal Security Service (FSB) representative is permanently positioned on the security staff at various Rosaviakosmos’ organizations;
- Security staff holds foreign passports and restricts travel of particular Rosaviakosmos’ employees;
- All foreign visitors must submit requests for visits to Rosaviakosmos facilities two weeks in advance; all visitors must be pre-approved and must state their agenda/reason for visit;
- All data to be used and presented to visitors (both domestic and foreign) must be cleared through security, and a security representative must be present at all meetings to ensure that data and discussions are consistent with what had been approved for release;
- Key Rosaviakosmos firms have Internal Compliance Programs (ICPs)—internal export control units—installed with U.S. assistance to help vet transactions against export control requirements;
- Russia’s Export Control Law outlines provisions against intangible transfers of technology, and key Rosaviakosmos personnel and presentations that attend international conferences and symposia are vetted to ensure these provisions are met.

We support these efforts and continue to work with the Russian Government to strengthen existing controls and related mechanisms. The State Department will also continue its close partnership with other agencies such as NASA. With respect to working with our executive branch colleagues, the State Department works with a wide array of agencies to identify and impede proliferators of missile technology through the Missile Transfer Analysis Group (MTAG). Many items used for space systems, especially spacelift, are controlled by the MTAG and are therefore identified and discussed by the USG agencies. Russia is a signatory to the MTAG. The State Department does not identify proliferators of space-unique equipment.

With respect to advising U.S. aerospace companies about U.S. Government proliferation concerns with particular Russian Government agencies, companies, and individuals, space technology that does not have a secondary military use is not a proliferation concern. Space technology is controlled through the standard export licensing process.

Questions submitted by Representative Bart Gordon

Q1. The June 1st Bush-Putin joint release states that: “. . . the Russian Federation is committed to meeting the U.S. crew transport and logistics resupply requirements necessary to maintain our joint American and Russian cosmonaut teams on board the ISS until the Space Shuttle returns to flight.”

Q1a. Does that statement mean that Russia has formally agreed to pay for all of the Soyuz and Progress flights needed to support the International Space Station while the Shuttle fleet is grounded?

Q1b. Has Russia agreed that it will not seek compensation from NASA or any of the other International Partners for those Progress and Soyuz flights?

Q1c. If not, what in specific terms does the release mean?

A1a,b,c. The ISS Multilateral Coordination Board (MCB), chaired by NASA Deputy Administrator Fred Gregory, on February 26, 2003, approved an option to maintain a continued crew presence on ISS until the Space Shuttle is able to return to flight. This option required that the ISS crew size be reduced from three to two, that the April 2003 Soyuz flight be used for crew exchange, and that the Russian Progress flight schedule be accelerated to support crew and ISS consumable needs until the Space Shuttle returns to flight. This option also required the addition of two Russian Progress logistics vehicles to the ISS manifest (one in 2003 and one in 2004) and assumes that the Space Shuttle and the European Space Agency's (ESA's) Automated Transfer Vehicle (ATV) will be flying in 2004. This option was adopted by the ISS Partnership contingent upon the ability of the Russian Aviation and Space Agency (Rosaviakosmos) to receive additional funding.

Rosaviakosmos has informed NASA that the Russian Government has advanced Rosaviakosmos all of its 2003 ISS funding to assist in the acceleration of logistics vehicles. Similarly, each of the other space agencies has made modest proposals to Rosaviakosmos that are currently being evaluated. These activities are taking place within the framework of the international agreements that govern the relationship among the ISS Partners.

The June 1st joint statement issued following the meeting of Presidents Bush and Putin does not mean—and was not intended to mean—that Russia has agreed to pay for all costs related to provision of Soyuz and Progress vehicles needed to support the ISS while the Shuttle fleet is grounded. Nor does it mean that Russia will not seek compensation from the United States for this purpose. What the joint statement means is that Russia is committed to working with the United States and other ISS partners to find a solution to the current problem of sustaining an operational ISS.

