

U.S. -Russian Cooperation in Human Space Flight  
Assessing the Impacts

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## **1. Introduction**

In 1992, and in particularly 1993, the two years following the dissolution of the Soviet Union, the United States entered into a number of agreements with the Russian government and the emerging Russian private sector related to expanded cooperation in outer space activities. The centerpiece of those agreements was a December 1993 invitation to Russia to become a full partner, along with the United States, Japan, Canada, and nine European countries acting through the European Space Agency, in the design, development, operations and utilization of an international space station - a permanently occupied, long duration orbital laboratory.

From the U.S. perspective, enhanced space cooperation with Russia was driven by a number of considerations. Many related to taking advantage of Russian space capabilities and experience to enhance U.S. space program efforts and potentially to reduce the costs of achieving various space objectives, particularly with respect to the space station program.

There were also a broader set of foreign policy, security, economic, and political factors underpinning U.S. initiatives, especially the invitation to join the International Space Station program. The purpose of this report is to present an interim assessment of the results of Russian participation in the International Space Station and other cooperative activities in terms of these broader factors. This separation of the broader rationales for Russian participation in the ISS program from the benefits that participation brought to the program itself should be recognized as artificial. A full assessment of the impacts, positive and negative, of Russia's involvement in the ISS must include the often intertwined programmatic and broader effects. However, more than seven years after Russia formally accepted an invitation from the existing space station partners to join the effort, it should be possible to assess results to date against the "non-programmatic" objectives that led to this invitation. This is so, even given the overall complexity of the Russian-U.S. relationship and the many problems Russia has faced in recent years on its path away from almost seventy five years of Communist control. It is difficult, but not impossible, to single out for analysis foreign policy, security, economic, and political developments linked to Russian space station participation.

In order to carry out such an assessment, two research centers of George Washington University's Elliott School of International Affairs, the Space Policy Institute (directed by John M. Logsdon) and the Institute for European, Russian, and Eurasian Studies (directed by James R. Millar) joined forces. The centerpiece of the assessment was an all-day workshop held on Monday, December 18, 2000 at George Washington University. Invited to participate in the workshop were ten well-established students of Russian affairs and U.S. foreign and national security policy. Each participant was asked to prepare a brief written paper as part of his or her contribution to the workshop discussions.

The ten workshop participants were:<sup>1</sup>

**Gary Bertsch**, University Professor of Political Science and Director on the Center for International Trade and Security, University of Georgia;

**Matthew Evangelista**, Professor of Government, Cornell University;

**James Goldgeier**, Associate Professor of Political Science and International Affairs, George Washington University;

**Rose Gottemoeller**, Senior Associate, Carnegie Endowment for International Peace;

**Dale Herspring**, Professor of Political Science and Fellow, Center for Russian and East European Studies, Kansas State University; (Professor Herspring was unable to attend the workshop, but did contribute a paper.);

**Paul Josephson**, Associate Professor History, Colby College;

**Igor Khripunov**, Associate Director of the Center for International Trade and Security, University of Georgia;

**Jacob Kipp**, Senior Analyst, Foreign Military Studies Office, U.S. Army Training and Doctrine Command;

**Jack Mendelsohn**, Executive Director, Lawyers' Alliance for World Security, Washington, DC; and

**James Clay Moltz**, Associate Director, Center for Nonproliferation Studies, Monterey Institute of International Studies.

Prior familiarity with the space program overall or with the International Space Station in particular were not relevant criteria as the workshop organizers selected participants; the goal was to assemble a panel with established credentials that represented a cross-section of disciplines, backgrounds, and research specialties relevant to the assessment topic. Participants were provided background information on the evolution of U.S.-Russian space cooperation (Appendix B). and the space station program (See [spaceflight.nasa.gov](http://spaceflight.nasa.gov) for such information.). It

turned out that several of the participants did in fact have prior knowledge of the specifics of space cooperation; that made their contributions to the assessment even more valuable.

Section 4 of this report contains a summary record of the participants' assessment of the impacts of U.S.-Russian cooperation in human space flight. In order to encourage maximum frankness, the whole assessment process was carried out on a "not for attribution" basis, i.e., participants were assured by the organizers of the assessment that they would not be individually identified with specific findings or conclusions in this report, nor would they be asked to agree with all parts of the assessment. Rather, the editors of this report selected from the written and oral contributions of the various workshop participants excerpts that, when combined, in their judgment reflected an accurate and balanced summary of the views expressed. There was no overall consensus among workshop participants sought, although they agreed on many points. A draft of the workshop summary was circulated to each participant for comment, but ultimately it is the editors who are responsible for the contents of this assessment.

## **2. The Rationales for Expanded Space Cooperation<sup>2</sup>**

In order to appreciate the contents of this assessment, it is necessary to first understand the various reasons that led the United States to seek expanded U.S.-Russian space cooperation, particularly in human space flight.

One of those most influential in shaping the thinking of U.S. government officials about the desirability of expanded cooperation in space with Russia was Roald Sagdeev. During the 1970s and 1980s, Sagdeev was director of the organization in the Soviet Union responsible for space science. He also served as a top science and arms control advisor to Mikhail Gorbachev. In the early 1990s, Sagdeev emigrated to the United States where he became a professor of physics at the University of Maryland and a well-placed advocate of expanded U.S.-Russian cooperation.

In the midst of the 1993 debate over the wisdom of bringing Russia into the space station partnership, Sagdeev and his Maryland colleague Michael Nacht wrote:

In the post-cold-war world, space policy is foreign policy.

Russian participation could advance U.S. goals in the former Soviet Union and strengthen President Boris Yeltsin. First, it would provide hard currency for the Government. Second, Russia is struggling to cling to the vestiges of its superpower status, and hardliners, in their fight against reforms, have played on the people's fear of diminished international standing. Remaining active in space exploration could help Russia maintain technological prestige while it reduces its nuclear arsenal.

The project would allow Russia's talented scientists and engineers to escape from the confines of the military and intelligence apparatus. They could show American experts the full range of their skills and technology. This could open the doors to legitimate financial opportunities at a time when many are tempted by lucrative projects that would enhance the military capabilities of third world despots.<sup>3</sup>

This listing of benefits to U.S. interests from expanded U.S.-Russian space cooperation closely parallels the rationales used by pro-cooperation advocates inside the U.S. government as the debate over expanded cooperation took place in 1992 and 1993.

During the George H. W. Bush (1989-1993) administration, the primary rationales for expanded cooperation were to provide employment opportunities on non-military projects for Russian scientists and engineers, and to give U.S. industry access to Russian space technologies. As the Soviet Union collapsed, U.S. intelligence estimates suggested that there was a very real possibility of "the possible purchase of the services of a number of Russian scientists and engineers with nuclear expertise [including the missiles and rocket engines needed for the delivery of nuclear weapons] by Third World dictatorships intent on building their own weapons of mass destruction." According to this account, in mid-1991, Russian laboratories, in dire economic straits, "began to signal their eagerness to sell both technology and the services of their scientists." While some in the Bush Administration welcomed the possibility of acquiring Russian technologies and capabilities, others "mired in Cold War thinking and animated by suspicion" opposed such a course of action. The *Washington Post* suggested that "today, the United States stands to profit from the end of the Cold War. The benefits of acquiring certain Russian technologies appear plain: U.S.-Russian ventures would help American industry, save taxpayer dollars, enhance national security, and, at the same time, keep Russian scientists employed." And, according to one unnamed government official, "We can get real advantages. And, if we don't, someone else will." <sup>4</sup>

By mid-1992, those advocating closer government and private-sector space relationships between the United States and Russia had prevailed. In June 1992, Presidents George H. W. Bush and Boris Yeltsin agreed to broader government-to-government space cooperation, and in July of that year a delegation of representatives of the U.S. aerospace industry traveled to Russia for initial exploratory discussions on possible technology acquisitions, joint ventures, and other forms of private sector collaboration.

It was not until the administration of President Bill Clinton took office in 1993 that even broader political rationales got added to the equation. In the process of preparing initiatives for the initial Clinton-Yeltsin summit meeting in April 1993, the White House was searching for dramatic initiatives to symbolize the "strategic alliance for reform" that was at the heart of the Clinton administration's new strategy toward Russia. Summit planners hit upon the idea of in essence merging the U.S. and Russian programs to develop a space station - an idea first suggested by Russian space leaders - as an ideal initiative from the administration's perspective. As observed by the *Wall Street Journal* in an article titled "U.S. Hopes to Move Moscow Into the West Through Deeper Ties," "Washington's decision to deal in the Russians on the orbiting space station is the cornerstone of an ambitious - and risky - strategy for binding Russia to the U.S. and Western-style reforms by building links with its military, scientific and industrial elites." The administration's strategy was seen as "a mix of cooperation, socialization, and cash-on-the-barrel payoffs. . . . If the courtship pays off, these and other elites will be wedded to U.S. values. If the gambit fails, the U.S. could find itself caught in an embrace that will be difficult and costly to undo." But "the proposed space station collaboration offers potential advantages for nearly every concerned constituency in Washington. The foreign policy team sees it as a way to advance the U.S.-Russian partnership. . . . Officials involved in controlling the spread of weapons see the

plan as giving Russian industrialists incentives to adhere to Russian nonproliferation rules. The two Russian companies with the biggest stake in a joint space station, NPO Energia and Krunichev, also build military spacecraft and missile parts." <sup>5</sup>

In summary, then, the major "non-programmatic"<sup>6</sup> rationales for enhanced U.S.-Russian cooperation in human space flight that lead to Russia becoming a partner in the International Space Station program were:

1. providing employment opportunities related to civilian space projects within Russia for Russian scientists and engineers who might otherwise have worked on projects not in the U.S. interest;
2. providing incentives for the Russian government and Russian industrial enterprises to adhere to the provisions of the Missile Technology Control Regime and other nonproliferation measures;
3. building ties between U.S. and Russian elites in the aerospace sector linked to shared Western values;
4. providing a way for the U.S. government and private sector to channel hard currency into the Russian economy to assist in its stabilization and growth; symbolizing U.S. support for Russian reform and the administration of President Boris Yeltsin; and
5. helping Russia to maintain one of the emblems of its great power status - its human space flight program - in existence.

