NASA OFFICE OF INSPECTOR GENERAL

OFFICE OF AUDITS
SUITE 8U71, 300 E ST SW
WASHINGTON, D.C. 20546-0001

July 15, 2015

TO: William McNally
Assistant Administrator, Procurement

Michael Suffredini
Program Manager, International Space Station Program

SUBJECT: Final Memorandum, *Audit of NASA's Management of International Space Station Operations and Maintenance Contracts* (IG-15-021; A-14-023-00)

Dear Assistant Administrator McNally and Mr. Suffredini,

The United States has invested almost $78 billion in the International Space Station (ISS or Station) over the last 21 years, and going forward, NASA plans to spend between $3 and $4 billion annually to maintain and operate the Station, including transportation for crew and cargo.[1] In a May 2014 report, the House of Representatives Committee on Appropriations stated that "in order for the Station to remain a sustainable long-term program, NASA must continue to seek and implement cost savings measures with the goal of reducing the ISS operations budget or, at a minimum, slowing the growth in such budget."[2] In this audit, we examined whether NASA's contract administration and oversight processes are sufficient to avoid incurring unnecessary costs on the contracts the Agency utilizes to operate and maintain the ISS. See Enclosure I for details on the scope and methodology.

[1] This investment includes $46.7 billion for construction and Program costs through 2014, plus $30.7 billion for 37 supporting Space Shuttle flights, the last of which took place in July 2011.

[2] H. Rep. No. 113-448, Commerce, Justice, Science, and Related Agencies Appropriations Bill, 113th Cong. (2014).

Background

The result of an international effort to conceive, plan, build, and operate a permanently crewed research platform in space, the ISS is a unique technological achievement and a key part of NASA's goal to send humans to Mars. Specifically, the Agency utilizes the ISS as a research platform to study and mitigate a variety of risks associated with human travel and long-term habitation in space. In addition to NASA-related research, the Station provides a laboratory for other Government agencies and private entities to conduct scientific research and holds the promise of advancing next-generation technologies in fields such as health and medicine, robotics, manufacturing, and propulsion.

Unique Operating Environment of the ISS

Many things taken for granted on Earth are not available in space, and safely operating the ISS and ensuring its crew has a sufficient supply of food, water, and oxygen requires precise planning and logistics. Much like a terrestrial house, the ISS needs routine maintenance and is subject to unexpected mechanical failures. However, because ISS systems are significantly more complicated than those in an average home, resolving problems can be challenging, and ground teams on Earth must continually monitor ISS performance and communicate with the on-Station crew to address any repair issues. As such, NASA expends substantial resources training astronauts for their ISS stays at facilities such as the Neutral Buoyancy Laboratory (NBL) and the Space Vehicle Mockup Facility at Johnson Space Center.[3]

ISS Operating Costs

NASA's annual cost to operate the ISS was almost $3 billion in fiscal year (FY) 2014, and is expected to increase to $4 billion by 2020.[4] Those costs include on-orbit vehicle operations, research, crew transportation, and cargo resupply missions by U.S. commercial and international partner vehicles.[5] During FY 2016, the ISS Program plans to spend $1.1 billion (almost 36 percent of its budget) on operation and maintenance of the Station (see Table 1). More than 50 percent of the Station's budget is managed by the ISS Crew and Cargo Transportation project, which obtains transportation services from both domestic commercial providers and international partners.

[3] At the NBL, astronauts train in a large indoor pool using underwater neutral buoyancy techniques to simulate the microgravity of space. The Space Vehicle Mockup Facility provides full-scale vehicle mockups, flight-like trainers, engineering test articles, and environmental simulators to provide an environment that closely emulates the physical characteristics of various types of "crewed" spacecraft, including the ISS.

[4] In January 2014, the Administration announced the United States' intention to extend ISS operations to at least 2024.

[5] NASA has contracts to deliver cargo to the Station with two private companies – Orbital Sciences Corporation and Space Exploration Technologies, Inc. (SpaceX). Since retirement of the Space Shuttle in 2011, the Russian Space Agency has been the only option for ferrying NASA astronauts to and from the Station. NASA has contracted with The Boeing Company and SpaceX to develop crew transportation vehicles and hopes to begin using these services in late 2017.

