IG-02-011

AUDIT REPORT

INTERNATIONAL SPACE STATION SPARE PARTS COSTS

March 22, 2002

National Aeronautics and Space Administration

OFFICE OF INSPECTOR GENERAL

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Acronyms

DCAA	Defense Contract Audit Agency
FAR	Federal Acquisition Regulation
FY	Fiscal Year
ISS	International Space Station
NMI	NASA Management Instruction
NPG	NASA Procedures and Guidelines
OIG	Office of Inspector General
OMB	Office of Management and Budget
PIO	Provisioning Item Order
PP&E	Property, Plant, and Equipment

March 22, 2002

W

TO: A/Administrator

FROM: W/Counsel to the Inspector General

SUBJECT: INFORMATION: Audit of International Space Station Spare Parts Costs
Report Number IG-02-011

The NASA Office of Inspector General has completed an audit of International Space Station (ISS) Spare Parts Costs. We found that NASA generally did not properly acquire and account for ISS spare parts. Although NASA properly justified and approved noncompetitive contract modifications, it did not negotiate for separately priced spare parts or develop a pricing history for use in purchasing additional spare parts. As a result, NASA had no assurance that the prices it paid were fair and reasonable for the $334 million spent on ISS spare parts through fiscal year (FY) 2000 and may not be able to cost-effectively and competitively procure about $608 million in future ISS spare parts.[1] Additionally, we found that The Boeing Company (Boeing) omitted contractor fee and indirect costs from the value of spare parts recorded on receiving reports it submitted to Johnson Space Center (Johnson). As a result, the Agency cumulatively understated in its annual financial statements the value of ISS spare parts by about $39 million from Program inception (FY 1995) through FY 2000.

Background

The Agency budgeted $831 million to acquire ISS spare parts through FY 2007. Johnson used noncompetitive contract modifications to issue provisioning item orders (PIO's) to acquire groups of line item spare parts from Boeing. The ISS contract stipulates that each deliverable item (line item spare part) should be priced and substantiated separately within the contractor's proposal. Further, Federal regulations require the Agency to pay fair and reasonable prices for ISS spare parts.

[1]The $608 million requirement was based on a seven-person crew. The current ISS core complete is based on a budget-limited three-person crew. Ultimately, the requirement may again be based on a seven-person crew.

The ISS contract incorporates the requirements of NASA Management Instruction (NMI) 5900.1B, "NASA Spare Parts Acquisition Policy," February 3, 1993,[2] which established Agency policy to ensure NASA spare parts are acquired at the lowest fair and reasonable cost. The NMI states that, if possible, each order should be on a firm fixed-price basis with individual items separately priced to provide a pricing history for later purchases.

Boeing prepares the official ISS property records that include a value for spare parts. NASA uses these property records to establish the value of ISS property in its annual financial statements. Federal accounting standards and Agency regulation require that the unit value for property shall reflect total costs including applicable fees and indirect costs.

Recommendations

We recommended that Johnson require Boeing to propose, negotiate, track, and report individual prices for ISS spare parts and establish price histories. These actions will ensure NASA knows the prices it is paying for ISS spare parts. We also recommended that Johnson ensure Boeing includes contractor fee and indirect costs in the value of ISS spare parts recorded in the official property records. This action will help ensure that property records show all applicable costs and fees and that NASA reports the correct value for ISS spare parts in its annual financial statements. We further recommended that the Assistant Administrator for Procurement reestablish Agency procedures for acquiring spare parts and that the NASA Chief Engineer reference the procedures in the next revision of the NASA Procedures and Guidelines (NPG) 7120.5A, “NASA Program and Project Management Processes and Requirements” dated April 3, 1998. These actions will ensure the Agency has a uniform policy for future acquisitions of spare parts to support NASA's major systems.

Management's Response

Johnson concurred with the recommendations to require Boeing to propose and negotiate individual prices for spare parts and to include fee and indirect costs of spare parts on receiving reports submitted to NASA. Johnson did not concur with the recommendation to track and report individual prices for ISS spare parts. However, in subsequent discussions with us, the ISS Procurement Officer agreed to use the receiving reports to track prices and establish price histories for batteries[3] and other high-dollar value spare

[2]Although the NMI was subsequently cancelled, it was still in effect at contract initiation in January 1995 (see "Need for Guidance on Spare Parts Acquisition" in the finding section of this report).

[3]The nickel-hydrogen batteries cost NASA about $3.3 million each. The ISS is designed to operate with 48 batteries. Additional details are in Finding A.

parts. NASA concurred with the recommendations to reestablish procedures for acquiring NASA spare parts and to reference the procedures in the next revision of NPG 7120.5A.

OIG Evaluation of Management's Response

Management's comments and planned actions are responsive to the recommendations. Details on the status of the recommendations are in the recommendations section of the report.

[original signed by]
Francis P. LaRocca

Enclosure
Final Report on Audit of International Space Station Spare Parts Costs

INTERNATIONAL SPACE STATION
SPARE PARTS COSTS

March 22, 2002

W

TO: AE/Chief Engineer
H/Assistant Administrator for Procurement
M/Associate Administrator for Space Flight
AA/Acting Director, Lyndon B. Johnson Space Center

FROM: W/Assistant Inspector General for Audits

SUBJECT: Final Report on the Audit of International Space Station Spare Parts Costs
Assignment Number A-01-009-00
Report Number IG-02-011

The subject final report is provided for your information and use. Please refer to the Executive Summary for the overall audit results. Our evaluation of your response has been incorporated into the body of the report. We consider management's proposed corrective actions responsive for recommendations 1 through 5. The recommendations will remain open for reporting purposes until corrective action is completed. Please notify us when actions have been completed on the recommendations, including the extent of testing performed to ensure corrective actions are effective. The final report distribution is in Appendix G.

We appreciate the courtesies extended to the audit staff. If you have questions concerning the report, please contact Mr. Dennis E. Coldren, Program Director, Space Flight Audits, at (281) 483-4773, or Mr. Kenneth Sidney, Auditor-in-Charge, at (281) 483-0728.

[original signed by]
Alan J. Lamoreaux

Enclosure

cc:
AI/Associate Deputy Administrator
AB/Associate Deputy Administrator for Institutions
B/Acting Chief Financial Officer
B/Comptroller
BF/Director, Financial Management Division
G/General Counsel
JM/Director, Management Assessment Division

Contents

NASA Office of Inspector General

IG-02-011 **March 22, 2002**
A-01-009-00

International Space Station Spare Parts Costs

Executive Summary

Background. In January 1995, Johnson signed a $5.638 billion cost-reimbursable contract with Boeing for the ISS. As of February 2002, the contract value was $10.8 billion. The contract includes the design, development, manufacture, integration, test, verification, and delivery to NASA of the U.S. on-orbit segment of the ISS, including ground support equipment and support for ground and orbital operations. (Appendix B contains overall contract details.) Johnson is acquiring ISS prime spare parts[4] through noncompetitive contract modifications. Johnson estimated ISS prime spare parts would cost $831 million through FY 2007 and spent $334 million through FY 2000. NASA will likely purchase an additional $608 million in spare parts over the life of the ISS.

Objectives. The overall objective was to determine whether NASA properly acquired and accounted for ISS spare parts. Specifically, we determined whether NASA appropriately justified and approved the acquisition of ISS spare parts through noncompetitive contract modifications, paid a fair and reasonable price for the spare parts, and adequately supported the value of the spare parts inventory that the Agency reported in its annual financial statements. Appendix A contains a detailed description of our objectives, scope, and methodology.