### **3. Issues for Assessment**

Participants in the December 18 workshop that was the centerpiece of this assessment were addressed by Leon Fuerth, National Security Adviser to Vice President Al Gore. Fuerth was one of the principal architects of the U.S. initiative to invite Russia to join the International Space Station partnership. In his view, that invitation was intended to create a "partnership among equals, one of whom was in trouble," with the partnership resulting in an "exchange of equal value" to both countries. That exchange involved several layers of interaction, both within and well beyond the space station program itself.

As noted in Section 1, a major rationale for expanding U.S.-Russian cooperation in human space flight was the hope that it would result in a better quality, faster-paced, less expensive space station program. Assessing the results of expanded cooperation in terms of its contribution to an improved U.S. space program, however, was not a focus of this assessment, and will not be further discussed in this report.

Another important rationale for U.S.-Russian cooperation was increasing U.S. domestic political support for a space station program, which in 1993 was in danger of either Executive Branch or Congressional cancellation. This strategy was successful. While funds for the space station were approved by a slim one-vote margin (216-215) in a June 1993 House vote, a similar vote one year later led to an over one hundred vote margin in favor of the redesigned space station, with Russia as an ISS partner.

The focus of this assessment, rather, is on the broader U.S. objectives sketched in the preceding section. In this context, the following questions seemed particularly relevant, and were used by the workshop participants as guides in preparing their written submissions and as organizing themes for workshop discussions:

A. **Impacts of Cooperation on the Russian Aerospace Industrial Base**

1. Has expanded U.S.-Russian space cooperation been effective in, as suggested by the Wall Street Journal, "binding Russia to the U.S. and Western-style reforms by building links with its military, scientific, and industrial elites"?
2. Has involving Russia in the U.S.-led space station partnership and other government-to-government and firm-to-firm space relationships been effective in denying or limiting the access of other countries (including U.S. allies) to Russian technologies, capabilities, and experience, which could have been used to compete with U.S. economic, political, and security interests?
3. Has expanded space cooperation had undesirable effects, such as helping to sustain Russian high technology or workforce capabilities relevant to military purposes? Are there other ways in which the close collaboration may have had, from the U.S. perspective, undesirable impacts?

B. **Impacts of Cooperation on Technology Transfer and Nonproliferation**

4. Is there evidence that those sectors of the Russian aerospace industry involved in cooperative activities with the United States have been less likely to engage in unwanted technology transfer to countries such as Iran than those industrial sectors not so involved?
5. Has U.S. support of the Russian space industrial base been comparatively more effective than U.S. defense conversion initiatives in other areas in keeping Russian scientists and engineers with critical skills from offering those skills to other countries, and in particular to "states of concern" to the United States?
6. Are there examples of ways in which the Russian government and emerging Russian private sector have modified their behavior to sustain the cooperative space relationship with the United States? Is space cooperation likely to have given the United States leverage over related areas of Russian behavior?

C. **Impacts on Overall U.S.-Russian Relations**

7. Highly visible U.S.-Russian cooperation in human space flight was intended to be emblematic of a changed U.S.-Russian relationship overall. Is it possible to evaluate the potency of this symbolic collaboration in signaling U.S. support for Russian reforms and in influencing the political context surrounding the U.S.-Russian relationship?
8. Has U.S. support of the Russian space program enabled Russian leaders to cite the Russian space program as one of the remaining manifestations of Russia's status as a leading nation, thereby creating a more positive Russian self-image, fostering a willingness to work with Western democracies, and helping the Russian leadership to undercut those within Russia advocating a more nationalistic approach to international affairs as a way of restoring Russian power and influence?

How does expanded U.S.-Russian space cooperation compare to other U.S. policy initiatives in influencing the character of recent relationships between the two countries?

#### **4. Assessment**

The following summary draws from both the papers prepared by participants in advance of the December 18 workshop and the discussions at the workshop itself. As noted earlier, the assessment was conducted on a "not for attribution" basis, and thus the participant who made a particular quoted comment or observation is not identified. Thus this summary should be seen as the editors' synthesis of the participants' views. While workshop participants have had an opportunity to comment on this synthesis, they have not been asked to indicate their agreement with all of its contents.

##### **4.1 Impacts on the Russian Aerospace Industrial Base**

As one workshop participant noted: "In the immediate aftermath of the Soviet break-up and through the mid-1990s, however, Russia's space/missile industry suffered steep declines in state orders, stimulating a desperate search for foreign partners that might enable it to maintain its workforce and production lines. A number of deals were made during this period with states of proliferation concern (such as Iraq, Iran, and India). At the same time, the simultaneous development of initial contacts with Western space interests raised another, more positive outlet for Russia's products and creative energies. A struggle between these two tendencies began that continues to this day." Though budgetary constraints on the funds available for space cooperation have limited its scope, "Russian leading producers in the space/missile industry (like Khrunichev, Energomash, and others) have redirected their main productive focus from weapons for the Russian military to civilian products for Western companies. This support has helped keep missile specialists from immigrating abroad, kept the industry alive, and allowed Russia to continue as a leading participant in international space development, giving Russians themselves hope for the country's transformation in a positive direction. Through this process, a sector once exclusively state-run, highly secretive, and extremely nationalistic has evolved into a much more open, more civilian-oriented, and more internationally focused industry."

Another participant noted that "Among Russia's export-oriented hi-tech industries, RKA's<sup>7</sup> managed and coordinated space industry is regarded as the most Western-oriented. Its Director General Yuri Koptev has a reputation of an industrial leader promoting pro-Western values and joint projects." Another added, "The Russian space sector has come a long way. If you look back ten years the space sector was totally within the military establishment, the so-called military industrial complex. It was an immense success for Yuri Koptev to take over the Russian space sector from the military - this was both successful and a massive bureaucratic struggle. This was, actually, a tremendously successful conversion; it is not complete, but still impressive."

Also, "Russia's commercial partnerships with U.S. aerospace companies play a pivotal role in complementing the ISS engagement. If the ISS project provides Russia an opportunity for highly visible international space cooperation and limited financial support, the real flow of hard currency comes from a variety of commercial contracts. They not only keep the space industry afloat but also help fulfill Russia's ISS obligations. In other words, the U.S. government-funded



ISS project helped develop a mentality and infrastructure for U.S. companies to step in and engage Russian partners in their own meaningful commercial contracts." As a result, "Unlike Russia's other hi-tech sectors, the space industry has been successful in developing a degree of compatibility with Western research standards, business practices, and political sensitivities."

In particular, Lockheed Martin has been a leader among the U.S. aerospace industry in developing partnerships with Russia,<sup>8</sup> and "Lockheed Martin's pitch to promote its space partnerships with Russia is based on the need to make the world safer by engaging thousands of highly skilled Russian aerospace engineers and scientists in commercial pursuits, thereby fulfilling cooperative threat reduction objectives. Moreover, because this is being done on a company-to-company basis, there is no expenditure of public funds and the presence of meaningful opportunities to affect real change in the way business is carried out in Russia. . . . This commercial cooperation promotes accountability and adherence to the international export control regimes. Lockheed Martin's business may be more effective than U.S. diplomatic efforts and sanctions in persuading Russia to steer clear of cooperation with rogue countries."

Another participant suggested that "The best evidence suggests that we were able to get some of the best Russian space engineers into the ISS program." For one thing, "the Russians gave up on a number of high-ticket programs with military space implications [Energia and Buran] while buying into cooperation with the United States to sustain parts of space infrastructure. There is much less talk for the last decade of militarization of space." Also, "Openness and transparency in the area of manned space flight has allowed the development of a deeper and broader network of contacts in the scientific and technical communities. Whether these new relationships are sufficient to change Russian policy in a crisis seems to be asking much. On the other hand, channels of communication in the information age often have unanticipated consequences -- especially where informal channels are involved." For, according to another participant, "I cannot think of anything - with the exception of military to military contacts - that can be more indicative of changes in US-Russian relationships than cooperation in the area of human space flight and military to military contacts. To begin with, there is the critical area of trust." "Closer ties in the area of space" are likely to result in "greater realism on both sides," and such "realism works against rabid nationalism."

To another participant, "U.S. policy with regard to space cooperation was successful in that it grabbed the attention of Russian policymakers at a high level as well as down into the aerospace industry, and resulted in some tactical victories, such as cancellation of the ISRO<sup>9</sup> sale. . . . Space cooperation policy was therefore a powerful opening round in a U.S. campaign to convey effectively the strategic choice most likely to succeed in bringing Russia into the world economic community. . . . The Russian military-industrial elite should come to conclude, from cooperation with the United States, that a choosing a high standard of nonproliferation policy behavior would pay off for them in economic terms, opening doors to playing in the world market that would not be available if they stuck to the 'bottom feeders'." After seven years, "the picture is overall positive, not least because a number of U.S. companies have become closely intertwined with their Russian aerospace counterparts. These close working relationships, if they are successful, produce a community of interests that invest Russian industry specialists in the cooperation. Their paychecks become regular, and they experience other worthwhile perquisites such as occasional trips to the United States. They also experience collegial relationships with their U.S. colleagues that enhance their sense of the strength of Russian technology to compete in the world

market. Although not tension-free, such relationships create a common understanding of technical and other requirements, including export control requirements."