Table 1: Space Operations FY 2016 Budget Request for the ISS Program

ISS Costs	Fiscal Year Budget Request (dollars in millions)						
	Actual 2014	Enacted 2015[a]	2016	2017	2018	2019	2020
Operations and Maintenance	$1,236.1	-	$1,106.1	$1,194.5	$1,327.7	$1,321.3	$1,327.6
Research	330.7	-	394.0	362.3	364.2	370.6	376.8
Crew and Cargo Transportation	1,397.3	-	1,605.5	1,717.1	1,949.1	2,134.1	2,333.9
Total	**$2,964.1**	-	**$3,105.6**	**$3,273.9**	**$3,641.0**	**$3,826.0**	**$4,038.3**

Source: President's budget request for FY 2016.

[a] Funding amounts for FY 2015 were not specified in Consolidated and Further Continuing Appropriations Act, Pub. L. No. 113-235 (2015).

Federal Acquisition Regulation Guidance

The Federal Acquisition Regulation (FAR) outlines the contract vehicles available to Federal agencies for acquiring goods and services, including fixed-price contracts, cost-reimbursement contracts, and award-fee contracts. In fixed-price contracts, the contractor agrees to deliver a product or service at a set price. Agencies generally use fixed-price contracts when costs and risks can be clearly defined, for example, when purchasing commercially available items such as laptop computers. In contrast, in cost-reimbursement contracts, agencies agree to pay all allowable costs the contractor incurs in delivering the service or product. Cost-reimbursement contracts involve increased risk for the Government and are generally more appropriate when performance uncertainties or the likelihood of changes make it difficult to accurately estimate costs in advance. Most of NASA's ISS operations and maintenance contracts are cost-reimbursement contracts.

NASA also utilizes a variety of incentive contacts – including award-fee contracts – in which a predetermined amount of money is set aside for the contractor to earn based on its performance. Since the 1960s, NASA has used award-fee contracts to motivate contractor performance. An award fee is a pool of money a contractor may earn in whole or in part by meeting or exceeding predetermined performance criteria. To assist in evaluating contractor performance, the FAR provides adjectival ratings and definitions for numerical scores on a scale of 0 to 100, as shown in Table 2. Most of NASA's ISS operations and maintenance contracts contain award-fee provisions.

Table 2: NASA FAR Supplement Adjectival Rating, Percentage Earned, and Description for Award Fees

Adjectival Rating	Amount Available To Be Earned	Description
Excellent	91–100%	Contractor has *exceeded almost all of* the significant award-fee criteria and has met overall cost, schedule, and technical performance requirements of the contract in the aggregate as defined and measured against the criteria in the award-fee plan for the award-fee evaluation period.
Very Good	76–90%	Contractor has *exceeded many of* the significant award-fee criteria and has met overall cost, schedule, and technical performance requirements of the contract in the aggregate as defined and measured against the criteria in the award-fee plan for the award-fee evaluation period.
Good	51–75%	Contractor has *exceeded some of* the significant award-fee criteria and has met overall cost, schedule, and technical performance requirements of the contract in the aggregate as defined and measured against the criteria in the award-fee plan for the award-fee evaluation period.
Satisfactory	50%	Contractor has *met* overall cost, schedule, and technical performance requirements of the contract in the aggregate as defined and measured against the criteria in the award-fee plan for the award-fee evaluation period.
Unsatisfactory	less than 50%, no award fee shall be paid for an unsatisfactory rating	Contractor has *failed to meet* overall cost, schedule, and technical performance requirements of the contract in the aggregate as defined and measured against the criteria in the award-fee plan for the award-fee evaluation period.

Source: FAR 16.401(e)(3)(iv), "Award-fee Plan" and NASA FAR Supplement 1816.405-275(b), "Award fee evaluation rating."

Finally, the FAR requires Government contracting officers to promote and provide for full and open competition in soliciting offers and awarding contracts.[6] However, because full and open competition is not always in the best interest of the Government, the FAR allows Federal agencies to forego competition and obtain goods or services from a sole source when, for example, there is a reasonable basis to conclude that their minimum needs can only be satisfied by unique supplies or services available from only one source or supplier with unique capabilities. In addition, in the case of a follow-on contract for the continued development or production of a major system or highly specialized equipment, an agency may continue with the current contractor when it is likely that awarding the business to any other source would result in substantial duplication of cost to the Government that would not be recovered through competition.[7]

[6] FAR 6.101 (a), "Policy."

[7] FAR 6.300, "Other Than Full and Open Competition."

