

GAO

Report to the Chairman and Ranking
Minority Member, Committee on Science
House of Representatives

November 1999

EXPORT CONTROLS

International Space Station Technology Transfers



G A O

Accountability * Integrity * Reliability

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Abbreviations

CBM	common berthing mechanism
EVA	extravehicular activity
ISS	International Space Station
MOU	Memorandums of Understanding
MDM	multiplexer/demultiplexer
NASA	National Aeronautics and Space Administration
OIG	Office of the Inspector General
RAM	Random Access Memory



United States General Accounting Office
Washington, D.C. 20548

**National Security and
International Affairs Division**

B-283363

November 3, 1999

The Honorable F. James Sensenbrenner, Jr.
Chairman
The Honorable Ralph M. Hall
Ranking Minority Member
Committee on Science
House of Representatives

With 16 countries involved, the International Space Station Program is one of the largest scientific collaborations ever attempted.¹ Under international agreements related to the program, the National Aeronautics and Space Administration (NASA), as the U.S. representative, is obligated to deliver, disclose, or transfer technology, data, and commodities necessary to meet its responsibilities in implementing the program. Concerned about the extent of safeguards to protect technology and information exported in support of the space station, you and the late Representative George Brown asked us to evaluate NASA's implementation of federal export control regulations. Specifically, we are providing information on (1) licenses granted to NASA to export space station-related technology and commodities and plans to export encryption technology and (2) the results of internal and external assessments of NASA's export control program and NASA's actions to implement audit recommendations. Encryption technology provides a capability to maintain the secrecy of information and is needed to provide secure transmission of command and control instructions between ground and space elements of the space station.

A significant percentage of NASA's international activities may involve transfers of commodities, software, or technologies to foreign partners by NASA or authorized contractors. To protect national security and U.S. foreign policy interests, the export of technology and commodities to the 15 partner countries involved with NASA in the International Space Station Program is controlled through a system of licenses. The Departments of Commerce and State are responsible for granting NASA such licenses.

¹ The 16 countries are the United States, as lead partner; Canada; Japan; the European countries Belgium, Denmark, France, Italy, Germany, the Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom; Russia; and Brazil.

Commerce issues licenses for the export of dual-use items—those items that have both commercial and military applications—on the Commerce Control List. Similarly, State issues licenses for exports of U. S. Munitions List items—articles, services, and related technical data designated as defense articles and services. NASA’s export activities must conform to the procedures and regulations established by Commerce and State.

Results in Brief

Since April 1995, the Commerce Department has issued nine Individual Validated Licenses² to export specific items and one special comprehensive license that allows NASA to export certain preapproved items without seeking Commerce’s approval each time NASA needs to export them for the International Space Station Program. Although the special comprehensive license was intended to preclude the need for individual licenses, NASA has only used it once because it has not been updated and, according to NASA officials, individual licenses are easier to obtain than updating the special comprehensive license. As new export requirements have materialized, NASA has elected to apply for individual licenses rather than amend the special comprehensive license. The State Department has not issued any licenses to NASA to export technology or commodities for the International Space Station. However, NASA erroneously authorized the export of radiation-hardened electronic parts to Russia in 1997 without first obtaining a license from State. NASA expects to export encryption technology for use in the program but has not determined whether a license is needed. NASA expects that such exports will be limited to its Japanese and European partners.

Internal and external reviews of NASA’s export control activities have identified weaknesses, including a need for greater management involvement in export-related decisions and additional training to educate employees involved with technology control about export laws, regulations, and procedures. NASA has taken steps to correct these weaknesses; however, some additional actions are needed. For example, annual internal audits have not provided sufficient information to assess the effectiveness of NASA’s export controls for the International Space Station Program. Resulting reports of audits that were issued in 1997 and

² An Individual Validated License is a written authorization from the government to export. After a license application is approved, a license is issued by Commerce bearing the license number and validation date. The license will generally be valid for a 24-month period.

1998 provide little detail and analyses beyond completing a required audit checklist.

This report recommends improvements aimed at improving the quality of NASA's internal audits.

Background

NASA had no formalized export control policy when the Space Station Program began in 1984, nor when the space station partnership was established in 1988. Although NASA issued a technical data and goods transfer control plan for the earlier Space Station Freedom Program in 1991, that plan did not include procedures for making export-licensing determinations. When Russia joined the International Space Station (ISS) Program in 1993, the need for associated export controls was heightened. Thus, NASA established a Space Station Export Control Steering Group and an Interagency Export Control Working Group early in 1994 to assist in developing an approach to controlling exports of ISS-related commodities. Chaired by NASA, the groups comprised senior policy, legal, and technical representatives from the Executive Office of the President's Office of Science and Technology Policy and the Departments of State, Commerce, and Defense.

Since 1994, NASA has been developing a more comprehensive technology control plan specifically for the ISS Program. The plan has remained in draft form but has been modified since its inception. NASA intends to finalize its most recent draft plan in mid-November 1999. In the meantime, NASA employees, contractors, and centers supporting the ISS Program have been instructed to use the draft control plan as guidance in implementing ISS-related export activities.