It was noted that there are continuing security risks associated with intimate U.S.-Russian cooperation at the technical level: "The risk, however, is that such specialists would continue their work on military applications even while 'converting' to civilian endeavors, and perhaps even improve the quality of their military research using insights gained from international cooperation in the civilian sector." For, "it would be very difficult to judge the extent to which cooperation with NASA has improved the prospects for Russian military space programs or whether Russian space industry employees are selling their military expertise on the side to third countries." In fact, "The most promising result of contacts between Russian and American civilian space communities would be the strengthening of a norm favoring the use of space for peaceful purposes.

. . . What are the prospects that those Russian scientists whose careers have been tied to the military application of space research could - by cooperating with the United States and other countries on the International Space Station - be weaned of their dependence on the military sector?" To this participant, the answer to that question does not lie on continuing civilian space cooperation, but rather on U.S. behavior regarding the militarization of space.

It is also important to recognize, another participant added, "Space cooperation is unique, in the sense that there are not many industries in which this kind of effort could be justified, and here the payoff is in terms of Russian expertise- in not having to duplicate what they already know. This is an example of what can be done, and that is a positive effect- but again, it is a very elite industry, and a special case."

Another participant was not sanguine about the transformational character of space cooperation: "Like MinAtom, RKA is a force of the past. Most of its leaders commenced careers in the Soviet period. Its programs are dominated by older scientists. . . . Joint Russian-American space efforts must break free of these Soviet era carry-overs in administration and political justification for the space program. They must focus on changing the old Soviet culture of doing research, selecting topics, and giving promotions. I believe we must actively seek out mechanisms to change the culture of doing business or science in all areas of Russian-American exchanges-legal, educational, scientific." To do this, "One of our goals should be not only to keep individuals from turning to weapons proliferation to support themselves, but also to provide younger individual scientists the kind of research autonomy and discretion their American counterparts enjoy. . . . Should NASA continue to cooperate with RKA, it should continue to insist that younger scientists be included and granted decision-making powers as members of U. S.-Russian teams. Joint programs must ensure funding for beginning specialists to overcome the generation gap that has developed between those older scientists and the young persons who will fill the agency's positions in the coming years." To this, another participant added, "Young people still see the value of space- from a realist perspective, space is a way to integrate with the western world." Another participant agreed that much change was still needed: "On issues of engineers and technologies, I am much less sanguine. I am not convinced that, in fact, we have worked wonders inside scientific and technical communities inside Russia.... There is a tremendous bureaucratic and social inertia on the Russian side, particularly tendencies toward centralization. I don't necessarily see any evidence that this has necessarily been overcome."

Also, "it is unclear how propping up RKA-granted for peaceful programs involving human space flight-reduces Russian space military capabilities. U. S. funding and contracts must ensure the creation of alternative domestic civilian sector employment opportunities for weapons specialists, including RKA employees. I would add that much of the fear of brain drain was orchestrated by Russian officials and scientists in search of western dollars in a time of economic difficulty. This is clear in the statements of MinAtom and RKA officials alike. . . . Nunn-Lugar and NASA funds cannot prevent Russian weapons specialists from seeking employment abroad. That will happen in any event. Who knows how many have already gone abroad? And more will. . . . Since we cannot prevent the flight of individuals, we must focus on seeking ways to deny the spread of critical technologies throughout the globe. Providing a market for Russian technology is therefore a much more effective way to fight unwanted technology transfer than is the fight against brain drain."

In addition, "Russians and Americans have demonstrated in a variety of different areas of science and technology both the symbolic and actual benefit of cooperation. But that collaboration has little impact on evolving Russian political institutions. Cooperative R&D programs cannot be justified because they change political institutions. There is little evidence that they bring about reforms by building links with the elite of the military-industrial complex. Still, they promote familiarity among the elite of both countries, and this is an important confidence-building measure for the conduct of foreign policy in both of them." It is necessary to remember that "the space industry is an elite industry. This is a sharing with the rich. Most of the industries in Russia are in much worse shape. . . . To normalize the economy, they must normalize laws, banking systems, corporate culture. The leadership still aspires to an empire. . . . Russia is being misled by its desire to dominate the near abroad."

It was noted that "an important issue is whether U.S. support for Russia's space industry may be used to boost Russia's defense component and thus pose a threat to U.S. national security." However, it appears that the Russian Ministry of Defense is working closely with RKA, and that the two agencies "have developed a list of space-based assets to be jointly funded and operated. So-called dual-use satellites are designed to work both in civilian and defense modes. The Ministry is eager to emulate RKA's ability to tap commercial funding." There is a "complex process in the Russian space sector- not just conversion, but commercialization of military space. There are many dual use technologies. Today there are practically no dedicated military satellites."

Thus "as long as nuclear deterrence is the basis of the U.S.-Russian strategic relationship, engaging Russia's missile and space industry in mutually beneficial technology exchange and relationships is key to predictability and stability. Any collapse of Russia's space infrastructure as a result of the inability to maintain and modernize it could lead to accidental or erroneous launches of strategic nuclear weapons fraught with catastrophic consequences for the United States. Russia's emerging dual-use space capabilities should be a concern but at the present juncture they cannot be a major argument against bilateral or multilateral cooperation." But another participant added "As to the relationship between the military and civilian components, it is becoming very blurred. The basic issue is, are we afraid of that? What would be the worst case scenario if part of the money and expertise goes into the defense sector? What we should be afraid of is Russia's weakness, rather than Russia's strength. One of the weaknesses is the

disintegrating early warning system . . . . Even if part of the spin-off from the ISS may benefit the military, at this particular juncture it may be beneficial because it contributes to more predictability. Down the road, military spillover may be a much more serious issue."

Finally, one participant cautioned that "It is difficult to underestimate the impact of the economic situation on the Russian space and missile complex- it is a very sobering situation." Another remarked that, if one considered "what a country with such current problems ought to be focusing research on, it seems to me the last things ought to be space and nuclear power. I think it's very inefficient to be involved in areas that have little or no social benefit. I think there is an exaggerated benefit for nonproliferation, and a very real risk of propping up the military." A third participant disagreed: "In an ideal world, we should have an emphasis on overall economic and social programs in Russia. On the other hand, I do believe in this kind of leading edge approach, that you want to encourage economic sectors that are a kind of beacon of encouragement in an otherwise discouraged economy and society." Also, "the important consequences are off into the future- the critical impacts on the industrial and economic base in Russia are yet to be determined. . . . In many ways, the stakes are quite high."

#### **4.2 Impacts on Nonproliferation and Technology Transfer**

One goal of offering enhanced space cooperation to Russia was to encourage Russia to comply with the MTCR and other nonproliferation measures, and "the current view inside the U.S. government is that the Russian aerospace industry has indeed engaged in many fewer unseemly technology transfers to countries such as Iran than have other sectors, most notably the nuclear power industry."

One participant posed the question "Is Russian participation in the ISS creating domestic interest groups with a long-term stake in MTCR compliance and in good relations with the United States?" His belief is that "the answer to this question is undoubtedly 'yes,' and specific evidence is available to support this claim." For "there are clear linkages observable today between the participation of Russian enterprises in the ISS and U.S. space launch initiatives and increased nonproliferation compliance by these entities. By contrast, those enterprises that have not been able to benefit from this cooperation have frequently sought out other, proliferation-related avenues in an effort to survive. . . . To take one example, cooperative ventures with the United States have caused RKA to undertake significant new initiatives aimed at improving Russia's compliance with the MTCR. It has begun extensive training of representatives from its numerous facilities and has set up a separate export control department to coordinate efforts throughout the industry and to facilitate cooperation with Western governments and firms. This new department is staffed by serious, highly qualified professionals who, though they want to promote Russia's space industry, also exhibit a growing commitment to nonproliferation norms."

"This new cadre of export control specialists in RKA is building the foundations for a 'compliance culture' with the Russian space/missile industry, one that understands the trade-offs involved in maintaining the benefits of existing cooperative programs with the United States, including on the ISS. In this context, the space station takes on added importance in keeping their efforts focused on the positive gains possible through cooperation with the West and in convincing industry to introduce effective export controls and strict licensing mechanisms. While

there are still strong tendencies at some enterprises within their industry to seek quick money through "back door" deals with states outside the MTCR, thanks to the ISS and other commercial ventures with the United States, new nonproliferation values are beginning to prevail in this internal struggle and are bringing about changes in industry norms."

According to another participant, RKA "has been a visible leader in promoting and organizing its intra-agency nonproliferation export control. . . . RKA operates its own internal export control commission chaired by its first deputy director. Its mandate is to assist exporters under RKA's jurisdiction to submit applications and obtain export control licenses from the Russian government. According to RKA sources, the commission is guided by a well-defined set of nonproliferation and political considerations. One of its recent decisions was to reject a proposed contract with Taiwan. As of now, most RKA's exporters from among its 104 facilities, including 23 joint stock companies, have either export control departments or specially trained persons responsible for export control decisions."

This analysis continued: "In Russia's fluid political and economic situation, it is difficult to evaluate the effectiveness of its national export control system in general and its components under RKA's jurisdiction in particular. However, hardly any of Russia's known major ISS contractors has been publicly implicated in serious export control violations or sanctioned by the United States for illegal transfers to the countries on its proscribed list. . . . This record is due in part to the growing incentive of being closely associated with Western companies and relevant contracts." In summary, "U.S.-Russian cooperation in manned space flight has strengthened Russia's nonproliferation commitment. There is clear evidence to conclude that Russia has been more sensitive to and cooperative on nonproliferation issues than it would have been in the absence of the ISS project. ISS activity has also kept more Russian space personnel engaged in civilian activities and reduced the likelihood of their involvement in military related activities and with states of concern. At the same time, U.S. support and cooperation with Russia has kept a military-related sector of the Russian economy afloat that could have negative military and proliferation consequences under different political scenarios in the future. This strikes us as a gamble that the United States should be prepared to take."