ISS Contracts

To provide services for the ISS, NASA utilizes 31 contracts that are valued at approximately $39 billion and managed by personnel at three Centers: Johnson Space Center (Johnson), Kennedy Space Center, and Marshall Space Flight Center (Marshall). (See Enclosure II for a complete listing of all ISS contracts.) Twenty of these contracts – worth about $29 billion (or 74 percent of all 31 contracts) – are cost-type contracts.[8] For this audit, we reviewed nine ISS operations and maintenance cost-type contracts and two ISS Program-funded contracts managed at Marshall, including the following:

Vehicle Sustaining Engineering. NASA's largest ISS contract is with The Boeing Company (Boeing) for the design, development, test, and evaluation of hardware and software required to operate the Station.[9] Boeing has been providing these services for 22 years under a cost-plus-award-fee contract that has grown in value to $17.7 billion.[10]

Facilities Development and Operations. The Lockheed Martin Corporation (Lockheed) provides support for human spaceflight operations programs at Johnson. The contract includes day-to-day operations of the Mission Control Center, which maintains contact with spacecraft and crew during flight missions. It also provides operations support for current and emerging space vehicles such as the Orion Multi-Purpose Crew Vehicle, Space Launch System, Commercial Crew Program, and Commercial Orbital Transportation Services. Currently, the ISS Program funds about 97 percent of the almost 8-year cost-plus-award-fee contract, which was awarded in November 2008 and is currently valued at $1.4 billion.

Neutral Buoyancy Laboratory and Space Vehicle Mockup Facility Operations. The Raytheon Technical Services Company supports the ISS Program with astronaut training; mission development for intravehicular and extravehicular activity; flight hardware design, development, and validation; and real-time mission support at Johnson. In addition, the contract also supports all activities associated with the manufacture, repair, and maintenance of mockups. The cost-plus-award-fee contract was awarded in July 2010 and is currently valued at $111 million and covers 5-years, which ends September 2015. Johnson is in the process of extending the contract.

---

[8] The remaining 11 contracts, worth approximately $10 billion (or 26 percent), are fixed price and cover such services as cargo and crew transportation.

[9] Development work includes the design, development certification, and production of hardware and software, including common hardware to be used by visiting vehicles, payloads, government-furnished equipment providers, and international partners. Integration and operation requirements include sustaining engineering of hardware and software, technical integration with the international partners and visiting vehicles, and certification of flight readiness.

[10] NASA first awarded the Vehicle Sustaining Engineering contract as a letter contract in 1993. The Agency definitized the agreement in 1995 as a cost-plus-incentive-fee/cost-plus-award-fee contract and has extended that contract several times, with the current agreement due to end in September 2015.

NASA FACES CHALLENGES TO REDUCE ISS OPERATIONS AND MAINTENANCE COSTS

NASA has taken a number of actions to control the operations and maintenance costs of the ISS Program, including openly competing contracts and eliminating some requirements from the Vehicle Sustaining Engineering and other contracts. Between FYs 2011 and 2015, the Program reduced these costs by $1.8 billion. However, given the unique operating environment of the ISS and the inherent challenge of operating at a flat operations' budget of $1.3 billion beginning in FY 2018, it is unclear to what extent these strategies will result in future cost savings. NASA also considered whether to convert portions of the Vehicle Sustaining Engineering and other contracts to a fixed-price vehicle, but ultimately decided not to do so.

Use of Full and Open Competition

One way to control costs is to provide for full and open competition when soliciting offers and awarding contracts. In the past 6 years, NASA competed 9 of the 11 ISS contracts we reviewed. For the other two contracts, NASA provided justification for proceeding with sole-source contracting vehicles.[11] We found the Agency's evaluations for the nine contracts thorough and the resulting award in the best interest of the Government. For example, in one case Johnson officials declined to exercise an option on a sole-source contract, opting instead to open the procurement to competition. Although Johnson ultimately awarded the contract to the incumbent, before doing so the Center received and evaluated two other proposals for mission suitability, past performance, and cost/price. We believe this process was instrumental in allowing Johnson to ensure it obtained a fair price for the contract.

The two sole source contracts we reviewed were the Vehicle Sustaining Engineering contract with Boeing and the Extravehicular Space Operations Contract with Hamilton Sundstrand Space System International, Inc.[12] In both cases, we found the Agency properly justified that full and open competition was not in the Government's best interest due to the unique knowledge of the incumbents and the nature of the services they perform. For example, Boeing developed one-of-a-kind hardware and software for the ISS and therefore possessed the unique ability to quickly understand on-orbit performance, identify anomalies, and resolve issues in a timely manner to ensure mission safety and success. Moreover, much of the data produced for the ISS Program is delivered in Boeing-developed formats, and therefore, transitioning to another contractor would be costly, time consuming, and possibly detrimental to mission safety and success.