Results of Audit. NASA generally did not properly acquire and account for ISS spare parts. Although NASA properly justified and approved noncompetitive contract modifications, it did not negotiate for separately priced spare parts or develop a pricing history for use in purchasing additional spare parts. As a result, Johnson had no assurance that the prices it paid were fair and reasonable for the $334 million spent on ISS spare parts and may not be able to cost-effectively and competitively procure an estimated $608 million in future ISS spare parts (Finding A). Also, Boeing did not include fee and indirect costs in the value of spare parts it reported to NASA. Consequently, the Agency's annual financial statements from FY's 1995 through 2000[5] cumulatively understated the value of spare parts by about $39 million (Finding B).

Recommendations. NASA should require Boeing to properly price and account for ISS spare parts and should establish procedures for acquiring and provisioning spare parts.

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[4]ISS prime spare parts are all the spare parts that Boeing provides NASA under the ISS contract. They can be made by Boeing, acquired by Boeing from its subcontractors, or furnished by the Government to Boeing.

[5]Using NASA Form 1018, "NASA Property in the Custody of Contractors," Johnson adjusted its official property records for FY's 1998 through 2000 by adding calculated fees to the year-end balances reported for 4 of the 11 property classification accounts. However, this adjustment did not show the amount of fees that pertained to ISS spare parts.

Management's Response. Johnson agreed to require Boeing to propose and negotiate individual prices for spare parts and to record total costs, including fee and indirect costs, of spare parts on receiving reports submitted to NASA. Johnson did not concur with the recommendation to track and report individual prices for ISS spare parts. However, in subsequent discussions with us, the ISS Procurement Officer agreed to use the receiving reports to track prices and establish price histories for batteries and other high-dollar value spare parts. NASA concurred with the recommendations to reestablish procedures for acquiring spare parts and to reference the procedures in the next revision of NPG 7120.5A. Management also provided general comments on our findings. The complete text of management's response is in Appendix E.

Evaluation of Management's Response. We consider NASA's comments and planned actions responsive. Our response to management's general comments on the findings is in Appendix F.

Introduction

Federal Acquisition Regulation (FAR) 15.402 requires that a contracting officer purchase supplies and services from responsible sources at fair and reasonable prices. The ISS contract stipulates that each deliverable item should be priced and substantiated separately within each proposal. The contract also incorporates the requirements of NMI 5900.1B, "NASA Spare Parts Acquisition Policy," February 3, 1993. The NMI established a uniform policy for the acquisition and provisioning of NASA spare parts and for ensuring that the Agency acquires spare parts in the proper quantities and at the lowest fair and reasonable cost. Also, NMI 5900.1B stated that, if possible, each order should be on a firm fixed-price basis with individual items separately priced to provide a pricing history for later spare parts purchases. (Appendix C contains the procurement requirements.)

The NMI assigned the overall responsibility for the acquisition of NASA spare parts to the Assistant Administrator for Procurement. The policy delegates the authority for acquiring spare parts through Center Directors to cognizant contracting officers and assigned the responsibility for ISS spare parts management to the Associate Administrator for Space Flight.

Boeing submits to the ISS Contracting Officer a cost proposal for each contract modification that includes direct cost, indirect cost, and fee for the spare parts listed in the PIO. The contracting officer obtains field pricing assistance from the Defense Contract Audit Agency (DCAA)[6] and the Defense Contract Management Agency[7] to evaluate the proposal and to establish a pre-negotiation position for the Government. After the contracting officer evaluates the proposal, NASA and Boeing negotiate a total price for the contract modification that contains the PIO listing of spare parts. As of January 2001, Johnson had ordered[8] about $633 million in spare parts.

[6]DCAA provides the latest approved or recommended direct labor rates that NASA should use to estimate the contractor's direct labor costs. DCAA also provides the latest approved or recommended indirect rates that NASA should use to estimate indirect costs. Further, DCAA reviews the proposed material costs to ensure that escalation factors are reasonable and that the items agree with the Government's bill of material.
[7]Engineers from the Defense Contract Management Agency perform technical evaluations at the contractor/subcontractor sites and advise NASA on whether the proposed direct labor hours are reasonable.
[8]NASA considers spare parts as ordered when it negotiates a contract modification with Boeing or otherwise authorizes the contractor to proceed (that is, the Agency issues an undefinitized contract action).

Findings and Recommendations

Finding A. Acquisition of Spare Parts

Johnson did not negotiate separate prices or develop price histories for ISS spare parts. This occurred because Johnson did not perform those actions required by NMI 5900.1B, which the ISS contract incorporates by reference. As a result, Johnson did not know the prices, either individually or by PIO, that it paid Boeing for the $334 million spent on ISS spare parts through FY 2000 and, therefore, had no assurance the prices were fair and reasonable. Also, without knowing the prices paid, Johnson could not develop a price history with which to procure, on a competitive fixed-price basis, an additional $608 million in spare parts that may be needed over the life of the ISS.

NASA's Acquisition Strategy and Price Histories

Lifetime Purchases. The ISS Program Office philosophy is that almost all procured spare parts can and will be repaired. Accordingly, Johnson's acquisition strategy has been to make lifetime purchases of sufficient spare parts hardware to support ISS performance and to procure no additional hardware other than for consumables[9] and re-procurement[10] spare parts. Johnson calls this process spares acquisition integrated with production. For ISS spare parts that Boeing delivered to NASA through December 2000, we determined that less than 5 percent of the items ordered were repetitive purchases.[11] Although Johnson had generally implemented its acquisition strategy of making lifetime purchases rather than repetitive purchases of ISS spare parts, Johnson plans to make additional repetitive purchases in the future.

Additional Spare Parts Requirements. The ISS Program recognizes that it will spend considerably more to acquire consumables and re-procurement spare parts for the ISS. Mainly, the consumables consist of nickel-hydrogen batteries, which cost about $3.3 million each and are designed to collect and store solar power aboard the ISS.[12] Also, Johnson may need to acquire re-procurement spare parts to resolve recently identified ISS power system issues.[13] Further, Johnson anticipates that as it accumulates more ISS operational data, the Program will need additional re-procurement spare parts to address changes in the predicted

[9]Consumables are spare parts, such as batteries and filters, that have a limited shelf life.

[10]Re-procurement spare parts have previously been procured but need to be procured again because the development hardware did not perform as NASA had predicted it would perform. These additional spare parts acquisitions relate to the risk of needing more spare parts due to problems such as redesign issues and higher than anticipated failure rates.

[11]About 4 percent (584 of 15,113) of the unit spare parts and about 4.5 percent (35 of 782) of the line items spare parts were repetitive purchases.

[12]Spare batteries will be kept on the ground and used to replace batteries that fail prematurely or have reached their 6-year life expectancy. The ISS is designed to operate with 48 batteries.

[13]NASA anticipates that, due to power system issues, it will need to re-procure two direct current switching units (three units were originally ordered), three battery charge/discharge units (three units were originally ordered), one pump module (three units were originally ordered), one photovoltaic radiator (one unit was originally ordered), one high-resolution spectograph (one unit was originally ordered), and one electronics/environmental control unit (two units were originally ordered).

failure rates and failure impacts.[14] Therefore, in addition to the $831 million Johnson estimated for known spare parts, the ISS Program Office may spend another $110 million for re-procurement spare parts through FY 2007. The Program Office also estimated it will probably spend $300 million for batteries from FY's 2008 through 2017.

Estimated Cost of Spare Parts. ISS spare parts may cost $1.241 billion over the life of the Program, of which $608 million remains to be ordered as shown below:

ISS Program Office's Estimated Costs of Spare Parts
(Millions)

Estimated Cost of Spare Parts Required Through FY 2007	$ 831
Potential Re-procurements Through FY 2007	110
Batteries Required (FY's 2008-2017)	300
Total Spare Parts Required	$1,241
Less: Spare Parts Ordered Through January 2001	(633)
Estimated Cost of Future Spare Parts	$ 608

To competitively acquire future spare parts from responsible sources at fair and reasonable prices that are most advantageous to the Government, Johnson should establish price histories as required by NMI 5900.1B.