In 1995, NASA published an agencywide export control program document for all programs involved in international activities. NASA based its export control program on federal laws and regulations that require licenses for exports of controlled technologies, commodities, and services. Commerce and State are responsible for granting licenses to NASA and its

designated contractors for the export of technologies to ISS partners.³ Under the authority of the Export Administration Act, Commerce established a licensing system for exports of dual-use items—those items that have both commercial and military applications—on the Commerce Control List. Similarly, under the authority of the Arms Export Control Act, State issues licenses for exports of defense articles and defense services that are on the U.S. Munitions List. The statutory authority to issue regulations regarding the export of dual-use items and defense articles and services is delegated to the Secretaries of Commerce and State. Commerce and State published the Export Administration Regulations and International Traffic in Arms Regulations, respectively, implementing the acts. NASA must ensure that its ISS export activities conform to these laws and regulations. NASA's export control program document contains a step-by-step process for NASA employees and contractors to follow in determining whether technology and commodities can be exported to foreign countries, with or without a license.

NASA includes the following elements in its decision to export items in support of the ISS Program: (1) the necessity of the export and its consistency with NASA's export control program, (2) any prohibitions on the export established by federal law or regulation, (3) whether State or Commerce is responsible for authorizing the export, and (4) whether the export requires a license. The export classification process includes these elements.

The line of authority for all NASA export-related activities originates at NASA headquarters and flows to the agency's field center export administrators, program and project managers, and transportation officers. These officials share responsibility for ensuring compliance with U.S. export control regulations and NASA's export control program. NASA's program requires training to be conducted at least annually and covers issues and developments in export controls that impact the agency's international activities.

³ The Export Administration Act (50 U.S.C. app. 2401, as amended) has expired. However, Commerce carries out the Export Administration Regulations pursuant to an executive order issued under the President's authority in the International Emergency Powers Act. The Arms Export Control Act (22 U.S.C. 2778, as amended) authorizes the President to control the export and import of defense articles and services. The authority to issue regulations with respect to export of defense articles and services was delegated to the Secretary of State by Executive Order 11958.

Status of Licenses and Plans to Export Encryption Technology

Since April 1995, the Commerce Department has issued nine individual licenses to export specific items and one special comprehensive license. With one exception, NASA has not used the special comprehensive license granted by Commerce to facilitate exporting the large volume of ISS-related technology and commodities that it expected to transfer to the ISS partners. State has not issued NASA any licenses to export ISS-related technologies. However, NASA inappropriately exported radiation-hardened technology without having obtained a license from State. A centralized database of exported technologies is in development and will include information on items transferred without licenses. While encryption technology has not been exported, the requirement for it is being considered by NASA and its European and Japanese partners.

Licenses Issued to Export ISS Technologies

From April 1995 through May 1999, Commerce issued nine individual licenses to NASA for the export of ISS-related technologies. An individual license is granted in response to an application for a specific export. Six licenses were for items shipped to Russia, two for items shipped to Italy, and one license for items shipped to Germany. Appendix I includes a description of the commodities transferred using these licenses and the countries of destination.

For ISS-related exports, NASA may request an individual license or use the ISS special comprehensive license. In May 1996, Commerce issued NASA a special comprehensive license to facilitate the large volume of expected exports incidental to the ISS Program and to eliminate the need to apply for an individual license for each item it expected to export. The special comprehensive license is to be used to export only items listed in the bilaterally established exchange list and included in the license. None of the items are under State's export control jurisdiction. The license covers certain ISS hardware, software, and technical data under the export control jurisdiction of Commerce. The license is only for the use of NASA personnel and approved related entities, such as authorized contractors and subcontractors listed in the license, and only when the entities have received specific contractual direction from NASA.

With the exception of one case in which the item exported was returned following a determination that procedures were properly followed, the

special comprehensive license has not been used.⁴ NASA headquarters export officials said that technologies listed in the special comprehensive license, which was developed more than 3 years ago, need to be reevaluated and that obtaining an individual license to transfer ISS technologies is less complicated than amending the special comprehensive license. In commenting on a draft of this report, Commerce stated that, in 1999, the NASA special license was fully entered into its electronic license database, making it easier for NASA to submit changes. Commerce further stated that, to export an item not identified in the original application, NASA would need to submit one form; to export multiple items not previously identified, NASA would submit an amendment form.

The special comprehensive license does not relieve NASA from its obligation to request a separate license if one is required. Because Commerce does not review each individual transaction authorized by the special comprehensive license, NASA and the entities authorized to use it must have mechanisms to ensure that each export made under it fulfills the terms and conditions of the license and applicable provisions of Commerce's export regulations.