Another participant noted that "it was in part because of the ISS program that the Russian government agreed to abide by the MTCR and to establish a special channel between [U.S.] National Security Adviser Sandy Berger and Yuri Koptev to deal with missile proliferation issues." Taking a broader view, one participant suggested that "cooperation with the Russian space program and Russian military has practical benefits as part of a multi-faceted U.S. strategy. Take proliferation. The U.S. has to use numerous mechanisms to try to get a handle on the problem of proliferation of weapons of mass destruction and their delivery systems. No one part of this effort will suffice. To the extent that discussions within the Permanent Joint Council established by the NATO-Russian Founding Act or programs to assist Russian engineers in working on civilian projects can help, these programs are valuable components of a strategy. Again, no one should be under any illusions. The space program is not going to cause the Russian government to cancel its relationship with Iran. That relationship is too lucrative for Russia. But as part of a broader strategy to contain proliferation efforts, U.S.-Russian cooperation in space makes a contribution."

Another participant observed, "on a lab-to-lab, company-to-company, and government-to-government basis, Russian decisionmakers have clearly gotten the message that they should avoid certain behaviors, such as technology sales to Iran. Their decisions to become engaged with the United States rather than with countries of proliferation concern seem to be based on the incentives that the United States has offered, among them financial incentives, but also less tangible incentives such as professional relationships. . . . Incentives do seem to have a beneficial effect on the standard of nonproliferation policy behavior that Russia has achieved. It is not an absolute success, because even where the U.S. approach has been most concentrated, i.e., space cooperation, individuals continue to engage in questionable behavior. Nevertheless, the impact has been clear, and the results of no action have also been clear. I would like to re-emphasize the importance not only of the monetary incentives-the resources that flow to the various institutes-but also the less tangible incentives, such as professional relationships and involvement in the world scientific, technological and manufacturing communities. These less tangible incentives, I believe, are those that have convinced many Russians that they do not want to throw in their lot with countries that are less developed economically and have questionable political, security and proliferation policy profiles. Although such markets might be tempting in certain perspectives, they do not show the Russians capable of competing at the highest level, which is precisely where they want to be."

There is still uncertainty about Russia's future course, however, in large part because of the policies being pursued by Boris Yeltsin's successor as President, Vladimir Putin. "Putin has embarked on a reacquaintance tour to many of those same old customers: Cuba, North Korea, India, Iran, etc., and even some young nonproliferation specialists (by contrast with the young managers), argue that Russia should be able to sell its weapons abroad, including missile technology. If not, they say, the United States will grab that market for itself-a very common explanation in Moscow for the U.S. concern with export control is that the U.S. is simply trying to keep Russia from legitimate arms sales so that it can claim Russian markets for itself."

"Russia is therefore suspended in some intermediate state. Some in Russia, and a fairly potent political class at that, are interested in sustaining these ties [to former Soviet bloc countries] no matter what the cost to Russian international economic status. At the same time, Putin has been exerting strong efforts to gain early Russian entry to the World Trade Organization (WTO), with the fervent support of the industrial and managerial class-especially the younger generation, but also engaging some of the powerful oligarchs. I would bet on the new managerial class to drive the country in a sounder economic direction, including international standards of export control, especially given Putin's attention to early entry into the WTO. However, aspects of current Putin behavior and current Russian behavior are admittedly contradictory."

In particular, one participant noted "What I'm looking at is a rapidly developing relationship with the PRC. There are not only arms sales that we know about, there are regular visits, there is brain drain from people going back and forth." Another added "I am struck that the technology flux of systems between Russia and China is very important. The Shenzhou spacecraft is clearly an upgrade of the Soyuz vehicle. . . . The example of the Shenzhou spacecraft shows how far things can go without us noticing. This could be an example of many other transfers going on between Russia and China without the United States noticing."

Although the majority saw space cooperation as a strong stimulus to acceptable nonproliferation behavior, one workshop participant expressed skepticism with respect to nonproliferation impact of space cooperation: "As a measure against proliferation, it is hardly significant. On the one hand, it can involve only a small portion of the Russian rocket community and, on the other hand, basic technology for ballistic missile development is fifty years old and readily available from a wide range of sources."

#### **<4.3> Impacts on Overall U.S-Russian Relations**

It was with respect to the impact of U.S.-Russian cooperation in human space flight on the overall course of U.S.-Russian relations since 1993 that workshop participants had the widest spread of views. This divergence of views appeared related to the participants' judgement of the validity of claims for broad-scale impact of space cooperation. As one participant suggested, "The Clinton Administration believed that pursuing cooperation in the space and military spheres would indeed have a broad, long-term impact on U.S.-Russian relations. But no one should be under any illusions. When the going gets tough, the influence of particular programs will be minimal. To be justifiable, these endeavors should be valuable as ends in themselves; as means to a broader end they are quite insignificant." However, another participant noted, the offer of expanded space cooperation did present "key decision-makers with a strategic choice- essentially . . . were they going to work with the United States or with Iraq? - with the US representing a more developed technological and economic community, and a more responsible one as well." Also, "space cooperation leaves a mark in the minds of Russian as to what real cooperation with the United States might mean."

Another participant suggested, however, that "overall, the state of U.S.-Russian relations has deteriorated so much in the last few years that even a high-profile cooperative initiative such as the International Space Station is unlikely to produce significant improvement. . . . Russian participation in the International Space Station is likely to have negligible political effects - neither bolstering reformers, undermining nationalists, nor raising the spirits of a dispirited population." Yet another participant suggested "Much of the American debate about the Clinton Administration's foreign policy -- both supporters and critics -- attribute too much influence to American initiatives -- positive or negative. It failed to deal with the underlying crises that have shaken Russian society, The demographic, social, and economic crises in Russia have deep roots in Soviet experience and are not amenable to short-term fixes. . . . Against the backdrop of the radical transformation of the Russian state, economy, and society over the last decade, US-Russian cooperation in manned space flights seems to be a matter of high expectations, significant progress, and marginal impact on the overall character of US-Russian relations. Begun in an era when the leaders of the Russian Federation expected a rapid transition from the Soviet system into a democratic polity and a market economy, bilateral cooperation with the United States seemed to be a measure that ensure Russia's status as a full partner in space. Cooperation in space belongs to that time when leaders in both countries viewed the logical development of US-Russian relations after the Cold War as directed toward strategic partnership."

Even though, this same participant noted, "Within this context of the evolution of US-Russian relations over the last eight years, what assessment can we make of US-Russian cooperation in

manned space flight? First, as a high visibility program of cooperation, the program is only now reaching the point where it will enter the mass consciousness of the public in the United States and Russia and around the world. At a time of strained relations it may well be of greater value by suggesting long-range cooperation in space. That will, however, depend on the underlying nature of U.S.-Russian relations, and that is more likely to be defined and redefined by the dynamics of regional conflicts and crisis, where national interests will have primacy. . . . Cooperation in the area of manned space flight implies a long-term, on-going relationship. That it has continued while the hope for [strategic] partnership has largely disappeared should be seen as one of its strengths. Both governments view such cooperation as serving valuable national purposes with regard to the future of space and their bilateral relations. . . . Both would like to co-opt the manned space programs of other states into a program in which they define the policy goals and long-range design. Russia seems willing to accept the role of a senior partner in a consortium where the United States provides the strategic leadership."

Another participant suggested that "Assessing U.S.-Russian cooperation in the ISS, and its impact on Russian behavior, is fraught with difficulty, yet some observations, however tentative and preliminary, may be possible. First, U.S.-Russian cooperation in manned space flight has been and can continue to be emblematic of a new, more cooperative U.S.-Russian relationship. It has signaled U.S. and Russian support for collaboration in a major, highly visible area of scientific, technological and commercial activity. This cooperation and commitment should not be overlooked or undervalued. . . . Overall, U.S.-Russian cooperation on manned space flight has been a cost-efficient, desirable development. It has fostered Russia's willingness to work with the United States, and it has helped the Russian leadership resist a more nationalistic approach to international affairs. U.S.-Russian space cooperation is building links between our military, scientific and commercial links and helping bind Russia to U.S. and Western-style economic principles. Despite numerous pitfalls and uncertainties, the ISS project has become a symbol of U.S.-Russian cooperation and Russia's integration in global space research and exploration."

However, "the recent surge of Russian nationalism and anti-Western sentiments may slow down the momentum and isolate the Russian scientific and industrial elites, which have a stake in the continuation of the process. There is a perception in Russia, for example, that the U.S. interest in bilateral space cooperation is motivated exclusively by the desire to acquire the Russian experience in manned orbital flights after which the United States would attempt to marginalize Russia. Yet other Russian critics claim that Russia's engagement in the ISS project could generally limit its freedom of movement because the United States dominates and controls the project. Accordingly, despite the scientific soundness and value of this project, it is highly politicized in Russia and has far-reaching political implications. The implementation of the project must be continuously supervised and controlled by the top political leadership in both countries and remain insulated from the vagaries of rapidly evolving domestic and international politics." Another participant added "I am deeply worried about what will happen with President Putin- and he himself probably still doesn't know. This may be one of the traditional turns away from the West after a long turn toward the West...I don't like it when exchanges in science and technology are affected by the way the political winds are blowing in Moscow or in Washington, but sometimes cooperation must be put on hold to express deeper concerns. The key question about ISS is whether the Russians are really in it for the long run."