Price Reporting

Proposing, Negotiating, and Reporting Prices. The ISS contract stipulates that each deliverable item (line item spare part) should be priced and substantiated separately within the contractor's proposal. However, Boeing does not propose a price for each spare part listed in the PIO. Instead, the Boeing production facilities at Canoga Park, California; Huntington Beach, California; and Huntsville, Alabama, propose their spare parts costs by major cost elements (that is, direct labor, material, other direct costs, overhead, and general and administrative expenses). Boeing-Houston, Texas, Boeing's home office, proposes a total spare parts cost that it adds to each proposal submitted by the Boeing production facilities. The ISS contracting officer requested that Boeing not propose costs for individual spare parts because (1) proposing costs for individual spare parts would increase proposal costs to Johnson and (2) the ISS Program Office did not negotiate prices for individual spare parts. After the contracting officer completes each proposal evaluation, Johnson and Boeing negotiate a total price for all of the spare parts in the PIO. Boeing reports cumulative costs for

[14]Failure rate refers to the number of hardware failures per year requiring removal and replacement on orbit of the failed hardware items. Failure impact refers to the possibility that NASA will need to make additional spare parts purchases because the severity of the failure consequences is greater than NASA anticipated.

all spare parts each month on NASA Form 533M, "Monthly Contractor Forecast Report - Format 4," and on the Performance Measurement System Report.[15] However, neither report identifies the costs for line item spare parts.

Line Item Spare Parts Prices. Boeing does not track and report individual spare parts prices to the ISS Program Office as NMI 5900.1B required. Consequently, Johnson did not establish a pricing history for later spare parts purchases. Also, Boeing could charge Johnson unreasonable prices for individual spare parts even though the total cost of a particular spare parts order appears reasonable.

Need for Guidance on Spare Parts Acquisition

NASA Cancelled NMI 5900.1B. The NASA Headquarters Procurement Systems Division issued NMI 5900.1B in February 1993. However, in a February 28, 1996, notice to the Manager, NASA Directives and Federal Regulations, the Associate Administrator for Procurement stated that NMI 5900.1B was no longer needed and was cancelled. Since then, NASA has had no policy on the acquisition and provisioning of spare parts.

NMI 5900.1B applied to the acquisition of spare parts for nonexpendable major systems (such as the ISS) as defined by the Office of Management and Budget (OMB) Circular A-109, "Major Systems Acquisitions," April 5, 1976. NASA FAR Supplement Part 1834 states that NASA's implementation of OMB Circular A-109 is contained in NPG 7120.5A, "NASA Program and Project Management Processes and Requirements," April 3, 1998. The NASA Office of the Chief Engineer is responsible for NPG 7120.5A, which provides broad guidance on program and project management processes and requirements and which incorporates by reference more specific guidance. The NASA Headquarters Office of Procurement is responsible for developing specific guidance on spare parts acquisition and originally issued NMI 5900.1B.

ISS Program Should Follow NMI 5900.1B. NMI 5900.1B was in effect when the Boeing contract was signed on January 13, 1995, and is incorporated by reference into the ISS prime contract. Therefore, the ISS Program should follow the instruction and negotiate separate prices and develop price histories for ISS spare parts to ensure that NASA pays fair and reasonable prices and competitively procures future ISS spare parts.

Recommendations, Management's Response, and Evaluation of Response

1. The Acting Director, Lyndon B. Johnson Space Center, should require Boeing to propose, negotiate, track, and report individual prices for ISS spare parts, as required by the ISS contract including NMI 5900.1B.

[15]NASA requires Boeing to report contract cost and schedule performance each month in the Performance Measurement System Report. The report provides NASA management with the primary data for determining current contract cost and schedule performance and the forecast of the estimated cost at completion.

Management's Response. Concur. NASA is now requiring Boeing to negotiate and propose prices for individual spare parts. Also, management will track and report prices for each spare part when the actions are cost-effective to the Program.

Evaluation of Response. Management's comments and planned actions are responsive to the recommendation. The recommendation is resolved but will remain open until agreed-to corrective actions are completed.

2. The Acting Director, Lyndon B. Johnson Space Center, should direct the ISS Program Office to track prices paid for ISS spare parts to establish the price histories needed to facilitate future purchases on a firm fixed-price basis.

Management's Response. Nonconcur. NASA estimated that $119 million of the $164 million remaining in the spare parts budget through FY 2007 will be spent on batteries. The remaining $45 million in the budget through FY 2007 is for spare parts reprocurement (other than batteries) due to changes in the failure rates and other program changes. NASA will not require Boeing to track prices for the reprocurements because Boeing's estimated cost of $4.5 million to track individual prices for the $45 million reprocurement offsets any cost savings obtained by having a line item price history for uncertain future spare reprocurements. Also, because of a Program change from a seven-member crew to a three-member crew, NASA is no longer recognizing a $110 million threat for additional spare parts reprocurement through FY 2007. Regarding the use of fixed-price contracts for future spare parts purchases, the ISS Procurement Office will continue to acquire spare parts through Boeing, the prime contractor and integrator, using the type contract that makes good fiscal sense. After submission of management's written comments, the ISS Procurement Officer agreed to use receiving reports from Boeing to track prices and establish price histories for batteries and other high-cost spare parts.

Evaluation of Response. Management's comments and planned alternative actions are responsive to the recommendation. We accept Johnson's rationale to not track and report individual prices for low-dollar value spare parts if it is not cost-effective. However, the possibility still exists that NASA will spend an additional $110 million for spare parts reprocurements through FY 2007 because the ISS Program could ultimately require a seven-member crew. The recommendation is resolved but will remain undispositioned and open until agreed-to corrective actions are completed.

3. The Assistant Administrator for Procurement should reestablish procedures for acquiring and provisioning NASA spare parts.

Management's Response. Concur. The NASA Office of Procurement will revise the NASA FAR Supplement to include appropriate procedures for acquiring and provisioning spare parts.

Evaluation of Response. Management's planned actions are responsive to the recommendation. The recommendation is resolved but will remain undispositioned and open until agreed-to corrective action is completed.

4. The NASA Chief Engineer should incorporate by reference in the next revision of NPG 7120.5A the spare parts procedures discussed in Recommendation 3.

Management's Response. Concur. The NASA Chief Engineer will reference the NASA FAR Supplement update in the next NPG 7120.5A revision.

Evaluation of Response. Management's comment and planned action are responsive to the recommendation. The recommendation is resolved but will remain undispositioned and open until agreed-to corrective action is completed.

Finding B. Accounting for Spare Parts Costs

Boeing did not include contractor fee and indirect costs in the value of the spare parts recorded on the receiving reports it submitted to NASA. This occurred because Boeing's accounting system was inadequate to determine the total unit costs of Government property[16] as required by Federal Financial Accounting Standards and by the NASA FAR Supplement. As a result, the Agency's annual financial statements from Program inception (FY 1995) through FY 2000 cumulatively understated the value of ISS spare parts by about $39 million.[17]

Requirements to Record Unit Acquisition Costs

Federal Financial Accounting Standards Guidance. Federal Financial Accounting Standards Number 6, "Accounting for Property, Plant, and Equipment (PP&E)," [18] effective June 1996, contains accounting standards for Federally owned PP&E. The accounting standards require that PP&E be recorded at cost. That cost shall include all costs to bring the PP&E to a form and location suitable for their intended use.

NASA Guidance. For NASA property, NASA FAR Supplement 1845.7101-3, "Unit Acquisition Cost," requires the unit value (called the unit acquisition cost) to include related fees, or a pro rata portion of fees, paid by NASA to the contractor and indirect production costs (see Appendix C).