NASA Failed to Obtain State License in One Case

According to NASA officials, State has not issued NASA any licenses associated with the ISS Program to export items under the export control jurisdiction of State. However, NASA disclosed that in January 1997, radiation-hardened electronic parts were inappropriately exported to Russia without a license. This export occurred because a NASA contractor's parts supplier had received an erroneous export classification from the manufacturer who was not aware that the parts were on State's U.S. Munitions List, and NASA did not independently determine whether a license was needed. Additional details about this export and the resulting NASA investigation are discussed on pages 11 and 12 of this report.

⁴ NASA verified its internal process of effecting an export under the authority of the ISS special comprehensive license in conjunction with the export of an electrical power system to its Japanese partner. The item was returned within 30 days.

A Database of All ISS Export Controlled Technologies Is Being Developed

NASA is not required to acquire a license for all export-controlled items that are ISS related. Under federal export control regulations, NASA has exported numerous ISS-related technologies with license exceptions. An exception allows NASA to export, under stated conditions, items subject to Commerce's Export Administration Regulations that would otherwise require a license. As required by State's and Commerce's regulations, NASA's export control program includes the requirement that records be maintained for at least 5 years on all exports and transfers. NASA's draft ISS export control plan reiterates these requirements. Appendix II shows examples of ISS-related export controlled commodities NASA exported in 1998 without licenses.

According to NASA officials, NASA's centers have retained individual records of all ISS items that the agency has made export classification decisions on and exported since 1995. However, the records were not summarized and the ISS program office could not readily provide us with a complete list of ISS technologies exported to its partners without licenses. Although such a database is not required under export control regulations, having this information would be useful to supplement guidance and as a crosscheck in reaching future export classification decisions. Moreover, it would provide NASA, State, and Commerce with a tool to use in conducting reviews to assess NASA's compliance with export laws and regulations.

According to NASA officials, the database of exported technologies currently in development will be a centralized database and will include information on items transferred without licenses and will be available agencywide. The ISS database development is a Johnson Space Center and ISS program office initiative.

Plans to Export Encryption Technology Are Being Discussed

To date, no encryption technology has been exported for use in the ISS Program. The requirements for and potential export of encryption technology needed to support the ISS are being discussed by NASA, its European and Japanese partners, and agencies that have export approval authority for the technology. To date, no license has been applied for. According to NASA officials, encryption will be needed to provide secure transmission of command and control instructions between ISS ground and space elements. The Japanese and European partners and NASA have agreed to use a common U.S. standard technology as the means of encrypting command and control communications. To use U.S. encryption technology, the Japanese and European partners must agree to provide it a level of protection equal to that provided by the United States, which would

require them to procure hardware from the list of sources approved by Commerce's National Institute of Standards and Technology. NASA would provide them technical support for the hardware selection, related software development, and encryption key management, enabling them to interpret the coded instructions. The Japanese and European partners are considering a draft agreement that outlines U.S. protection requirements for the technology. If they concur with U.S. protection requirements and sign the agreement, NASA or the supporting contractor could initiate action to obtain a license to export encryption technology to the partners. NASA is collaborating with the National Security Agency and the National Institute of Standards and Technology about exporting the technology to these partners.

NASA officials stated that Russia would not be included as a destination in any potential licenses for encryption technology. While Russia and the United States will use a common infrastructure to transmit data between ISS space and ground elements, the Russian Space Agency and NASA will not use a common encryption technology or share such technology. Both the United States and Russia have their own encryption systems. According to NASA officials, Russia and the United States prefer using their own systems.

Reviews of NASA's Export Control Program Have Identified Some Weaknesses

NASA's export control program is subject to periodic internal reviews and to external reviews by Commerce and State. Moreover, investigations can be triggered by specific events requiring follow-up. The reviews and investigations conducted to date have identified some weaknesses in NASA's export control program. NASA officials have taken steps to address many of these weaknesses. However, further actions are needed in some areas, such as improving the quality of NASA's internal audits.

State's Review of License Application Triggered NASA's Investigation of Radiation-Hardened Electronics Parts Exported Without License

In 1998, the State Department requested NASA's review and comment on a license application involving a U.S. company affiliated with a Russian company for radiation-hardened electronic parts. The license application had also indicated that NASA had exported the parts to Russia in the past. In reviewing the application, NASA detected a potential issue of improper export with its prior transfer of the parts to Russia. NASA initiated an investigation and found that it had inappropriately exported radiation-hardened electronics parts to Russia for use in the ISS Program. NASA had exported these parts without a license after the parts were erroneously classified as the lowest level of controlled technology. NASA did not follow its own policy, which is to determine the classification of material proposed for export or to ensure that its contractors have appropriately determined the material's classification. Instead, a NASA contractor's supplier determined that the export of the parts to Russia did not require a license and the contractor relied on that determination. NASA, in turn, relied on its contractor's classification of these parts.