Reducing Requirements

The ISS Program has also taken steps to review contract requirements to ensure it is procuring only those services necessary to operate and utilize the Station safely. In 2007, as the ISS Program was preparing for the then scheduled end of ISS operations in 2016, it initiated a review to find opportunities to reduce operations costs, focusing on minimizing changes to the Station and supporting ground

[11] Of the nine contracts NASA opened to competition, three were new contracts and six were for recurring services. The Agency awarded all but one of the six recurring contracts to the incumbent.

[12] The contract with Hamilton Sundstrand provides the spacesuits, tools, and crew aids astronauts use to perform on-orbit assembly, service, and repair in support of the ISS and scientific payloads.

infrastructure beginning in FY 2011. As a result, the Program was able to reduce facility space and hardware, the number of review panels and boards, and the number of subcontracts. Further, in 2013 the ISS Program directed its divisions to reduce costs by 5 percent between FYs 2014 and 2019, which resulted in the Program reducing procurement costs by $272 million and civil servant staffing by 45 full-time equivalents at an additional cost savings of $53 million over that same period. For FY 2016 and beyond, the ISS Program is targeting an average of more than $700 million in annual savings compared to FY 2011 levels, a portion of which is expected to come from renegotiating the Boeing contract. The Program's system operations and maintenance budget between FYs 2011 and 2015 decreased by $1.8 billion through content reductions, efficiencies, and other savings.[13] In August 2014, the ISS Program initiated an effort to reduce requirements for the payload integration process, which its Standing Review Board viewed as cumbersome, too lengthy, and too costly for users.[14] By reducing requirements, the ISS Program hopes to deliver payload to the Station more quickly at reduced costs – all while keeping the Station and its crew safe.

One challenge the ISS Program faces in trying to reduce its contract requirements is extending operations of the ISS until 2024 – 11 years beyond the 15-year lifespan for which the Station was designed and tested. While the ISS Program has not identified any major obstacles to the extension, the increased lifespan has led to some uncertainty among Program officials regarding Station requirements. At this point, it is not clear how this uncertainty will impact the Program's ability to reduce requirements further.

Consideration of Fixed-Price Contracts

In addition to competing contracts and reducing requirements, NASA also assessed whether it would be appropriate to instead use a fixed-price contract vehicle. This analysis led the Agency to take steps to explore converting more than 50 percent of an extension to the Boeing contract to a fixed-price vehicle with a performance incentive. Under the fixed-price portion, Boeing would have been entitled to receive additional funds if it provided value or benefit over and above nominal performance. Conversely, if Boeing delivered all contract requirements but its performance nevertheless negatively impacted NASA, Boeing's baseline profit would have been negatively affected. The ISS Program felt it was in the position to use the knowledge gained from Program and historical contract experience to further refine the requirements to support this acquisition strategy. If awarded, this combined fixed-price/cost-plus contract would have represented a major change in the contract structure and shifted some cost risk to Boeing.

In December 2014, NASA released a request for proposal to Boeing to extend the contract for 5 years, through September 2020, with an expected value of approximately $2 billion. In July 2015, NASA notified us that after further consideration of the Program's needs and risks, it did not plan to move forward with the fixed-price option and instead would negotiate the extension as a cost-plus-award-fee contract. Given that this decision came after we completed our audit work, we were not in a position to review the reasonableness of NASA's decision. As of July 2015, negotiations were ongoing with a completed contract expected by September 2015.

[13] We did not independently verify the reduction was directly attributable to these actions.

[14] NASA instituted the Standing Review Board process to help ensure appropriate program and project management oversight in order to increase the likelihood of mission success.

The ISS Program has also decided not to convert any of the other cost-plus contracts we reviewed to fixed price at this time. Procurement officials pointed out several challenges to using fixed-price contracts to procure services in support of the ISS, including the evolving nature of launch schedules and manifests, complexity of payloads, safety considerations, data requirements, and other requirements that cannot easily or accurately be defined. For example, the contract with Lockheed provides development and operations of the Mission Control Center, which is evolving to support the Orion Multi-Purpose Crew Vehicle as well as the ISS. According to Agency officials, NASA cannot clearly define the changing mission requirements to a point where a contractor could accurately price the work. For example, cyber security within the Mission Control Center is constantly evolving, with the size and frequency of software patches difficult to accurately predict. Similarly, it is difficult to predict the type and schedule for visiting vehicles to the ISS. NASA officials stated that with the uncertainties involved in this effort, a fixed-price contract would likely only increase cost to the Government as the contractor tried to price for unknowns.