Inclusion of All Applicable Costs in Spare Parts Values

Boeing documents delivery of spare parts to NASA on Department of Defense DD Form 250, "Material Inspection and Receiving Report" (receiving report). On each receiving report, Boeing records a value for each spare part and uses the values from the receiving reports to prepare official property records and NASA Form 1018, "NASA Property in the Custody of Contractors." The Agency uses Form 1018 as the primary documentation in establishing the value of ISS property in its annual financial statements.

Boeing judgmentally estimated the unit values for ISS spare parts made at its production facilities and used vendor invoices to value spare parts made by Boeing subcontractors. However, Boeing did not allocate indirect costs and applicable fee to the unit values of spare parts recorded on the DD Forms 250 and in the official property records. NASA adjusted its official property records for FY's 1998 through 2000 by adding fees to the property values reported for special test equipment, special tooling, Agency-peculiar equipment, and contract work-in-process.[19] However, NASA could not determine the amount of fee that applied to

[16]Boeing also excluded fee and indirect costs in determining the value of ISS flight hardware.
[17]We could not determine the amount of the understatement for each fiscal year because only cumulative totals through FY 2000 were available for our use.
[18]The Federal Financial Accounting Standards define PP&E as tangible assets that have an estimated life of 2 or more years, are not intended for sale in the ordinary course of business, and are intended to be used or available for use by the entity.
[19]Except for contract work-in-process, the Agency adjusted the three categories for property valued at $100,000 or more.

ISS spare parts. Because of Boeing's omissions in the values for spare parts, NASA understated by about $39 million the aggregate spare parts values it reported in the Agency's financial statements from FY's 1995 through 2000. The $39 million represented about $27.6 million in fees and about $11.4 million in indirect costs that NASA paid to Boeing on the total cost of spare parts through FY 2000.

DCAA Review of Contractor-Held Property

Arthur Andersen LLP, an independent certified public accounting firm, audited NASA's FY 2000 Financial Statements. At our request and in conjunction with NASA's FY 2000 Financial Statement audit,[20] DCAA collected information on NASA property in the possession of 10 major contractors, including Boeing. Regarding Boeing, DCAA reported in January 2001 that the contractor did not consistently value Government property in accordance with generally accepted accounting principles and NASA FAR Supplement 1845.7101-3.[21] In particular, Boeing had not included shipping and other material handling costs (indirect costs) when determining the unit cost for Government property. Also, Boeing had not accumulated actual costs for fabricated assets. Therefore, the asset value that Boeing reported to NASA each time Boeing delivered a fabricated asset was based on estimated costs. Further, DCAA reported that, due to shortcomings in Boeing's accounting system and property records,[22] the associated costs such as engineering, testing, analysis, overhead, and fee were not readily available to determine the total unit acquisition cost.

Independent Audit of NASA's FY 2000 Financial Statements

In its February 6, 2001 audit report, Arthur Andersen issued an unqualified opinion on NASA's financial statements (see Appendix D). Arthur Andersen found no material weaknesses[23] in internal controls and no reportable conditions[24] of noncompliance with the laws and regulations it tested. However, the public accountant identified one reportable condition involving controls over contractor-held property reporting. That is, DCAA, in conjunction with the Arthur Andersen audit, found internal control deficiencies regarding contractor-held property accounting procedures at Boeing's sites at Canoga Park, California; Huntington Beach, California; and Huntsville, Alabama.

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[20]We asked DCAA to collect information on NASA property in the possession of contractors to assist the Agency and Arthur Andersen in assessing the accuracy of contractor-held property as recorded in the financial records and to evaluate certain internal controls related to such property.

[21]DCAA issued Report No. 3521-2001B17800904, "Report on Application of Agreed-Upon Procedures, Government Property in the Possession of NASA Contractors," in January 2001 (see Appendix D).

[22]DCAA found that Boeing's policies and procedures lacked sufficient detail and specificity with respect to establishing unit acquisition costs for Government property.

[23]A material weakness is a reportable condition in which the design or operation of one or more internal control structure elements does not reduce to a relatively low level the risk that errors or irregularities in amounts that would be material in relation to the financial statements being audited may occur and not be detected within a timely period by employees in the normal course of performing their assigned functions.

[24]A reportable condition is a matter that, in the auditor's judgment, should be communicated because it represents a significant deficiency in the design or operation of internal control that could adversely affect the organization's ability to meet internal control objectives of reliable financial reporting, compliance with laws and regulations, and reliable performance reporting.

Recommendations by DCAA and Arthur Andersen. To resolve the internal control deficiencies regarding contractor-held property reporting that were disclosed during the NASA FY 2000 Financial Statements audit, Arthur Andersen made several recommendations to NASA, and DCAA made a recommendation to Boeing. Specifically, in a February 2001 management letter, Arthur Andersen recommended that NASA perform a comprehensive assessment of policies and procedures maintained and followed by contractors to ensure the policies and procedures are in accordance with the NASA FAR Supplement. When they are not in compliance with the NASA FAR Supplement and generally accepted accounting principles, NASA should reach a conclusion and document its acceptance of these deviations. Arthur Andersen also recommended that NASA perform periodic reviews of amounts reported on NASA Forms 1018 using consistent review criteria to ensure that Boeing is following policies and procedures. Additionally, in July 2001, DCAA recommended that Boeing production sites revise policies to specifically include all the costs described in NASA FAR Supplement 1845.7101-3 when determining the unit acquisition cost of Government property. NASA agreed with all the recommendations and is taking action to resolve deficiencies regarding contractor-held property reporting, such as providing training on NASA Form 1018 reporting to contractors at NASA Centers. Pricewaterhouse Coopers LLP, an independent certified public accounting firm, performed NASA's FY 2001 financial statement audit and reviewed the corrective actions taken by NASA with the assistance of DCAA.[25] Pricewaterhouse Coopers LLP determined that the FY 2000 financial statement audit recommendation on the reporting of contractor-held Government property was still open as of March 2002. Therefore, we are making the recommendation below for ISS spare parts.

Recommendation, Management's Response, and Evaluation of Response

5. The Acting Director, Lyndon B. Johnson Space Center, should ensure Boeing includes fee and indirect costs in the value of ISS spare parts recorded on the receiving reports submitted to NASA, as required by NASA FAR Supplement 1845.7101-3.

Management's Response. Concur. Johnson directed Boeing to include total costs and fee in the spare parts value recorded on receiving reports submitted to NASA. Johnson is reviewing the property records to ensure total costs are reflected.

Evaluation of Response. Management's comments are responsive to the recommendation. The recommendation is resolved but will remain undispositioned and open until the agreed-to corrective actions are completed.

[25]DCAA reviewed the records at three prime contractors (Boeing, Lockheed Martin, and United Space Alliance) and two subcontractors (Boeing-Huntington Beach, and Honeywell).

Appendix A. Objectives, Scope, and Methodology

Objectives

The overall objective was to determine whether NASA properly acquired and accounted for International Space Station (ISS) spare parts. Specifically, we determined whether NASA appropriately justified and approved the acquisition of ISS spare parts through noncompetitive contract modifications, paid a fair and reasonable price for ISS spare parts, and adequately supported the value of the spare parts inventory that the Agency reports in its annual financial statements.

Scope and Methodology

To satisfy our objectives, we reviewed the portions of the ISS contract (NAS15-10000) pertaining to spare parts acquisition. We interviewed personnel from NASA, Blackhawk Corporation (NASA's support contractor), and The Boeing Company regarding procedures for budgeting, acquiring, accounting for, and valuing spare parts. We reviewed applicable regulations including the NASA Management Instruction, Federal Acquisition Regulation (FAR), and NASA FAR Supplement regarding contracting and property accountability of spare parts as well as Federal law regarding reporting of spare parts in NASA's financial statements. We reviewed Department of Defense DD Forms 250 on spare parts Boeing delivered to NASA to determine the basis for spare parts values in NASA's property records and financial statements. Also, we determined the extent to which NASA made repetitive purchases. We did not assess the reliability of computer-processed data because we did not rely on it to achieve our objectives.