The parts were exported to Russia in January 1997. According to a NASA export control official, the supplier's and manufacturer's regional office officials were unaware that the radiation-hardened parts were on State's U.S. Munitions List and therefore required an export license. NASA was unaware of the error for about 18 months until the U.S. company affiliated with a Russian company applied to State for an export license for the same parts, and State referred the license application for NASA's review in June 1998. According to a State official, the request for the license in this instance was to support activities associated with the Russian Mir space station. NASA export control officials told us that the application inaccurately stated that NASA had obtained a license for an earlier export of the same parts to Russia.

In a June 1998 letter to State about the incident, NASA formally acknowledged the error and stated that it had reminded the Russian Space Agency and the Russian company that the parts were solely for use in Russian-provided components of the ISS and were not to be used for any other purpose or transferred without NASA's written approval. The Russian company responded that it had accounted for each of the exported parts and indicated how they were being used and where they were located. NASA accepted this response in good faith.

Although NASA may seek advice from the manufacturers to assist in the determination, NASA is ultimately responsible for determining the correct

classification and requesting a license, if required. As a result of this incident, NASA advised State in July 1999 that the ISS program office had instituted specific changes to its export procedures, requiring

- a manufacturer export office, rather than a sales office, to confirm export classifications of commercially available items and
- a NASA manager export to be directly involved in determining export classifications before proceeding with exports.

According to NASA, key features of this process include a centralized database to capture all ISS exports and backup data, an Export Control Council to review exports and resolve issues, and documented export compliance training for employees. Also, training conducted by the ISS export administrator highlights the fact that radiation-hardened parts are export controlled. We concur with the need for these steps.

NASA's Office of Inspector General Assessment

In March 1999, NASA's Office of the Inspector General (OIG) completed a review of the agency's export activities related to controlled technologies. The report noted that NASA had not identified all export-controlled technologies related to its major programs and did not maintain a catalog of classifications for transfers of export-controlled technologies. The report further stated that agency oversight of training for personnel in the export control program needed improvement and that, as a result, NASA might not have adequate control over export-controlled technologies to preclude unauthorized or unlicensed transfers. The OIG recommended that NASA

- establish a policy and procedures for cataloging controlled technology export classifications that would be available for all NASA installations;
- define the qualifications of personnel that perform export program audits;
- designate only qualified personnel to perform annual audits of the export control program, in accordance with established policy;
- establish a policy for resolving and following up on recommendations resulting from export control audits;
- enhance the current export control training program for NASA personnel, to include educating them about U.S. export laws and regulations and procedures for classifying and documenting exports; and
- expand training on a recurring basis to NASA employees involved directly or indirectly with technology control.

NASA concurred with the OIG report, and according to NASA officials, the agency is taking actions as follows:

- The agency plans to establish a central catalog of export control technologies. Each center has been requested to provide the headquarters Export Administrator copies of all classifications made for exports to facilitate the development of the catalog.
- NASA is hiring additional staff to conduct training in export controls and write policy guidance. NASA officials told us that it was developing computer-based training and that the agency plans to expand training modules to include more in-depth coverage of export laws and regulations, classification requirements, and procedures useful for conducting the annual audits of the export control program.
- In addition to computer-based training, the headquarters' and centers' export control administrators will continue to conduct training seminars on export controls.
- Auditing requirements and auditor qualifications are being included in a NASA program directive and a NASA procedures guide scheduled to be completed at the end of 1999. The directive and guide will also specify how center management will follow up on recommendations resulting from export control audits.

Commerce's Assessment of NASA's Export Controls

In June 1998, Commerce's Office of Exporter Services reviewed NASA's export control program, including the use of the special comprehensive license for the ISS Program. The purpose of this review was to ensure that NASA was complying with the Export Administration Regulations and the terms of the license. Commerce also reviewed pertinent records associated with NASA's export control program, indicating in its report that NASA did not have a formal procedure in place to ensure that products were at the consignee sites and were being used for the intended purpose. Commerce concluded that, overall, NASA had adequate export controls and was complying with the act's implementing regulations. However, to ensure full compliance with the implementing regulations, Commerce recommended that NASA

- revise its procedures for screening the Denied Persons List, a list of specific persons whose export privileges have been denied by Commerce;

-
- update its export control audit module to reflect the latest Commerce terminology—using the Denied Persons List instead of the Table of Denial Orders;⁵
 - develop a procedure for verifying that exports of certain items are at their intended destinations; and
 - develop procedures for screening against Commerce’s most current entities list, which provides notice of license requirements for certain end users when there is an unacceptable risk that the commodity or technology may be diverted.

NASA has taken steps to implement these recommendations. While Commerce noted that NASA does not have a formal procedure in place to ensure that products are being used by the intended entity and for the intended purpose, it did not make recommendations regarding this point. NASA’s procedures developed in response to Commerce’s review focus on verifying that exports of certain items are at their intended destinations. Ascertaining that usage is as intended is not addressed.