Yet, to one participant, "If nothing else, good relations in the area of space policy help provide us with a cushion when they are failing in other areas. . . . Moscow's military as well as its space program are in very dire straits. Both would seem to be close to cardiac arrest. Having said that, I think our interactions with the Russians in both of these areas are critical to our future bilateral relationship. It would be easy to dismiss the Russians as serious players given their internal situation- an attitude often heard around Washington. To a large degree, we have to carry the ball for them. . . . So why should we continue to pick up the tab? Why should the American taxpayer continue to subsidize the Russian space program - or our military to military contacts? It seems to me that there are two answers to this question. First, when it comes to the space program we are dealing with a very high visibility program. If we ignore the Russian space program, we run the risk of wounding their pride in a very serious way. They don't need to be told that they are down and out. They know it better than we do. My experience with Russians tells me that they are experts when it comes to knowing the extent of their technological inferiority vis-a-vis the West - or put differently, just how far they are behind us. But by keeping them involved in the space program we are at least giving them a psychological fig leaf."

This participant noted that "the more ties we can develop with the Russians in sensitive areas like space and the military the better off our overall relationship will be. . . . It is also worth noting that we have a unique, and even unparalleled opportunity. Both the Russian military and space programs will shortly be forced to undergo some major reforms. It is clear to everyone - and especially the Russian professionals for whom I have developed considerable respect over the years - that something must be done. And it is not just a question of money, although that is critical. Putin is addressing this issue in the military area right now. It is only a matter of time before the space programs undergo the same process. The closer our ties are to these two critical institutions the better will be our chances of impacting on the evolution of these structures. I am not suggesting that either the Russian military or space program will mirror what we have in this country. Both will be Russian and carry an indelible Russian trade-mark. Nevertheless, I think we would be silly to underestimate the impact these two programs will have on our bilateral relations."

He concluded that "further development of our bilateral space and military to military relations is a win-win process."

Another reason for continuing cooperation was suggested: "it is important for U.S. decisionmakers to recognize that even the short-term cutoff of ISS cooperation could have severe costs, undermining changes that have not yet become consolidated and incurring other risks. . . . It can be argued convincingly that U.S. withdrawal of support or conditioning of funding for cooperative space projects on the proliferation-related behavior of other Russian entities not involved in the project but under some form of state control (as some critics have suggested) would be counterproductive to U.S. policy aims. Specifically, not engaging these Russian companies would greatly exacerbate proliferation problems (by reversing market forces that make the United States their currently preferred partner), cause the ISS to suffer scientifically (from the loss of Russia's considerable experience and expertise in manned space flight), and remove one of the few positive signs of long-term cooperation in the current U.S.-Russian relationship (which has suffered greatly in the past two years due to NATO expansion, U.S./NATO bombing of Yugoslavia, and U.S. national missile defense tests and attempts to

revise the ABM Treaty). Alienating firms currently involved in cooperative projects may push Russian space know-how into the willing arms of India or China, possibly encouraging the formation of new alliances in space activities. Thus, while enterprises directly involved in the ISS should be held to a very high nonproliferation standard, the United States should exercise restraint in considering blanket sanctions that punish innocent as well as guilty enterprises, just because both are nominally under Russian state control."

One rationale offered for bringing Russia into the space station partnership was to help it maintain its self-image as a great power. One participant noted that "the Putin Administration has recently reaffirmed Russia's commitment to continued space cooperation. Apparently, much more than its predecessor, the new government views this hi-tech cooperation as an important trapping of Russia's great power status. ISS cooperation was a major topic of discussion between President Clinton and President Putin at their meeting during the UN Millennium General Assembly in New York in September 2000." Also, "There is consensus about the importance of symbolism. One particularly important symbolic dimension is the buzzword of equality. This is especially important [to Russia] now, under Putin. It is an asset for Russia under Putin to be an equal partner with the United States on the space station, and it does provide leverage to contribute to positive outcomes. . . . The space station may provide a way to channel the desire for equality into positive avenues."

While some participants thought treating Russia as an equal in the ISS was a valuable objective, at least one participant strongly disagreed: "The United States does neither itself nor Russia any favors by trying to find ways to help Russia bolster its self image as a great power. It would be much more productive for Russia to accommodate itself to its reduced capabilities internationally as Britain did after World War II. The United States in many ways ended up in the worst of all worlds in the 1990s: it made a lot of noise about Russia being a great power, but it went ahead and acted in ways that demonstrated Russia's palpable weakness. Those who believe it can't hurt to play along with Russian pretensions are wrong, because Russia is only more humiliated when actions demonstrate where it really stands."

"We should look for ways to work constructively with Russia. Russia can pose problems for the American agenda in Europe and Asia. And Russia has much it could contribute to peacekeeping missions or to major scientific endeavors. But Russia is no longer one of the world's great powers, and the sooner everyone accepts that, the quicker we will be able to have a more productive relationship."

## **5. Summary Remarks**

The overall picture produced by the comments of workshop participants has three principal elements.

First, the different evaluations presented above on impacts of ISS cooperation, both negative and positive, are best interpreted as produced, at least in part, by differences in the context in which the analysis was placed. The broader the context, the less the impact. And vice versa. Restricting the view to the space sector proper, the impact of ISS cooperation was judged by nearly all participants to have been significant. The sector has been converted to civilian control. It adheres

to the culture of compliance with export control and nonproliferation requirements. And it has been opened to the world market.

As one looks for impacts beyond this, the influence of cooperation in space diminish the farther one moves from the space program itself. At a nationwide view or a general international policy view, most workshop participants agreed that the impacts have been much less significant.

Second, impacts such as those discussed in this assessment are difficult to measure. Other U.S. policies may counteract the positive impacts of ISS cooperation, for example. But direct measurement has not yet been seriously attempted. Several suggestions were made regarding the desirability and feasibility of such measurements.

Finally, considerable uncertainty is inevitable in attempting to project impacts of cooperation to date into impacts in the future. The policy directions of the new administrations of Vladimir Putin and George W. Bush raise considerable uncertainty regarding the future context for ISS cooperation. Putin, for example, has been restoring links with the countries that the Soviet Union had as arms industry customers, such as Iran, Iraq, the PRC, and so forth. The new Bush administration has voiced a commitment both to further NATO expansion and to national missile defense. Whether or not these apparent differences in priorities and policies can be reconciled with continued fruitful cooperation in foreign policy and national security terms on the ISS remains to be seen.

## **Appendix A**

### **Biographical Sketches of Workshop Participants and Organizers**

**Gary K. Bertsch** is University Professor of Political Science, and the Director of the Center for International Trade and Security, at the University of Georgia. Professor Bertsch has been at the University of Georgia since 1969, and is a member of the Board of Trustees of the University of Georgia Foundation, and the Council of Foreign Relations. Professor Bertsch's research focuses primarily on the domestic and international politics of technology trade, strategic trade and weapons proliferation. From 1995 to 1997 he served on the National Research Council's Committee on Dual-Use Technology, Export Controls, Materials Protection, and Accounting.

**James M. Goldgeier** is Associate Professor of Political Science and International Affairs at George Washington University, where he serves as director of European Studies and Russian and East European Studies. He is also a nonresident senior fellow in foreign policy studies at the Brookings Institution. In 1995-96, Goldgeier was a Council on Foreign Relations International Affairs Fellow, serving at the State Department and National Security Council Russia offices.

**Rose Gottemoeller** is a senior associate at the Carnegie Endowment for International Peace. Her research is primarily in the area of nuclear security, specifically relating to the breakup of the Soviet Union. Prior to joining the Carnegie Endowment, Ms. Gottemoeller served as the US Department of Energy's assistant secretary for nonproliferation and national security. Ms. Gottemoeller has also worked on nuclear nonproliferation issues for the National Security Council, the Arms Control and Disarmament Agency, RAND, and the US Department of State. In 1993, while at the National Security Council, she was part of the team that developed initiatives for enhanced U.S.-Russian space cooperation.

**Matthew Evangelista** is a Professor of Government at Cornell University, where he teaches courses in international and comparative politics. He received his undergraduate degree in Russian history and literature from Harvard, a certificate in Russian language from the Pushkin Institute in Moscow, and his Ph.D. in Government from Cornell. Prior to returning to Cornell to teach, Professor Evangelista taught at the University of Michigan. He currently serves as the head of the National Council for Eurasian and East European Research.

**Dale Herspring** is a Fellow in the Center for Russian and East European Studies at Kansas State University. Prior to his work at Kansas State, Professor Herspring taught at the National War College, Georgetown University, Columbia, and the George Washington University. Professor Herspring has done extensive work on Russia and Eastern Europe, focusing primarily on civil-military relations.

**Paul R. Josephson** is an Associate Professor of History at Colby College. He has also taught at Wellesley College, Sarah Lawrence College, and Columbia University. Professor Josephson has done extensive work on Russia and the USSR, with a substantive focus on science, technology, and security. Professor Josephson has published and contributed to a number of books and articles, including *Red Atom* and *Totalitarian Science and Technology*.

**Igor Khripunov** is an Adjunct Professor of Political Science and the Associate Director of the Center for International Trade and Security at the University of Georgia. His research mainly focuses on nonproliferation and export controls, conventional weapons transfers, chemical disarmament, and other security related matters. Prior to his work at the University of Georgia, Professor Khripunov worked for the UN Secretariat in New York, the Soviet Ministry of Foreign Affairs, and the Soviet (and Russian) Embassy in Washington, DC. He co-directs (with Gary Bertsch) the Center for International Trade and Security's project on "The NIS and Weapons Proliferation: Promoting Export Controls in the former Soviet Union."