Management Controls Reviewed

We reviewed management controls relative to the acquisition of and accounting for ISS spare parts and property accountability and reporting in the NASA financial statements. We determined that management controls needed to be strengthened to ensure that NASA complies with applicable policies and procedures on acquiring and accounting for spare parts (see Findings A and B).

Audit Field Work

We performed the audit field work from January through June 2001 at the Lyndon B. Johnson Space Center. We performed the audit in accordance with generally accepted government auditing standards.

Summary of Prior Audits and Reviews

The Defense Contract Audit Agency and NASA's independent certified public accounting firm issued audit reports related to Boeing's accounting for Government property. The reports are summarized in Appendix D of this report.

Appendix B. International Space Station Contract

Brief Description of the Statement of Work. The Statement of Work for the International Space Station (ISS) contract describes The Boeing Company's (Boeing's) requirements for the design, development, manufacture, integration, test, verification, and delivery to NASA of the U.S. On-Orbit Segment[26] of the ISS, including ground support equipment and for support for ground and orbital operations. The Statement of Work also requires that Boeing provide technical support and data for NASA's operation and utilization of the ISS and describes Boeing's requirements to integrate the complete ISS System.

Date Awarded and Price. NASA awarded the ISS contract (NAS15-10000) on January 13, 1995, for a total value of $5.638 billion. As of February 2002, the contract value was $10.8 billion.

Major Modifications. On December 21, 1999, the ISS contract was restructured. The purpose of this restructuring was to definitize adjustments to the estimated costs and fees, change the contract type, and effect other contract actions. Boeing and the ISS Program Office agreed that the modification provided a full equitable adjustment for all issues that were identified or known prior to October 1, 1999.[27] Modification 1114, dated February 7, 2002, added $934 million to the contract value and extended the station integration and operations work through the current period of performance, December 31, 2003.[28]

Contract Type. The ISS contract initially was a cost-plus-award fee/incentive fee/fixed fee contract. When the contract was restructured, the fee structure was changed to a cost-plus-award fee/fixed fee contract.

Estimated Completion Date. The ISS contract states that all work required under the contract shall be completed on or before December 31, 2003. Currently, the final On-Orbit Award Fee evaluation period is scheduled for 3 months after Flight No. UF5.[29] The ISS Assembly Sequence, Revision F, June 2001, identifies the launch date for Flight No. UF5 as February 2005.

[26]The U.S. On-Orbit Segment is an Earth-orbiting facility that houses experiment payloads, distributes resource utilities, and supports permanent human habitation for conducting research and science experiments in a microgravity environment.

[27]Office of Inspector General Report Number IG-02-002, "Restructuring of the International Space Station Contract," November 8, 2001, further discusses the modification.

[28]This work has been planned and is contained in the budget estimates represented in the FY 2003 President's budget.

[29]Flight No. UF5 provides for experiment delivery, resupply, and exchange for the ISS. Elements contained on the flight include a multipurpose logistics module, which carries inside experiment equipment racks, and an express pallet, which carries external experiment equipment.

Appendix B

Contractor. The prime contractor for the ISS is Boeing. Boeing has four development sites at Huntsville, Alabama; Canoga Park, California; Huntington Beach, California; and Houston, Texas.

Costs Incurred to Date. As of February 2002, NASA had disbursed $9.787 billion on the ISS contract.

Cost and Schedule Performance. Boeing's Performance Measurement System Report, January 2002, indicates that since contract inception, Boeing has declared $1.1 billion in cost overruns. NASA estimated that the overrun will be $1.2 billion.

Appendix C. Procurement Requirements

Federal Acquisition Regulation (FAR) 15.402, "Pricing Policy"

Contracting officers must (a) purchase supplies and services from responsible sources at fair and reasonable prices.

NASA FAR Supplement 1845.7101-3, "Unit Acquisition Cost"

(a) The unit acquisition cost shall include all costs incurred to bring the property to a form and location suitable for its intended use. For example, the cost shall include the following, as appropriate:

(1) Amounts paid to vendors or other contractors.
(2) Transportation charges to the point of initial use.
(3) Handling and storage charges.
(4) Labor and other direct or indirect production costs (for assets produced or constructed).
(5) Engineering, architectural, and other outside services for designs, plans, specifications, and surveys.
(6) Acquisition and preparation costs of buildings and other facilities.
(7) An appropriate share of the cost of the equipment and facilities used in construction work.
(8) Fixed equipment and related installation costs required for activities in a building or facility.
(9) Direct costs of inspection, supervision, and administration of construction contracts and construction work.
(10) Legal and recording fees and damage claims.
(11) Fair values of facilities and equipment donated to the Government.
(12) Material amounts of interest costs paid.

(b) Acquisition cost shall include, where appropriate, for contractor acquired Special Test Equipment, Special Tooling, Agency-Peculiar Property and Contract Work-In-Process, related fees, or a pro rata portion of fees, paid by NASA to the contractor. Situations where inclusion of fees in the acquisition cost would be appropriate are those in which the contractor designs, develops, fabricates or purchases property for NASA and part of the fees paid to the contractor by NASA are related to that effort.

(d) The contractors shall report unit acquisition costs using records that are part of the prescribed property or financial control system as provided in this section. Fabrication costs shall be based on approved systems or procedures and include all direct and indirect costs of fabrication.

Appendix C

NASA Management Instruction (NMI) 5900.1B, "NASA Spare Parts Acquisition Policy"

This instruction established a uniform policy for the acquisition and provisioning of NASA spare parts:

> It is NASA policy to support its nonexpendable major systems by applying sound management and engineering judgment to selecting and acquiring spare parts in the quantities and at the lowest fair and reasonable cost, consistent with the program being supported. Breakout and competitive procurement, particularly of replenishment spares, are encouraged to the maximum extent practicable.

Paragraph 6(a), "Initial Provisioning," states:

> (1) Initial provisioning shall be accomplished during full-scale development of a major system. The contractor is required to:
>
> (a) Develop a list of proposed spare parts and related quantities needed to support the major system during the initial provisioning period. The list should provide the basis for an assessment of the potential for breakout and competition. There must be for each item a unit price, an identification of the original equipment manufacturer (OEM), and a listing of the OEM's most recent selling price to the next higher tier contractor.
>
> (b) Submit to NASA the list developed in subparagraph (a) and participate in an initial provisioning conference in which NASA evaluates the contractor's recommendations and the data upon which they are based and makes initial purchase and inventory-stocking decisions.
>
> (2) The contractor makes recommendations only. The decisions (a) to purchase or not purchase an individual item suggested by the contractor as a spare part and (b) on the quantity of each item to be purchased are made solely by NASA. Program managers shall ensure that spares' recommendations are processed and purchase decisions made in a timely manner in order to minimize procurement costs and have needed spare parts available prior to the first predicted usage of the system.
>
> (3) Program managers are responsible for assuring, as part of the initial provisioning process, that parts are screened for availability from Government sources and obtained from those sources if available at a lower cost than other alternatives, providing that traceability standards can be maintained. To the maximum extent

practicable, spares should be purchased directly from the actual manufacturer, i.e., lowest-tier subcontractor, to eliminate the layers of support costs at each tier. Purchase requirements should be consolidated upon completion of NASA decisions on the contractor's provisioning recommendations, and efforts should be made to identify and consolidate common hardware used in various elements of the program.