Johnson Space Center Internal Audits

NASA’s export control program requires the agency’s centers to conduct annual audits of their export control practices and submit a report describing the review process, audit results, and any recommendations to NASA headquarters. However, such audits have not always been conducted in a comprehensive and rigorous manner. NASA’s OIG found during a 1999 review of NASA’s export control program that though a significant portion of Johnson Space Center exports related to the ISS, the Center’s auditor did not review ISS exports. Moreover, we found that the Center’s 1997 and 1998 annual audit reports were not sufficiently detailed to provide NASA headquarters with sufficient information to assess the effectiveness of the agency’s export control practices. Center auditors documented their reviews for fiscal years 1997 and 1998 by using a checklist—the NASA Export Control Program Audit Module—that included general questions requiring yes or no answers. Accompanying written reports, which were supposed to include a description of the review process, the audit results, and recommendations, were not prepared as required. Rather, the Center auditors forwarded only the completed checklists, with limited added detail, to the headquarters export administrator. For example, the checklists for 1997 and 1998 included a yes answer in response to a question regarding whether Commerce Export Administration Regulations’

⁵ Former terminology for Denied Persons List.

record-keeping requirements were being followed. However, they did not explain how the auditors reached this determination, nor did they include any comments or recommendations on this issue. NASA guidance requires auditors to verify, through sampling, that required screening and licensing procedures are regularly followed and that required documents are maintained in compliance with Commerce's Export Administration Regulations. In commenting on a draft of this report, Commerce pointed out that the special comprehensive license also requires that NASA conduct a complete system review and not simply compare its procedures to an audit checklist.

Agencywide Self-Assessment of Transfer/Export Control Practices

In December 1998, NASA initiated an assessment of its export control program to determine whether its technology transfer and export control procedures were thorough, rigorous, and provided for fully safeguarding controlled goods and technologies, particularly in its international partnerships and programs. NASA required managers and employees at various organizational levels to complete a questionnaire designed to assess technology controls in their areas of responsibility. Consolidation of all assessments is under way, and NASA's centers will be briefed on results. NASA officials told us that NASA has no plans to conduct a similar agencywide self-assessment in the future on a regularly scheduled basis.

NASA requested feedback on its three-part questionnaire from (1) NASA Enterprise directors, (2) center directors, and (3) center managers that direct projects involving international participation. We examined the assessments completed by the Human Exploration and Development of Space Enterprise, the Johnson Space Center, and the ISS program office since these entities are the most likely to be involved with ISS technology transfers. While the responses about the effectiveness of the implementation of NASA's export control program were generally favorable, Johnson Space Center and ISS program office assessments cited a lack of adequate staff for export control matters. In particular, the assessments determined that additional personnel were needed for the time critical export classification process. The ISS program office assessment indicated that export control personnel were working with Johnson Space Center management to increase the number of personnel involved.

Conclusions

NASA's internal audits at the Johnson Space Center have not been comprehensive or detailed enough to judge the effectiveness of NASA's

export control program or compliance with export control laws and regulations. The reports of audit lack evidence of audit work focused specifically on ISS exports and do not include detailed information on audit methods, findings, and recommendations as required by the agency's export control program. Since NASA has no plans to conduct the agencywide self-assessment on a regular basis, making the Johnson Space Center's audit more useful takes on added urgency.

Recommendation

To enhance NASA's ability to oversee and implement its export controls of ISS-related technologies, we recommend that the NASA Administrator ensure that center-based audits are completed with sufficient detail to enable the agency to identify weaknesses in NASA's export control procedures.

Agency Comments and Our Evaluation

NASA reviewed a draft of this report and stated that the report captured the many facets of export control related to the ISS Program. NASA did not explicitly state whether it agreed or disagreed with our recommendation. NASA also provided technical comments to further clarify understanding of some issues and suggested revisions that we have incorporated where appropriate.

NASA's written comments are presented in appendix III.

We also provided drafts of this report to the Departments of Commerce and State. We did not receive a written response from State. However, a State official indicated the agency concurred with the report. Commerce provided written comments, stating that the report is accurate (see app. IV). Both State and Commerce provided technical suggestions for clarification purposes that we incorporated where appropriate.

Scope and Methodology

To determine the number and types of ISS-related licenses issued in conjunction with the ISS Program and the destination of technology and commodities exported to date, we compared export license records maintained by NASA headquarters with Commerce's Export Control Automated Support System database. Our comparison included ISS-related licenses that Commerce issued between fiscal year 1994 and the first quarter of fiscal year 1998. We also reviewed program office listings of ISS-related items it exported without licenses. To obtain information on the

status of encryption exports, we reviewed NASA records and held discussions with NASA officials about requirements for such exports and countries of destination.

To determine the results of past reviews of NASA's export control program, we reviewed audit reports conducted by NASA's OIG and Commerce and the results of a NASA investigation of radiation-hardened electronic parts. We also reviewed the methodology and results of recent internal audits of export control practices conducted by NASA's Johnson Space Center. We assessed NASA's responsiveness to audit recommendations by discussing follow-up actions with NASA officials and documenting changes in NASA's policies and procedures.