**Jacob W. Kipp** is a senior analyst with the Foreign Military Studies Office of the U.S. Army Training and Doctrine Command at Ft. Leavenworth, Kansas. Dr. Kipp is also an Adjunct Professor of History at Kansas State University, where he teaches in the Soviet and East European Studies program. Dr. Kipp is an expert on Russian/Soviet and East European military and naval history. His research has focused on the impact of technology on the evolution of Russian/Soviet military strategy and doctrine, and the Soviet concepts of space as a theater of military actions.

**John M. Logsdon** is the Director of the Space Policy Institute of the George Washington University's Elliott School of International Affairs. He is also Professor of Political Science and International Affairs. Dr. Logsdon's research interests include U.S. and international space policy, the history of the US space program, and the structure and process of government decision-making for research and development programs. He is the author and editor of numerous books, articles, and reports.

**Jack Mendelsohn** is Vice President and Executive Director of the Lawyers Alliance for World Security (LAWS). Prior to joining LAWS, Mr. Mendelsohn was a Senior Foreign Service Officer with the U.S. Department of State, the Deputy Director of the Arms Control Association,

and a Professor of National Security Affairs at the U.S. Naval Academy. Mr. Mendelsohn served in the Arms Control and Disarmament Agency, and was the Agency's senior US representative on the US START I delegation. Mr. Mendelsohn has extensive experience in arms control, nonproliferation, and security issues.

**James R. Millar** is the Director of the Institute for European, Russian and Eurasian Studies, and Professor of Economics and International Affairs, at the Elliott School of International Affairs, George Washington University. Previously, Professor Millar was Director of International Programs and Studies at the University of Illinois at Urban-Champaign. Professor Millar has served as a consultant and instructor in macroeconomics for the International Business School, Inc, which, since 1992, has trained more than 5,000 Russian executives. Professor Millar edits the journal Problems of Post-Communism, and has done extensive work on economics and daily life in the USSR and Russia.

**James Clay Moltz** is Associate Director and Research Professor at the Center for Nonproliferation Studies at the Monterey Institute of International Studies. Mr. Moltz is the Director of the Newly Independent States nonproliferation program at the Monterey Institute. Mr. Moltz is a consultant with the US Department of Energy's Office of Nonproliferation and Arms Control, Russian Nuclear Materials Task Force. Mr. Moltz is the founding editor of The Nonproliferation Review, and has published numerous articles on nuclear nonproliferation and other security issues.

## **Appendix B**

### **The Evolution of U.S.-Russian Cooperation in Human Space Flight**

**John M. Logsdon**

A. The Early Years Only two countries - the United States and the former Soviet Union (hereafter identified as Russia<sup>10</sup>) - have developed the capabilities needed to take humans into space, support them while there, and return them safely to Earth. Although the space programs of the two countries were developed as part of their Cold War competition, almost from the start there have been suggestions that the United States and Russia should also cooperate in space, even in the politically most visible area of human space flight.

Thus President John F. Kennedy in his 1961 inaugural address suggested to the Soviet Union "together let us explore the stars." He was more explicit in a September 20, 1963 address before the United Nations, when the Apollo program was already well underway, suggesting "why, therefore, should man's first flight to the Moon be a matter of national competition? Surely we should explore whether the scientists and astronauts of our two countries - indeed of all the world - cannot work together in the conquest of space."<sup>11</sup> Shortly before he was assassinated, Kennedy ordered NASA Administrator James E. Webb to work together with others in the government to "develop a program of substantive cooperation with the Soviet Union in the field of outer space," including "cooperation in lunar landing proposals."

With Kennedy's death, the momentum behind this cooperative initiative dissipated. President Lyndon B. Johnson had since his days in the U.S. Senate been a supporter of a strong space program, and influential members of Congress had reacted negatively to Kennedy's cooperative proposal. The idea of U.S.-Russian cooperation was revived in 1970, after the United States was

first to reach the moon with the Apollo 11 mission in July 1969. As part of his administration's détente strategy, President Richard Nixon in May 1972 signed an agreement with the Chairman of the Soviet Council of Ministers Alexei Kosygin to have an U.S. Apollo spacecraft rendezvous and dock with a Russian Soyuz vehicle. The subsequent Apollo-Soyuz Test Project led to a highly visible July 1975 "handshake in space."

This project was seen by the Nixon and Ford administrations not as a dead-end undertaking, but rather as the beginning of increasingly intimate U.S.-Russian cooperation in human space flight. After two years of negotiations, in May 1977 the leaders of the National Aeronautics and Space Administration (NASA) and the Soviet Academy of Sciences initialed an agreement that called for "Study of the Objectives, Feasibility and Means of Accomplishing Joint Experimental Flights of a Long-Duration Station of the Salyut-type<sup>12</sup> and a Reusable 'Shuttle' Spacecraft (Salyut-Shuttle Program)." The agreement also called for "Consideration of the Feasibility of Developing an International Space Platform in the Future (International Space Platform Program)." In this 1977 agreement, then, the United States and Russian anticipated what eventually happened a quarter-century later - flying a U.S. Space Shuttle to a Russian space station, and working together with other countries to develop an International Space Station.

The 1977 agreement was not implemented; the Carter administration chose not work closely with Russia in reaction to the Russian violations of human rights and its 1979 invasion of Afghanistan. In 1982, the Reagan administration, as part of its initial negative stance toward Russia, allowed the framework agreement for U.S.-Russian space cooperation to lapse.

In 1987, with the change in the political climate for U.S.-Russian relations following the rise to power of Mikhail Gorbachev, a new framework agreement was negotiated; it did not, however, list human space flight as one of the sixteen areas selected for initial cooperation. Another five years were to pass before such cooperation once again became politically acceptable.

B. Space Cooperation during the George H. W. Bush Administration - 1989-1991 The 1987 agreement anticipated that additional areas of U.S.-Russian space cooperation could be undertaken if they were of mutual benefit and interest. Discussions began in 1989 about the possibility of cooperation in biomedical research related to human space flight, and of potentially having a U.S. astronaut fly to the Russian Mir station while a Russian cosmonaut flew aboard the U.S. Space Shuttle. This possibility was discussed between U.S. Vice President Dan Quayle, who chaired the Bush Administration's National Space Council, and Mikhail Gorbachev, while Gorbachev was in Washington for a summit meeting with President Bush in June 1990. To assess the feasibility of such an undertaking, NASA Administrator Richard Truly made an exploratory visit to Russia in October 1990.

Presidents George H. W. Bush and Mikhail Gorbachev signed an astronaut-cosmonaut exchange agreement during their July 1991 summit meeting in Moscow. However, the Russian side was reported to be disappointed because the United States rejected a more ambitious Russian proposal - to have the Shuttle actually rendezvous and dock with the Mir station. This rejection came, it was reported, because of "concerns among Defense, State and Commerce department officials about technology transfer and national security." Also discussed at the summit was the Russian desire to enter the commercial space launch market; this would require the United States

to allow U.S.-built communications satellites to be launched by Russian boosters from the Russian launch site at the Baikonur Cosmodrome in Kazakhstan. The two presidents agreed to a mechanism for annual high-level consultations on space. <sup>13</sup>

C. 1992- The Beginnings of More Intimate U.S. Russian Space Cooperation In December 1991, the Soviet Union was disbanded and Mikhail Gorbachev was no longer in power. This put the Russian Federation in the position of being, for most purposes, the successor state to the Soviet Union, and its president, Boris Yeltsin, in the position of being the counterpart to U.S. President Bush. Among the obligations and commitments which the Russian Federation assumed from the Soviet Union were those related to space cooperation.

In April 1992, President Yeltsin created a Russian Space Agency (RSA) as a civilian organization, responsible, among other duties, for government-to-government space cooperation. He named as its head Yuri Koptev, formerly deputy director of the Ministry of General Machine Building, the overseer of the Russian military-industrial complex. The creation of RSA gave NASA a single civilian point of contact within the Russian government, something heretofore missing, given the several centers of control over the space program of the former Soviet Union, most of which were controlled by the Soviet military.

In the United States, on April 1, 1992 Daniel Goldin replaced Richard Truly as NASA Administrator. Like Yuri Koptev, Goldin had spent most of his career working on national security programs, in his case for the aerospace firm TRW. Goldin was brought to NASA by the Bush administration with a mandate to reform an organization perceived by the White House as too conservative and having lost its position at the cutting edge of technology and innovation. Goldin and Koptev first met in early June 1992; Koptev was in Washington to discuss cooperation possibilities in anticipation of a summit meeting between Presidents Yeltsin and Bush later that month. From the start of their relationship, Koptev and Goldin agreed on the desirability of using space as an arena to symbolize and reinforce the new, peaceful relationship between the United States and Russia.

The June 1992 Bush-Yeltsin summit included the signing of a new U.S.-Russian Space Cooperation Agreement. That agreement called for, among its other provisions:

- going beyond the already agreed-upon cosmonaut-astronaut exchange to "a rendezvous [and] docking mission between the MIR and the Space Shuttle in 1994 or 1995";
- "detailed technical studies of the possible use of [Russian] space technology" for U.S. missions, including Space Station Freedom;
- "steps to encourage private companies to expand their search for new commercial space business";
- in addition, "reflecting its support for economic reform in Russia," the United States agreed to support a decision by the international organization INMARSAT to launch its U.S.-built INMARSAT 3 satellite on a Russian Proton launcher.