Paragraph 6(b), "Initial Provisioning Period," states:

(1) The basic contract should define an initial provisioning period. This period generally should cover test and evaluation, plus a short period of operation, so that sufficient operational experience can be gained with the system to provide a basis for fully competitive acquisition of spare parts.

(2) To provide a vehicle for ordering spare parts during this period, the contract shall include a separate line item, with a ceiling or not-to-exceed amount, obligating the contractor to provide any parts identified during initial provisioning and ordered by the Government. Unless otherwise justified, prices shall be negotiated before the contractor begins work on an individual order. If possible, each order should be on a firm fixed-price basis with individual items separately priced (see paragraph f(1)). As experience is gained with the operational system, the items selected as spare parts and the quantities needed may change. Individual item pricing will facilitate making those changes and provide a pricing history for later purchases.

(3) Early in the initial provisioning period, NASA typically orders spare parts exclusively from the major systems contractor. As experience is gained, however, opportunities to breakout items for competitive acquisition will become apparent. Before ordering spare parts under the major systems contract, therefore, the contracting officer should examine the alternate sources that may be available.

Paragraph 6(f), "Pricing," states:

(1) Each purchase of spare parts must meet the criterion of a fair and reasonable price. Several different methodologies are used by contractors to price spare parts. Certain of these can result in unrealistic and unreasonable prices for individual items even though the total cost of a particular spare parts order is reasonable; e.g., distribution of overhead costs by prorating the costs equally to each line item of the order without regard to the cost of the items involved. The concept of value added can help avoid this pitfall. NASA personnel are cautioned, when selecting

and pricing spare parts, to use a value-based method of distributing costs to individual items of a spare parts order; i.e., ensure that unit prices are in proportion to an item's base cost (e.g., manufacturing or acquisition cost).

(2) The Federal Acquisition Regulation (FAR), at 48 CFR 15.812-1(a), specifically prohibits any method of distributing costs to line items that distorts the unit prices. The FAR also incorporates a contract clause of 48 CFR 52.215-26, Integrity of Unit Prices, that requires contractors, in certain circumstances, to identify items that they will not manufacture or to which they will not contribute significant value. Value added includes such items as required quality assurance, calibration, and configuration management; other activities, such as sustaining engineering, provisioning, and cleaning, should be separately priced. Programs managers should use this information to determine when price distortions have occurred through overhead applications and what resources to apply to breakout of the items. To assist in making these determinations, percentage-price-increase standards may be established for the program; e.g., item price increases of X percent over the original purchase price must be justified to and approved by the program manager.

(3) If spare parts management and support are contracted out, special care shall be taken by NASA personnel in pricing. In such situations, human resources associated with the acquisition of spares (sustaining engineering, procurement support, logistics, and so forth) and related overhead may be priced separately from the cost of the spare parts to the support contractor. If so, overhead, general and administrative expense, and fee charged directly against the spare parts prices shall be limited and checked for duplication to the maximum extent. Particular attention shall be given to proposed overhead charges and whether the costs included therein are for value added and are incurred in specific support of the spare parts purchase.

Appendix D. Prior Audits and Other Reviews

Defense Contract Audit Agency Report

Report No. 3521-2001B17800904, "Report on Application of Agreed-Upon Procedures, Government Property in the Possession of NASA Contractors," January 5, 2001.

The Defense Contract Audit Agency (DCAA) evaluated The Boeing Company's practices for determining unit acquisition costs for NASA property additions for the period October 1, 1999, through September 30, 2000, on contract number NAS15-10000. DCAA reported that the contractor did not consistently value Government property in accordance with generally accepted accounting principles and NASA Federal Acquisition Regulation (FAR) Supplement 1845.7101-3. The evaluation determined that the contractor utilized purchase orders and invoices for contractor-acquired property, DD Forms 1149[30] for Government-furnished property, and estimates for fabricated property to determine acquisition cost. Boeing had not included shipping and other material handling costs (indirect costs) when determining the unit cost for Government property. Also, Boeing had not accumulated actual costs for fabricated assets at a sufficient level of detail necessary to determine actual costs. Therefore, the asset value that Boeing reported for fabricated assets was based on estimated costs. Additionally, due to Boeing's accounting system shortcoming, the associated costs (such as engineering, testing, analysis, and overhead) and fee were not readily available to determine the total unit acquisition cost. DCAA concluded that Boeing's accounting system and property records did not provide sufficient information and data to determine the unit acquisition costs for Government property. In July 2001, DCAA sent letters to Boeing production sites recommending that they revise their policies to specifically include all the costs described in NASA FAR Supplement 1845.7101-3 when determining the unit acquisition cost of Government property.

Arthur Andersen LLP, An Independent Certified Public Accounting Firm

NASA's FY 2000 Financial Statement Audit, February 6, 2001

Arthur Andersen audited the NASA FY 2000 Financial Statements and issued an unqualified opinion. Arthur Andersen found no material weaknesses in internal controls and no reportable conditions of noncompliance with the laws and regulations it tested. However, the independent public accountant identified one reportable condition involving controls over contractor-held property reporting. Specifically, Arthur Andersen stated that as part of the 10 major contractor sites visited, DCAA, in conjunction with the financial statement audit, found internal control deficiencies regarding contractor-held

[30]DD Form 1149, "Requisition and Invoice/Shipping Document," is a Department of Defense form used by the Federal Government to transfer property on loan.

property accounting procedures at Boeing's sites at Canoga Park, California; Huntington Beach, California; and Huntsville, Alabama. In its Report of Independent Public Accountants on Internal Control, Arthur Anderson stated that NASA's internal controls for the reporting of contractor-held property required improvement to ensure that contractor-held property is reported in accordance with NASA and Federal accounting requirements. Specifically, NASA should enhance existing procedures designed to educate contractor personnel and NASA property administrators on property accounting and reporting requirements. Further, Arthur Andersen recommended that NASA perform a comprehensive assessment of policies and procedures maintained and followed by contractors to ensure they are in accordance with the NASA FAR Supplement. When contractor policies and procedures are not in compliance with the NASA FAR Supplement and generally accepted accounting principles, NASA should reach a conclusion and document the acceptance of these deviations. NASA should also perform periodic reviews of amounts reported on NASA Forms 1018[31] using consistent review criteria to ensure that its contractors perform contractor-held property reporting in accordance with NASA FAR Supplement requirements.

[31]The Agency uses NASA Form 1018, "NASA Property in the Custody of Contractors," as the primary documentation in establishing the value of International Space Station property in NASA's annual financial statements.

Appendix E. Management's Response

National Aeronautics and
Space Administration
Lyndon B. Johnson Space Center
2101 NASA Road 1
Houston, Texas 77058-3696

February 15, 2002

Reply to Attn of: BD5

TO: NASA Headquarters
Attn: W/Assistant Inspector General for Audits

FROM: AA/Acting Director

SUBJECT: Management's Response to OIG's Draft Report on the Audit of International Space Station Spare Parts Costs, Assignment Number A-01-009-00

We have reviewed the subject draft report, and thank you for the opportunity to provide comments. To provide a single Agency response, this letter was prepared in conjunction with the appropriate Headquarters' offices.

We have provided some general comments regarding audit findings, and have addressed each recommendation individually.

If you have any questions regarding this response, please contact Ms. Pat Ritterhouse, JSC Audit Liaison Representative, at 281-483-4220.