We conducted our review from September 1998 through September 1999 in accordance with generally accepted government auditing standards.

Unless you publicly announce its contents earlier, we plan no further distribution of this report until 14 days from its issue date. At that time, we will send copies to the Honorable Daniel S. Goldin, NASA Administrator; the Honorable Madeleine Albright, Secretary of State; the Honorable William M. Daley, Secretary of Commerce; the Honorable Jacob Lew, Director of the Office of Management and Budget; and other interested parties. We will also make copies available to others upon request.

If you or your staff have any questions concerning this report, please contact me on (202) 512-4841. Key contributors to this assignment were Jerry Herley, Samuel Cox, and Shirley Johnson.



Allen Li
Associate Director
Defense Acquisitions Issues

Commodities Exported Using Individual Validated Licenses

Licenses	Description	Destination
1 ^a	Circuit emulator, International Space Station system bus upgrade, multiplexer/demultiplexer (MDM)	Russia
Amendment	Circuit emulator, ISS system bus upgrade, MDM	Russia
Amendment	Electronics equipment connectors	Russia
Amendment	Prototype and flight MDM, field-testing equipment, and cable kits	Russia
Amendment	Prototype MDMs	Russia
Amendment	MDMs for payload blocks, command and control, navigation and guidance, and testing; connectors; test processors; and memory cards	Russia
Amendment	Microswitches, MDM spare prototype, functional equivalent, and flight circuit boards	Russia
2	Connectors, MDM prototypes and circuit boards, spare circuit boards, flight enhanced MDMs, and flight stand	Russia
3	Random Access Memory (RAM) and optical couplers for developmental and flight stages	Russia
4	Synchronous RAM	Russia
5	Microcircuit optical coupler flight parts (radiation-hardened) for service module and functional energy block matching unit requirements	Russia
6	Hewlett Packard optical coupler circuits	Russia
7	Hatch assembly kits, including hatches, tracks, trusses, and roller assemblies	Italy
8	Institute of Electrical and Electronics Engineers (Firewire) Ethernet Hub/Gateway	Germany
9	Active and passive common berthing mechanism (CBM) kits; CBM seal kits with bold assemblies	Italy

^a As shown, license 1 was amended six times.

Examples of ISS-Related Commodities Exported in 1998 Under No License Required Authority

Description	Destination
Articulating portable foot restraint for ISS extravehicular activity (EVA)	Canada
Seat track material to be used for evaluating ISS designs and for interfacing with seat track anchors	Russia
Labels fabricated for National Space Development Agency of Japan flight in support of the ISS	Japan
Protective caps to provide cover for ISS EVA-installed communication cable connector	Canada
Cable, Russian degassing pumps to support the Russian spacesuit unbiblical for flight/testing applications	Russia
Fans/hardware	Canada
Bar code reader, laser	Russia
Camera equipment (35-70 millimeter f2.8D lens, Nikon) in support of Russian segment imagery	Russia
Terminal switching unit	Russia
Smith press station for training of ISS crews	Russia
22-inch hand rails (class III) for ISS EVA training	Russia
Russian simplified aid for EVA rescue mockup	Russia
Ammonium persulfate reservoir and acid reservoirs	Russia
Laptop computer	Russia
Microfixtures	Canada
On-board spacesuit control assembly	Russia

Comments From the National Aeronautics and Space Administration

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

National Aeronautics and
Space Administration
Office of the Administrator
Washington, DC 20546-0001



SEP 29 1999

Mr. Allen Li
Associate Director
Defense Acquisitions Issues
General Accounting Office
Washington, DC 20548

Dear Mr. Li:

Thank you for the opportunity to review and comment on the recent draft report entitled, "Export Controls--International Space Station Technology Transfers (GAO code 707379)." This letter is to clarify and update a number of points made in the report so that this information can be included in the final report.

Enclosed you will find general and specific observation comments for your consideration. There were approximately 16 staff hours expended on this response. Please contact Michael Hawes at 358-4424, if further assistance is required.

Sincerely,


J. R. Dailey
Associate Deputy Administrator

Enclosure

**Comments on GAO Draft Report:
EXPORT CONTROLS--International Space Station (ISS) Technology
Transfers (GAO code 707379) dated October 1999**

We have completed our review of the draft GAO report entitled "Export Controls--International Space Station (ISS) Technology Transfers," and would like to make the following general observations and specific suggestions.

General Comments:

We have appreciated the ability to work closely with the GAO team as they have reviewed this critical issue. In general, the report captures the many facets of export control related to the ISS program. There are a few areas which still seem to reflect some misunderstanding. Our comments on these items are included in the body of the comments below.

Specific Suggestions:

1. Page 2 – "RESULTS IN BRIEF" – First paragraph, second sentence – suggest rewrite as follows:

"Although the special comprehensive license (SCL) was intended to preclude the need for individual licenses, NASA has only used it once. As new export requirements have materialized, and a license determination has been made, NASA has, to date, elected to apply for individual licenses rather than apply for an amendment to the SCL."