In the aftermath of the June 1992 summit, Administrator Goldin and the Executive Director of the White House National Space Council, Brian Dailey, visited Russia from July 12-17 to discuss the steps needed to implement the summit space initiatives. They agreed to increase the

intensity of working-level interactions between the two countries. NASA awarded a contract to the lead Russian organization for human space flight, Energia, to examine ways in which "hardware systems and technology developed for use in the former Soviet space program can be evaluated for use in the U.S. program, and specifically Space Station Freedom." Also in July, representatives of seventeen U.S. aerospace firms, under the sponsorship of the U.S. Department of Commerce, visited forty Russian organizations involved in space, with the goal of identifying the basis for future mutually beneficial commercial interactions such as joint ventures and licensing agreements. These steps could give U.S. firms access to Russian space-related technologies, which in several areas were superior to similar U.S. capabilities.

On October 5, 1992, NASA and RSA signed an "Implementing Agreement . . . on Human Space Flight Cooperation" that identified the steps to be taken to carry out the program agreed upon at the June summit, and the necessary legal and other details associated with the cooperation. The agreement specified that the joint effort was to be referred to as "the Shuttle-Mir Program."

By the end of 1992, then, the foundation was in place for significantly expanded cooperation in space between the United States and Russia. This cooperation, if fully realized, could involve both government-to-government and private sector interactions, extend across the full range of space activities, including science, applications, and space launch,<sup>14</sup> and renew some of the hopes for human space flight cooperation of the 1960s and 1970s. What was not known, however, was the attitude of the incoming administration of President-elect Bill Clinton towards this new Russian-U.S. space relationship.

D. Space Cooperation and the April 1993 Vancouver Summit Before the Clinton administration could focus on U.S.- Russian cooperation in human space flight, it first had to decide on its attitude overall toward the U.S. human space flight program. Soon after he became President, several of President Clinton's advisers, including Office of Management and Budget Director Leon Panetta, suggested that he cancel the Space Station Freedom program; if that had happened, expanding U.S.-Russian cooperation obviously would have become a moot point. After several weeks of heated debate, the President decided in March 1993 to investigate whether there were better alternatives to the current Space Station Freedom plan; he directed NASA to undertake a rapid and far-reaching redesign of the station, with the redesign goal being "to significantly reduce development, operations, and utilization costs." The guidelines for the redesign noted that "new opportunities for Russian participation should be considered" and that "consideration may be given to greater use of . . . the Russian Mir Space Station."<sup>15</sup>

The idea of additional Russian involvement in a redesigned station, beyond providing Soyuz spacecraft as crew rescue vehicles, came out of the interactions between representatives of NASA, RSA, and Energia in the early months of 1993. Russia was planning to replace the Mir station, launched in 1986, with a Mir 2 station, and suggested that the United States indeed might want to use the new Russian station as a central element in the new design. RSA chief Koptev and Energia head Yuri Semenov in a March 16 letter to NASA Administrator Goldin suggested that "billions of dollars" could be saved by the "unification" of Russian and U.S. efforts to create a "joint advanced orbital station."<sup>16</sup>



While at the technical agency level discussions of additional Russian participation in the space station went forward, at the political level the Clinton administration in March 1993 decided to make expanded U.S.-Russian space cooperation an initiative to be offered to Boris Yeltsin at his first meeting with Bill Clinton, which was to be held in Vancouver, Canada on April 3-4. The concept embraced by the President and his Vice President Al Gore was that bringing the two countries (and also the existing partners in the space station program, all traditional U.S. allies) closer together in space, was an excellent way of fostering and then symbolizing the strategic alternative sought by the White House - to ally Russia with the West, rather than seeing it pursue an independent course in the post-Cold-War period.

As he met with President Clinton, Boris Yeltsin was engaged in a fight for his political life with those in the Russian Parliament who were calling for his removal from power. The Clinton administration had decided to cast its lot with Yeltsin and his support of Russian reforms that it was thought were moving the Russia towards democracy and a market economy. In a speech just before leaving for the Vancouver summit, President Clinton had called for "a strategic alliance with Russian reform." The proposals that Clinton was bringing to the summit were intended to provide both long-term and immediate, substantial assistance to Russia. The stakes in the success of U.S. support of the Yeltsin government were high. As Time magazine noted: "If the U.S. does not succeed in helping Moscow stay on the path of economic and democratic reform and Yeltsin is ousted, the West will almost certainly face a leader in the Kremlin far less friendly to its interests." <sup>17</sup>

The focus of the Yeltsin-Clinton summit discussions, then, was on a \$1.6 billion package of aid to Russia. The two presidents also approved "a comprehensive strategy of cooperation to promote democracy, security, and peace." As a means of facilitating cooperation, they created "working groups involving high-level officials of both governments with broad authority in areas of economic and scientific and technological cooperation." In particular, they agreed to establish a "United States-Russian Commission on technological cooperation in the areas of energy and space." That Commission was to be headed by U.S. Vice President Al Gore and Russian Prime Minister Viktor Chernomyrdin. In his remarks at the close of the summit meeting, Boris Yeltsin noted that, with respect to space, "we decided to cooperate . . . and decided to join forces, the US and Russian Administrations," and that President Clinton had stressed that this was "in support of Russian reforms, a part of the strategic form of cooperation between us." <sup>18</sup>

In the aftermath of the summit agreement on increased space cooperation, White House Science Advisor John Gibbons directed NASA to give "full consideration" to the possible use of Russian technology and expertise as it considered alternative ways of redesigning the space station. As a means of making Russian expertise available to the station redesign team, NASA announced that a team of Russian engineers and other officials would come to Washington to serve as consultants to the redesign effort.

Gibbons was forced a few days later to clarify his instructions. On April 13 he told NASA that he wanted "to make it clear that the White House has made no policy decision to focus our space station redesign effort around present or future Russian capabilities." According to one official, the lowering of expectations with respect to Russian participation was intended to preserve "the integrity of the redesign process" and that "no decisions" about the preferred new design had

been made. This clarification apparently reflected disagreements within the Clinton administration, between the White House and the Congress, and between the United States and at least some of the U.S. space station partners about the wisdom of giving Russia a central role in a redesigned space station. These disagreements blocked any quick decision on the degree of Russian participation to be sought. The leaders of the visiting Russian team met in April with White House, Defense Department, and NASA officials to suggest alternative forms of Russian participation, but were not able to reach agreement. Frustrated by the delays, they left Washington in early May. <sup>19</sup>

E. Station Redesigned, but Without Russian Participation The NASA Space Station Redesign Team submitted its report to Administrator Goldin on June 9, 1993. It outlined three possible designs for a new station. None of those designs made extensive use of Russian hardware beyond the already agreed-upon role of the Soyuz as the initial crew rescue vehicle.

The redesign effort had been monitored by a blue-ribbon panel chaired by Charles Vest, President of the Massachusetts Institute of Technology, and reporting directly to the White House. In its report, the Vest panel also gave the bulk of its attention to assessing the three options that did not include expanded Russian involvement. But the report made a key recommendation: that "several considerations of safety, flexibility, and redundancy of launch and assured crew return vehicles argue strongly for launching the station at an orbital inclination that allows access by as many spacefaring nations as possible." The panel noted that "an inclination of 51.6 degrees would achieve this, and would enable Russian participation, thereby potentially reducing costs and enhancing international cooperation." <sup>20</sup> The Vest panel gave only limited attention to the specifics of potential Russian involvement, but recommended that "NASA and the Administration further pursue opportunities for cooperation with the Russians as a means to enhance the capability of the station, reduce costs, provide alternative access to the station, and increase research opportunities." <sup>21</sup>

President Clinton accepted the report of the NASA redesign team and the Vest panel on June 17. The President called on NASA to "work with our international partners to develop a reduced cost, scaled-down version of the original Space Station Freedom." He selected for implementation the first option investigated by the redesign team, which was designated Option A or Option Alpha; it made substantial use of existing hardware planned for Space Station Freedom. By this declaration, the Clinton administration committed itself to going forward with the station program, a decision that at least formally had been in limbo until the redesign effort was completed. (At almost the same time in mid-June, the budget for the space station was approved in the House of Representatives by a one-vote margin, 216-215.) Clinton did not specifically mention Russian participation in his statement; however, he did say that he would "seek to enhance and expand the opportunities for international participation in the space station project, so that the space station can serve as a model of nations coming together in peaceful cooperation." <sup>22</sup>

F. Reaching Agreement on Russian Participation: the Policy Debate The mechanism for attempting to reach policy agreement on the scope and character of Russian participation in the space station, and on other U.S.-Russian space issues, was the commission that had been created

at the Vancouver summit. Named after its co-chairs, it had quickly become known as the Gore-Chernomyrdin Commission.

In addition to space station cooperation, another pending U.S.-Russian space policy issue in front of the Commission was the Russian desire for increased access by its launch vehicles to commercial contracts to launch communication satellites. The commercial launch market was seen by Russia as a potential source of substantial amounts of hard currency, if Russia were to be allowed to use its very capable boosters to launch for a fee non-Russian commercial satellites. Most of the potential customers were owners or operators of communication satellites. The United States could control access to that market because most communications satellites were either U.S.-manufactured or contained U.S. technology subject to export controls. In either case, a U.S. export license was required to ship the satellite to the Baikonur Cosmodrome or some other Russian launch site. The Department of State, over the opposition of other parts of the Bush administration, had approved in December 1992 a joint venture between the Lockheed Corporation and the Krunichev Enterprise, manufacturer of the workhorse Russian Proton launcher, to market the Proton in the West. The incoming Clinton administration had put that approval on hold, but at the Vancouver summit President Clinton had indicated that the United States intended to facilitate Russian entry into the commercial launch market as part of the general U.S. strategy of encouraging a market economy in Russia.