Roy S. Estess

Enclosure

cc:
BG/L. Yates
BG/T. Neeley
HQ/AE/W. B. Keegan
HQ/AE/G. Robinson
HQ/H/T. Luedtke
HQ/H/L. Becker
HQ/JM/J. D. Werner
HQ/M/F. Gregory
HQ/MX/G. A. Gabourel

Appendix E

Management's Response to OIG's Draft Report on the Audit of International Space Station Spare Parts Costs, Assignment Number A-01-009-00

Auditor's Finding A: Acquisition of Spare Parts

"Johnson did not negotiate separate prices or develop price histories for ISS spare parts. This occurred because Johnson did not perform those actions required by NMI 5900.1B, which the ISS contract incorporates by reference. As a result, Johnson did not know the prices, either individually or by PIO, that it paid Boeing for the $334 million spent on ISS spare parts through FY 2000 and may have paid prices that were not fair and reasonable. Also, without knowing the prices paid, Johnson could not develop a price history with which to procure, on a competitive fixed-price basis, an additional $608 million in spare parts that may be needed over the life of the ISS."

JSC Comments:

NASA agrees that developing price histories for individual spare parts can provide value to future estimates for follow-on procurements and material changes to existing flight and ground components. However, NASA does not agree that the approach for spares procurements taken through FY 2000 resulted in the government paying unfair or unreasonable prices.

See Appendix F, OIG Comment 1

NASA's approach to station spares procurements is grounded in both Shuttle Program and DOD experience, as well as ongoing observations on the state of the nation's aerospace industrial base. Early in the development of the International Space Station (ISS), it was recognized that a one-of-a-kind vehicle with a long operational life would face severe spares replenishment challenges. Indeed, the Station's Prime contractor identified sub-vendors who could not be maintained as sources of supply, at any reasonable price, well before station assembly was completed. NASA just could not provide sufficient, ongoing business to justify the suppliers keeping production capabilities intact. NASA, therefore, proceeded with life-of-type procurements and the integration of spares procurements with basic flight hardware production so as to avoid production line restart costs or the costs of developing new sources of supply as the original equipment manufacturers shifted production to more profitable hardware.

With spares production proceeding in parallel, or just behind, the production of the flight hardware, NASA chose to negotiate individual provisioning item orders (PIOs), under a cost-reimbursement arrangement, that gained efficiencies through the effective grouping and scheduling of spares production when production capacity was available. This integrated approach guaranteed fair and reasonable prices overall by ensuring the vendors were working continuously on either basic flight hardware or spares. In all cases, the provisions of FAR Clause 52.216-7, "Allowable Cost and Payment," were met, and appropriate surveillance and auditing were conducted to protect the government's interests.

See Appendix F, OIG Comment 2

The intent of NMI 5900.1B was also satisfied. NMI 5900.1B does not require NASA contractors to track and report individual spare parts prices, and allows nonexpendable

Enclosure

hardware programs considerable latitude in defining a spares procurement approach that best meet's program needs and is in the best interest of the government.

While there is always a risk that operational circumstances may require NASA to buy some small number of spares beyond those acquired under a life-of-type approach, the initial procurement cost of an individual spare is valuable only as a starting point in estimating the cost of replenishment. This is particularly true in the case of the Space Station. The cost of any reprocurement will be dictated by the availability of a source of supply; efforts necessary to update production drawings; the need to provide required tooling, obtain required materials, obtain/certify test equipment and/or facilities; and the availability of personnel with appropriate skills. In all likelihood, NASA would face the choice of purchasing a special production run at 3-4 times the original procurement cost, or upgrading the subsystem/component to meet the current state of technology. Unlike the DOD, which maintains extensive procurement histories for annual replenishment buys, ISS will replenish only on an exception basis, and prior cost data will be of very limited utility.

Finally, in response to the IG's comment that "a method of achieving individual spare parts pricing could be through the use of a process such as change order accounting, which is addressed in FAR 52.243-6", NASA disagrees. Change order accounting only applies through the period it takes to definitize a contract change order (in this case, the PIO). With the maximum time allowed by the FAR of 6 months for change order definitization, the value added for line item accounting would be small compared to the significant costs associated with requiring the reporting.

See Appendix F, OIG Comment 3

Recommendations for Corrective Action

The Acting Director, Lyndon B. Johnson Center should:

1. Require Boeing to propose, negotiate, track and report individual prices for ISS spare parts, as required by the ISS contract including NMI 5900.1B.

2. Direct the ISS Program Office to track prices paid for ISS spare parts to establish the price histories needed to facilitate future purchases on a firm fixed price basis.

Recommendation 1: JSC Procurement Response

To the recommendation of proposing and negotiating for individual ISS spare parts NASA concurs. However, we feel there has been neither adverse nor unfavorable results from the way we currently do business and the IG has not demonstrated unfair or unreasonable prices paid for spares. The ISS office has requested, and will continue to request, the contractor price and substantiate separately each deliverable item listed in their proposals. The first action was taken in Request for Proposal #342 for Provisioning Item Order #75, dated January 23, 2002.

See Appendix F, OIG Comment 1

To the recommendation of tracking and reporting the price of each line item of spares, NASA concurs and will do so when it is deemed beneficial to the program. To supplement our insight, NASA is in the process of adding additional financial reporting for spares at the contractor level. NASA has requested a supplemental dollars and EP report (PC27F) for WBS 3.20 (Spares) on each major subcontract with a value greater

than $3M. This $3M threshold was determined by reviewing the balance of future spares procurements. Since 99 percent of these procurements were greater than $3M, it was felt that this would be the correct level of reporting. Additionally, this threshold for reporting has been used in previous prime contract requirements.

This additional financial report will provide NASA insight into forecasted and actual costs for the major spares subcontractors. The single largest line item that will benefit from this report is the future $119M procurement of batteries. Modification 1091 was transmitted to Boeing for signature on October 26, 2001. Although not signed yet, NASA has communicated to Boeing the requirement to submit the financial reports in accordance with direction in the unsigned modification.

Recommendation 2: JSC Procurement Response

NASA does not concur with tracking of prices paid for ISS spare parts to establish price histories needed to facilitate future purchases on a firm fixed price basis.

The rationale for the non-concurrence is based on the following analysis. The $831M (stated in the audit report) is the total ISS budget for spares acquisition from contract inception through FY 2007. Of this $831M spares budget, $667M of spares have already been ordered leaving a balance of $164M. Of this $164M budget to go for spares, $119M (ISS current estimate) for the procurement of a single line item, battery ORUs, to be delivered from FY 2005 through FY 2007. In addition, the Program Office estimates it will probably spend another $300M for batteries from FY's 2008 through 2017 that is not part of the current budget. The Program has been evaluating and will continue to evaluate and negotiate batteries as single line items. The battery procurements to date are valued at $69M.

The remaining $45M of the $831M budget is for re-procurement due to changes in failure rates and/or program changes. Also, the IG auditor stated that the ISS Program Office might spend another $110M above the FY 2007 budget for re-procurements for the same reasons. However, due to a program change from a seven-member crew to a three-member crew, the possibility of expending $110M was reduced to $65M and possibly to zero. What actually happens depends on the flight rate and power usage. Less power usage equates to a reduced need of ORU re-procurements. Currently, the assessment by the ISS Spares and Logistics Office is that this $110M is no longer a threat.

Therefore, reporting by line item for the approximately $45M of spares reprocurement (other than batteries) due to changes in failure rates and other program changes is not financially beneficial to the Program. NASA requested in mid-November 2001, and received on December 6, 2001, Boeing's estimated cost of $4.5M to track and report only the remaining spares. In NASA's opinion, the Boeing cost to track and report line item prices on the remaining spares of $45M will offset any cost savings obtained by having the line item price history for uncertain future spares procurements.
Finally, regarding the issue of using fixed type prime contracts for the balance of spares, the ISS Procurement Office will use the appropriate type of contract that makes good fiscal sense within the boundaries of the resources available within the office to carry out those actions. In the case of the balance of spares needed or projected for the ISS, Boeing, as the prime contractor and integrator of the ISS, will continue to be responsible for these procurements.