From our perspective there is no relevance to the fact that the SCL does not cover all current licensable requirements. The important point is that NASA sought a proper license prior to effecting the export of a licensable commodity. Also, the way the first paragraph is structured, the reader can get the impression that since the approval of the SCL, BXA has issued 9 individual validated licenses (IVLs). For the record, this is not the case – the SCL was applied for in November 1995, conditionally approved by BXA in May 1996, and released by NASA Headquarters for use by the ISS Program in November 1997. By that time, six (6) of the nine (9) IVLs had been applied for and approved by BXA.

2. Page 2 – "RESULTS IN BRIEF" – First paragraph, last sentence – suggest rewrite as follows:

"Current NASA planning involves the export of encryption technology to the Japanese and European partners for use in ground control facilities for secure ISS command and control purposes. Once the details of this planning are complete, a determination will be made as to the need for an export license and, if required, an export license application will be submitted."

Now on p. 4.

Now on p. 4.

**Appendix III
Comments From the National Aeronautics
and Space Administration**

Now on p. 4.

3. Page 2 – “RESULTS IN BRIEF” – Second paragraph, first sentence – suggest rewrite as follows:

“...in export-related decisions and *additional* training to educate employees...”

The use of the word “better” has the connotation that the content of NASA’s existing training is less than adequate which we do not believe to be the case. We do agree that additional training to reach more of the workforce is necessary and have already begun that process.

4. Page 2 – “BACKGROUND” – First sentence

See comment 1.

Now on p. 5.

The statement that NASA had no formalized export control policy when the International Space Station (ISS) Program began is misleading. NASA recognized the issues related to export control early in the program, and in 1991, during the Freedom program, issued the document SSP 3030, titled, “Space Station Freedom Program Technical Data and Goods Transfer Control Plan”. A copy of this document was provided to the GAO audit team.

Now on p. 7.

5. Page 4 – “STATUS OF LICENSES AND PLANS TO EXPORT ENCRYPTION TECHNOLOGY” – First sentence – Should read “Since April 1995 ...”; Suggest that the fifth sentence that begins “...A centralized database...” be the start of a new paragraph to not give the impression it is related to the previous sentence. This database will be historical in nature. Also suggest the sentence be reworded as follows: “A centralized database...items transferred *where no license was required.*”

See comment 2.

Now on p. 7.

6. Page 4 – “Licenses Issued to Export ISS Technologies” – First paragraph, last sentence should be changed as follows: “Appendix I includes a description of the *commodities* transferred using these licenses and the countries of destination.”

See comment 3.

Now on p. 7.

7. Page 4 – “Licenses Issued to Export ISS Technologies” – Second paragraph, fourth sentence should be changed as follows: “*No items under State Department jurisdiction will be exported under the authority of the Special Comprehensive License.*”

Now on p. 8.

8. Page 5 – “NASA Failed to Obtain State License in One Case” – Third sentence should be changed as follows: “This occurred because a NASA contractor’s *retail parts supplier had received an erroneous export classification from the parts manufacturers regional office, who was not aware that the parts were on the U.S. Munitions List, and NASA ...*”

Now on p. 9.

9. Page 6 – “A Database of All ISS Export *Controlled* Technologies is Being Developed” – Suggest change in caption as noted.

**Appendix III
Comments From the National Aeronautics
and Space Administration**

See comment 2.
Now on p. 9.

10. Page 6 - "A Database of All ISS Export *Controlled* Technologies is Being Developed" – In the first, second and third paragraphs change the terminology from "without a license" to "*using EAR 99 or other license exceptions.*"

See comment 4.
Now on p. 11.

11. Page 7 – "NASA Investigation of Radiation-Hardened Electronics Parts Exported Without License" – This caption and the first sentence of the first paragraph are wrong and misleading. What triggered the NASA investigation was a license application that had been submitted to State by a private entity for a Space Station-related export. In the normal course of business, State staffed the license to various U.S. Government agencies, including NASA, for review and comment. NASA, in reviewing the private entity's license application, detected a potential issue with a prior NASA export of radiation-hardened parts, verbally notified State immediately, and self-initiated an internal investigation and subsequently filed a self-disclosure with State. There was no request from State to NASA that initiated the investigation whatsoever.

In the second paragraph, second and third sentences of this section change as follows: "According to a NASA export control official, the *retail* parts supplier *and the parts manufacturer's regional office* were unaware ...an export license. NASA was unaware...when the *private entity* applied to State ...June 1998."

Now on p. 11.

12. Page 7 – "NASA Investigation of Radiation-Hardened Electronics Parts Exported Without License" – With regard to the third sentence of the second paragraph, the private entity applicant for the license in question was not a Russian company, but rather a U.S. company affiliated with a Russian company. Also, contrary to the purported statement by the State Department official, the company's license application was described, at least in part, as being in support of certain Space Station activities.

Now on p. 11.