Q2. Even if NASA is allowed to proceed with the Orbital Space Plane project, the only means other than the Shuttle of getting U.S. astronauts into space for the next ten years will be the Russian Soyuz spacecraft.

Q2a. In light of the Columbia accident, what specific steps is the Administration taking to ensure that the U.S. will be able to make use of the Soyuz as a backup to the Space Shuttle for the next ten years?

Q2b. Will any modification to the Iran Nonproliferation Act be required to ensure that the U.S. can make use of the Soyuz if needed?

A2a,b. The Administration does not plan to seek an exception to, or request an amendment of, the Iran Nonproliferation Act. We are continuing to urge the Russian Government to cease the kinds of proliferation activities that have caused Congress to pass the INA with the objective of influencing Russia in this regard such that we will no longer require the INA.

Questions submitted by Representative Nick Lampson

Q1. From a foreign policy perspective, is having to take the crew off of the International Space Station for an indefinite period an acceptable alternative to loosening the restrictions of the Iran Nonproliferation Act if the ISS had to be abandoned because the Shuttle fleet was grounded and none of the Space Station partners could pay to provide the Soyuz and Progress spacecraft needed to keep it operating?

A1. From a foreign policy perspective, neither loosening the restrictions imposed by Iran Nonproliferation Act nor abandoning the ISS would be acceptable alternatives. While NASA is working on issues related to returning the Shuttle to flight, it is also

consulting with the Russian Aviation and Space Agency to develop options that will support continuing ISS crew presence on orbit without resorting to measures that would be inconsistent with the INA.

Q2. Does the Administration believe that the “in-kind” and “third-party” transaction prohibitions in the Iran Nonproliferation Act would prohibit the U.S. companies from purchasing Space Station related goods and services from Russian companies? Why or why not? If not, are there other provisions in the INA that would prevent such company-to-company contracts?

A2. The Iran Nonproliferation Act was intended as a source of leverage on Russia to improve the proliferation record of Russian companies in the space sector. If U.S. companies under contract with NASA were to subcontract with these same Russian companies for space station-related goods or services, this leverage would be diminished or lost altogether. We believe such arrangements would raise legal questions under Section 6 of the Iran Nonproliferation Act and would likely be viewed by many as an evasion of the law.

Q3. Khrunichev and RSC Energia are the two main Russian Space Station contractors. Does the Administration believe that they are “organizations or entities under the jurisdiction or control of the Russian Aviation and Space Agency” under the terms of the Iran Nonproliferation Act? Why or why not?

A3. As referenced in the answer to the preceding question, payments by NASA to Russian companies, either directly or through NASA contractors, would diminish pressure on Russian aerospace companies to improve their nonproliferation record or would also raise legal questions. If procurement from Russian sources to support the ISS or NASA’s human space flight programs became necessary, NASA would need to conduct the specific inquiry required to make a formal determination of whether companies like Energia or Khrunichev meet the Act’s detailed definition of jurisdiction and control of Rosaviakosmos. This inquiry could require significant research and analysis of Russian records to verify the firm’s creation, legal structure, corporate governance, transactions in its equities and other factors. To date, neither State nor NASA has had occasion to make such a determination.

Q4. Does the Administration believe that the “in-kind” and “third-party” transaction prohibitions in the Iran Nonproliferation Act would prohibit one or more of the other Space Station International Partners from purchasing Soyuz or Progress spacecraft or services from Russia in exchange for some compensation from the United States? Why or why not?

A4. The Iran Nonproliferation Act has been a source of pressure on Russia to improve the proliferation record of companies in the space sector. If the U.S. Government provided compensation to another Space Station International Partner “in exchange for” that partner purchasing spacecraft or services that the U.S. could not purchase directly due to the restrictions in Section 6 of the Iran Nonproliferation Act, this pressure would be diminished or eliminated altogether. We believe such arrangements would raise legal questions under Section 6 and would likely be viewed by many as an evasion of the law.