Recommendation for Corrective Actions

3. The Associate Administrator for Procurement should reestablish procedures for acquiring and provisioning NASA spare parts.

Recommendation 3: Office of Procurement Comments

Concur. Although we believe current Federal Acquisition Regulation (FAR) provisions allow for proper identification and pricing of spare parts, there are NASA FAR Supplement (NFS) revisions which we believe should be made (most likely to NFS 1815.4). These revisions would ensure that the concerns of the audit report are met, and that appropriate attention would be paid to spare parts pricing on any future contracts. These provisions would apply to contracts where significant levels of recurring spare parts were contemplated. We anticipate that these changes would include, at least, a requirement to establish separate line item prices for individual spare parts being procured, and guidance which would address the pricing of spare parts to ensure that a value-based method of distributing costs is used in the pricing and negotiation of individual line item prices. To further ensure this, we would also emphasize the use of standard FAR Clause 52.215.14, "Integrity of Unit Prices (October 1997)," where appropriate.

CORRECTIVE ACTION OFFICIAL:	Code HK/Ron Lentz
CORRECTIVE ACTION CLOSURE OFFICIAL:	Code HK/Scott Thompson
PROJECTED CORRECTIVE ACTION CLOSURE DATE:	May 30, 2002

Recommendation for Corrective Action

4. The NASA Chief Engineer should incorporate by reference in the next revision of NPG 7120.5 the spare parts procedures discussed in Recommendation 3.

Recommendation 4: Office of Chief Engineer Comments

Concur. NASA Procedures and Guidelines (NPG) 7120.5 will include a reference to the NFS "spare parts" update in the Program and Project planning sections, although the next 7120.5 revision time frame has not been established. Therefore, we can not provide a date for completed actions.

Auditor's Finding B. Accounting for Spare Parts Costs

"Boeing did not include contractor fee and indirect costs in the value of the spare parts recorded on the receiving reports it submitted to NASA. This occurred because Boeing's accounting system was inadequate to determine the total unit costs of Government property as required by Federal Financial Accounting Standards and by the NASA FAR Supplement. As a result, the Agency's annual financial statements from Program inception (FY 1995) through FY 2000 cumulatively understated the value of ISS spare parts by about $39 million."

Recommendation for Corrective Action

5. The Acting Director, Lyndon B. Johnson Space Center should ensure Boeing includes fee and indirect costs in the value of ISS spare parts recorded on the

Appendix E

receiving reports submitted to NASA, as required by NASA FAR Supplement 1845.7101-3.

JSC Comments

Concur. Boeing has been directed to include total costs, including fees, on all transfer documents, in accordance with NASA FAR 1845.7101.3. The documents are being reviewed by JSC personnel to ensure that total costs are reflected. We consider actions taken responsive to the recommendation.

Appendix F. OIG Comments on Management's Response

The Johnson Space Center (Johnson) provided the following comments in its response to our draft report. Our responses to the comments are also presented.

Management Comments. NASA does not agree that the approach for ISS spare parts procurements through FY 2000 resulted in the Government paying unfair or unreasonable prices.

1. OIG Comments. We have reworded the finding to state that Johnson had no assurance that the prices it paid to Boeing were fair and reasonable.

Management Comments. NASA Management Instruction (NMI) 5900.1B does not require contractors to track and report individual spare parts prices.

2. OIG Comments. We agree that NMI 5900.1B does not explicitly state that contractors should track and report individual spare parts prices. However, the NMI states that, if possible, each order of spare parts should be on a firm fixed-price basis with individual items separately priced to provide a pricing history for later purchases. Therefore, The Boeing Company should track and report individual spare parts prices so that NASA can develop pricing histories.

Management Comments. Change order accounting is not an effective method of achieving individual spare parts pricing because it applies only through the provisioning item order definitization period (about 6 months or less) and would be too costly.

3. OIG Comments. We acknowledge that change order accounting may not be an appropriate method of achieving individual spare parts pricing and, accordingly, we have deleted all references to it.

Appendix G. Report Distribution

National Aeronautics and Space Administration (NASA) Headquarters

A/Administrator
AI/Associate Deputy Administrator
AB/Associate Deputy Administrator for Institutions
AE/Chief Engineer
B/Acting Chief Financial Officer
B/Comptroller
BF/Director, Financial Management Division
G/General Counsel
H/Assistant Administrator for Procurement
HK/Director, Contract Management Division
HS/Director, Program Operations Division
J/Assistant Administrator for Management Systems
JM/Director, Management Assessment Division
L/Assistant Administrator for Legislative Affairs
M/Associate Administrator for Space Flight

NASA Centers

Acting Director, Lyndon B. Johnson Space Center
Director, Kennedy Space Center
Chief Counsel, Kennedy Space Center
Director, Marshall Space Flight Center

Non-NASA Federal Organizations and Individuals

Assistant to the President for Science and Technology Policy
Deputy Associate Director, Energy and Science Division, Office of Management and Budget
Branch Chief, Science and Space Programs Branch, Energy and Science Division, Office of Management and Budget
Director, Acquisition and Sourcing Management Team, General Accounting Office
Senior Professional Staff Member, Senate Subcommittee on Science, Technology, and Space

Chairman and Ranking Minority Member – Congressional Committees and Subcommittees

Senate Committee on Appropriations
Senate Subcommittee on VA, HUD, and Independent Agencies
Senate Committee on Commerce, Science, and Transportation
Senate Subcommittee on Science, Technology, and Space
Senate Committee on Governmental Affairs
House Committee on Appropriations
House Subcommittee on VA, HUD, and Independent Agencies
House Committee on Government Reform
House Subcommittee on Government Efficiency, Financial Management, and Intergovernmental Relations
House Subcommittee on Technology and Procurement Policy
House Committee on Science
House Subcommittee on Space and Aeronautics

Congressional Member

Honorable Pete Sessions, U.S. House of Representatives

NASA Assistant Inspector General for Audits
Reader Survey

The NASA Office of Inspector General has a continuing interest in improving the usefulness of our reports. We wish to make our reports responsive to our customers' interests, consistent with our statutory responsibility. Could you help us by completing our reader survey? For your convenience, the questionnaire can be completed electronically through our homepage at http://www.hq.nasa.gov/office/oig/hq/audits.html or can be mailed to the Assistant Inspector General for Audits; NASA Headquarters, Code W, Washington, DC 20546-0001.

Report Title: International Space Station Spare Parts Costs

Report Number: _____ **Report Date:** _____

Circle the appropriate rating for the following statements.

	Strongly Agree	**Agree**	**Neutral**	**Disagree**	**Strongly Disagree**	**N/A**
1. The report was clear, readable, and logically organized.	5	4	3	2	1	N/A
2. The report was concise and to the point.	5	4	3	2	1	N/A
3. We effectively communicated the audit objectives, scope, and methodology.	5	4	3	2	1	N/A
4. The report contained sufficient information to support the finding(s) in a balanced and objective manner.	5	4	3	2	1	N/A

Overall, how would you rate the report?

☐ **Excellent** ☐ **Fair**

☐ **Very Good** ☐ **Poor**

☐ **Good**

If you have any additional comments or wish to elaborate on any of the above responses, please write them here. Use additional paper if necessary. _____

How did you use the report? _____

_____

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_____

How could we improve our report? _____

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How would you identify yourself? (Select one)

- ☐ Congressional Staff
- ☐ NASA Employee
- ☐ Private Citizen
- ☐ Government: _____ Federal: _____ State: _____ Local: _____
- ☐ Media
- ☐ Public Interest
- ☐ Other: _____

May we contact you about your comments?

Yes: _____ **No: _____**

Name:_____

Telephone:_____

Thank you for your cooperation in completing this survey.

Major Contributors to the Report

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