13. Page 7– "NASA Investigation of Radiation-Hardened Electronics Parts Exported Without License" – With regard to the last sentence on the page, to be complete it should read as follows: "The application inaccurately stated that *NASA had obtained a license for an earlier export of the same parts.*"

Now on p. 11.

14. Page 8 - "NASA Investigation of Radiation-Hardened Electronics Parts Exported Without License" – In the first full sentence of the first paragraph at the top of the page, the statement that "...State's query about NASA's prior export to the firm" is incorrect. As indicated above, there was no State query to NASA about this export, rather NASA self-initiated the investigation based on information in the license application from the private entity.

Now on p. 11.

15. Page 8 - "NASA Investigation of Radiation-Hardened Electronics Parts Exported Without License" – In the second paragraph, second sentence, change as follows: "The Russian company *accounted for each of the parts that were exported, indicating how they were being used and where they were located.*"

**Appendix III
Comments From the National Aeronautics
and Space Administration**

With regard to the last sentence of this paragraph, while it is true that NASA accepted the Russian response in good faith, it was also accepted within the context of the Intergovernmental Agreement and the NASA/RSA Memorandum of Understanding on the ISS program, which are legally binding international agreements to which the United States and Russian governments are parties.

The following are GAO's comments on the National Aeronautics and Space Administration's (NASA) letter dated September 29, 1999.

GAO Comments

1. We do not agree that the statement "NASA had no formalized export control policy when the International Space Station (ISS) Program began" is misleading. However, we have revised the text of the report to provide additional explanation. We believe that our report's background section accurately describes the status of the NASA export control policy when the ISS Program began as well as the current status of its export control plan for the ISS Program.
2. In our opinion, the terminology "without license" is a more accurate characterization of the information that will be included in the database being developed.
3. We believe that our report accurately states that none of the items on the bilateral exchange list are under State's export control jurisdiction.
4. We have revised the text of the report to clarify this fact.

Comments From the Department of Commerce

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



THE SECRETARY OF COMMERCE
Washington, D.C. 20230

OCT 21 1999

Mr. Allen Li
Associate Director
Defense Acquisitions Issues
U. S. General Accounting Office
Washington, D.C. 20548

Dear Mr. Li:

Thank you for providing the Commerce Department with an opportunity to comment on your draft report on International Space Station (ISS) Technology Transfers (GAO code 707379).

In general, we believe the report is accurate. Much of it pertains to the activities under the jurisdiction of the Department of State. We did find some inaccuracies, however, in the report's characterizations of Bureau of Export Administration (BXA) procedures and the conditions under which BXA authorizes the ISS-related exports. BXA has the following concerns with your draft report:

"Results in Brief" section Page 2: The Special Comprehensive License, or SCL, requires that NASA conduct a complete system review and not simply compare its procedures to an audit checklist.

"Status of Licenses and Plans to Export Encryption Technology" section, Page 4: The SCL contains a specific condition related to the export of technology that reads:

"No retransfer/reexport of technical data, goods or software subject to this license is authorized without the prior written authorization of the Department of Commerce unless such retransfers/reexports are eligible for license exceptions or permissive reexport."

"Licenses Issued to Export ISS Technologies" section, Page 5: The statement attributed to NASA that obtaining individual licenses is less complicated than amending an SCL prompts the following comment. NASA submitted its original special license application prior to the implementation of the SCL electronic licensing system. In 1999, the NASA special license was fully entered into BXA's electronic license database, making it easier for NASA to submit changes. To export an item not identified in the original application, NASA would need to submit one form, the BXA-748. To export multiple items not previously identified, NASA would submit an amendment form.

"Commerce's Assessment of NASA's Export Controls" section, Page 10: The draft states, "[w]hile Commerce noted that NASA does not have a formal procedure in place to ensure that

**Appendix IV
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Commerce**

Mr. Allen Li
U.S. General Accounting Office

products are being used by the intended entity and for the intended purpose, it did not make recommendations regarding this point.” We note that Commerce did recommend that NASA implement procedures to acknowledge receipt of specific, identified products. For other products, an acknowledgment procedure was already in place. Parties involved in the ISS have signed MOUs assuring that items are to be used only for the ISS and to be used only as intended.

Should you have any questions or need further information, please contact William A. Reinsch, Under Secretary for Bureau of Export Administration, at (202) 482-1455.

Sincerely,



William M. Daley

See comment 1.
Now on p. 14.

GAO Comments

The following are GAO's comments on the Department of Commerce's letter dated October 21, 1999.

1. We recognize that parties involved in the ISS Program have signed Memorandums of Understanding (MOU). Signing these agreements is recognition by the partners of their responsibility and obligation to comply with the terms of the agreement. However, we believe a mechanism that provides assurance that the partners are complying with the terms of exports is a necessary step in NASA's implementation of its export control policy. In our opinion, NASA's procedures for verifying that exports of certain items are at their intended destinations do not provide adequate assurance that the items are being used for the intended purpose.

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