There was a major stumbling block that had to be overcome before the Gore-Chernomyrdin Commission could move forward. That obstacle was a 1992 contract between the Russian space trading company Glavkosmos and the Indian Space Research Organization (ISRO) to sell both two rocket engines using cryogenic (extremely cold) fuel and the technology needed for India to manufacture subsequent engines.

The United States viewed this contract as a violation of the Missile Technology Control Regime (MTCR), and in 1992 had imposed trade sanctions on both Glavkosmos and ISRO, hoping to persuade them to abandon the exchange. Although Russia was not a party to the MTCR, the United States believed that it had agreed to honor the spirit of the regulations; Russia argued that this particular contract, involving as it did very specialized space equipment not easily converted for weapons delivery purposes, was not a MTCR violation.

Presidents Yeltsin and Clinton discussed the issue at their Vancouver summit meeting. That discussion was apparently set in the context of their more general discussion of expanded space cooperation and access for Russia to the commercial launch market. It was reported that Yeltsin suggested that Russia might be willing to cancel its contract with India if the United States were to somehow compensate Russia for the revenue thereby lost; the U.S. position was reported as being that the potential for space station cooperation and access to the global commercial launch market were sufficient incentives in themselves. Post-summit talks between the two countries failed to resolve the issue, and in mid-June both Bill Clinton and Al Gore sent letters to their Russian counterparts urging them to find a way to remove this obstacle to expanded cooperation.

Prime Minister Chernomyrdin was scheduled to visit Washington in June for the first meeting of the Gore-Chernomyrdin Commission, but he postponed the trip indefinitely after the Clinton administration made it clear that no progress could be made with the dispute over the rocket

engine sale still outstanding. A high-level U.S. delegation visited Moscow in late June to meet with President Yeltsin, but also failed to resolve the deadlock. Increasing the pressure, the United States threatened new sanctions against a broader range of Russian organizations, sanctions that would effectively block Russian entry into the commercial launch area. The application of the sanctions was delayed until July 15 to allow President Clinton and President Yeltsin to discuss the matter in their bilateral meeting following the annual G-7 economic summit, held on July 10. [23](#)

Those discussions were fruitful. On July 15, Russia agreed to abide by the MTCR, and to cancel the transfer of rocket engine technology to India, although it would deliver the engines it had contracted to supply. This agreement broke the logjam blocking Russian access to the commercial launch market and removed what could have been a "showstopper" for expanded U.S.-Russian space station cooperation.

One day later, NASA signed an agreement with the Russian Space Agency for a short-term studies on the benefits of adding to the one mission already agreed upon additional Space Shuttle flights to the Mir station, and on how to give Russia a larger role in the redesigned space station. The deadline for the studies was August 31, in anticipation of the now scheduled first meeting of the Gore-Chernomyrdin Commission at the start of September.

G. Agreement in Principle on Russian Participation in the Space Station The Gore-Chernomyrdin Commission met in Washington on September 1-2. At the conclusion of their meeting, the Vice President and Prime Minister signed in a public ceremony a number of agreements in energy, aeronautics, and space. In particular:

1. a memorandum of understanding on missile-related exports, in which Russia agreed to abide by the criteria and standards of the MTCR;
2. an agreement on the terms and conditions for Russian entry into the commercial space launch market;
3. an agreement on a "cooperative human space flight program" that would be divided into three phases:
  - a. Phase One An expansion of the Shuttle-Mir program to include U.S. equipment being placed on new Russian modules to be launched to Mir, and a number of additional Shuttle flights to Mir so that U.S. astronauts could total two years of time aboard the Russian station;
  - b. Phase Two The joint use in orbit of a next-generation Russian module and a U.S. laboratory module as an interim step toward a permanent space station;
  - c. Phase Three Creating a permanent international space station involving contributions not only from the United States and Russia, but also U.S. partners in the Space Station Freedom program.

The phased approach to Russian participation, first only with the United States and then later with other space station partners, had been worked out in preliminary fashion in August meetings between RSA and NASA. But there were many details to be worked out; the two agencies were directed to develop by November 1 "a detailed plan of activities for an international space station." Goldin and Koptev joined Vice President Gore and Prime Minister Chernomyrdin at the

conclusion of the September 2 ceremony to unveil an artist's conception of the new international space station, with U.S. and Russian contributions at its core.

As part of the agreement on cooperation in human space flight, the United States agreed to provide Russia \$400 million as "compensation for services" to be provided during Phase One and mutually-agreed on Phase Two activities. In addition, "other forms of mutual cooperation and compensation will be considered as appropriate."

In his remarks at the ceremony, Vice President Gore characterized the work of the Commission as providing a "jump start" to the vision of a U.S.-Russian partnership sketched by Presidents Clinton and Yeltsin at Vancouver, suggesting that "in many ways, the agreements on space that we are signing today represent the leading edge of what we are striving to accomplish, Russia and the United States together: from broad market access for Russian high-technology goods to long-term projects to work together in complex, productive ways." <sup>24</sup>

H. Working Out the Details There were three requirements that had to be met before the final agreement to make Russia a central participant in the space station program could be concluded:

1. developing a detailed technical and management plan for an international space station with Russian contributions;
2. getting the support of the U.S. Congress for this fundamental shift in the station program;
3. getting the agreement of the existing station partners for the new station design and new Russian role in the program.

NASA Administrator Goldin and RSA General Director Koptev on November 1, 1993 signed an "Addendum to Program Implementation Plan" for what was by now called Space Station Alpha. The addendum laid out a plan that was intended to advance the U.S. and Russian space programs and "benefit their respective aerospace industries. This new relationship will also benefit the existing partnership involved in the international space station program." The plan for Phase One called for an expanded Shuttle-Mir program, with up to ten Shuttle flights to Mir between 1995 and 1997. In Phase Two, the interim station would be built around a Russian-built, but U.S.-financed, Energy Module known as the Functional Cargo Block (FCB), a Russian-built Service Module<sup>25</sup> containing "basic housekeeping functions, life support functions, . . . and limited payload operations," and a U.S.-built-and-financed Laboratory Module. Phase Three "completes construction of the international space station." The Addendum set out the management relationships for all three phases, and noted that for Phase Three "Russia will become a full International partner in the Space Station" and would assume the obligation of the existing Intergovernmental Agreement between the original station partners. <sup>26</sup>

Japan, Canada, and nine European countries working through the European Space Agency had been partners to the United States in the Space Station Freedom Program since signing an Intergovernmental Agreement in September 1988. The United States had worked out a new station relationship involving Russia essentially on a bilateral basis. The U.S. partners had been kept informed of U.S. moves vis-à-vis Russia, but they had not yet been formally asked to approve adding Russia to the station partnership. On October 16, 1993, the United States met with its existing station partners to formally inform them of its intent to ask the partnership to

invite Russia to join the station program. At the conclusion of that meeting, the partners invited Russia to "collectively explore possible Russian partnership." Then on November 7, the existing partners met with the Russian Space Agency to jointly review the plans set out in the November 1 Addendum. They agreed "on the need to complete an intense process at all levels that could lead to Russia becoming a full partner in the International Space Station." Finally, meeting at the intergovernmental level in Washington on December 6, "recognizing the Partners' shared objective of building broad cooperative relationships with Russia," the space station partners decided to "hereby invite Russia to become a Partner in the detailed design, development, operations and utilization of The Space Station, within the framework of the Space Station Agreements." <sup>27</sup>

The proposal to bring Russia into the international space station program initially produced skeptical reactions among some members of Congress that had previously supported the program. Their reported concerns included "uncertainty about the state of the Russian economy and the military-industrial infrastructure that operates the Russian space program; . . . about the hidden costs of such a complex technical venture and how it would affect other NASA programs, and distaste for rewarding the former enemy in a way they say could cost American jobs." The House space subcommittee held detailed hearings on potential Russian participation in early October. Vice President Gore and NASA Administrator Goldin briefed the congressional leadership on the Program Addendum on November 4. Finally, Congressional leaders were called to the White House on November 29 to meet with the President and Vice President on the issue. After that meeting, a headline in The New York Times reported that the "impasse is broken on space station. White House wins support for U.S.-Russia project." The Washington Post reported that the Congressional leaders "unanimously agreed" to support the project after the President "painted the Russian partnership as a historic opportunity to beat swords into plowshares, or more literally to convert the deadly missiles of the Cold War into peaceful long-haul trucking for the orbital facility." <sup>28</sup>

### I. Russia Joins the Space Station Partnership

The second meeting of the Gore-Chernomyrdin Commission took place in Moscow on December 16-17, 1993. At the beginning of the meeting, Prime Minister Chernomyrdin announced that Russia had accepted the invitation to join the space station program. NASA and RSA signed a protocol to amend their October 5, 1992 agreement to "significantly increase U.S.-Russian cooperation in human space flight" by an expanded Shuttle-Mir program. Finally, Gore and Chernomyrdin signed a "Joint Statement on Space Station Cooperation" that set out the steps needed to formally bring Russia into the station partnership. The statement also noted that NASA and RSA had agreed to contractual arrangements for up to \$400M through 1997, and noted "with satisfaction" the activities underway to forge U.S.-Russian industrial ties."

Although many bumps in the road would lie ahead in translating agreements and plans into reality, the events of 1993 that brought Russia into full partnership in the International Space Station could have lasting significance. First, they represented a milestone in accomplishing a long-standing dream - bringing the two leading spacefaring countries together to, as President John Kennedy has said 32 years earlier, "explore the stars together." Also, they elevated the U.S. civil space program to a position in national affairs it had not held since the Kennedy presidency

- as an important element of Presidential strategy aimed at core national objectives. It will take some years for a full assessment of the results of the 1993 cooperative initiatives.