Similarly, ISS officials chose to retain a cost-reimbursable contractual arrangement for services to train astronauts in the NBL and Space Vehicle Mockup Facility. Again, NASA contends that the cost-reimbursement contract structure provides the flexibility necessary to meet changing requirements in a safe and cost effective manner and that using a firm-fixed-price contract would likely increase costs to the Government. For example, the NBL and Mockup Facility are used to provide real-time support to troubleshoot on-orbit anomalies like an equipment malfunction during an extravehicular activity – a situation that could not be planned for when proposing costs for a fixed-price contract. Further, due to the Station's age, unknown anomalies and equipment failures are more likely to occur requiring unplanned support of the NBL and Mockup Facility. In our judgment, NASA's decisions not to move to fixed-price contracts for operating the Mission Control Center and training astronauts were reasonable.

AWARD FEES INCONSISTENT WITH CONTRACTOR PERFORMANCE AND CONTRACT DOCUMENTATION

While the ISS Program has worked to control costs by evaluating contract types and reviewing requirements, similar to findings in several previous award-fee audits, we found instances in which the final award-fee scores and payments were not supported by the written evaluations.[15] As a result, we question between $500,000 and $700,000 of award-fee payments made between October 2012 and February 2014.[16]

We identified an ISS contract managed at Marshall for which the award-fee evaluations did not support the overall award-fee scores. Specifically, in two consecutive award-fee periods the written performance evaluation stated, "Contractor performance did not meet expectations in the Cost Control

[15] NASA Office of Inspector General, "NASA's Use of Award-fee Contracts" (IG-14-003, November 13, 2013), and "Extending the Operational Life of the International Space Station Until 2024" (IG-14-031, September 18, 2014).

[16] The 10 award-fee contracts we reviewed included 54 award-fee periods with maximum award fees available of $403 million. NASA paid the contractors $385 million, or 96 percent, of the maximum amount available. Due to the sensitivity of contract pricing data, we are providing a range of questioned costs rather than a precise dollar amount.

Factor"; rated the Factor as a "significant weakness" due, in part, to a significant cost overrun; and noted, "There were no strengths identified in this area."[17] Nevertheless, the contractor received a rating of "satisfactory" for the Cost Control Factor in both performance periods.

According to the FAR-criteria, a "satisfactory" rating is justified when the contractor *meets overall cost requirements.*[18] In addition, Marshall award-fee criteria states that any factor receiving an adjective rating of "unsatisfactory" shall be assigned zero performance points for purposes of calculating the numerical score and award-fee percentage.[19] Therefore, based on the written evaluation included in the contract documentation, we believe the contractor should have received an "unsatisfactory" rating for the Cost Control Factor in both of these periods and therefore no award fee for that factor; consequently, we question between $300,000 and $400,000 in associated payments.

When we brought this issue to the attention of NASA contracting officials, they provided documentation explaining that the Performance Evaluation Board considered whether the contractor should receive an unsatisfactory rating, but was reluctant to give that rating because it would result in a complete forfeiture of the 25 percent award-fee associated with the Cost Control Factor. The document stated that the Board "reluctantly" accepted the satisfactory rating because the contractor had made efforts in the second award-fee period to improve cost performance. However, according to Agency guidance, contractors are to be rated on the current period's performance, and not contingent on future potential performance.[20]

Although in our view NASA did not take appropriate action regarding the Cost Control Factor for these two award periods, in a September 2014 modification to the contract, the Agency reduced the contractor's available award-fee pool by almost $600,000. We commend NASA for eventually taking action to respond to the contractor's performance relating to Cost Control; however, we believe the Agency should use the mechanisms available to it when determining award fee for individual periods rather than relying on later modifications to the contract.

We also identified a contract at Johnson for which the contractor received an overall rating of "excellent" in two evaluation periods despite performance evaluation reports stating that, due to understaffing "during real-time operations," there was "an increased risk of error" in one period and "a direct impact on the safety of the ISS crew and vehicle" in the subsequent period, while these employees provided ancillary support. Specifically, the performance evaluation noted the contractor did not meet requirements because the contractor was understaffed during a planning mission for a maneuver to avoid space debris, which caused an increased the risk of error. In the following period, the evaluation noted two of the contractor's employees providing ancillary support services were found "sleeping during real-time operations." The evaluation report noted the seriousness of this incident, stating:

[17] The Cost Control Factor measures for the contractor's ability to develop and adhere to cost plans and control the various elements of cost for maximum effectiveness. Within the Cost Control Factor, the contractor is evaluated on two subfactors: Budget Management and Contract Value Management.

[18] FAR 16.401 (e)(3)(iv), "Award-fee Plan."

[19] Marshall Work Instruction 5116.1, Appendix B, "Evaluation of Contractor Performance Under Contracts with Award Fee Provisions," February 12, 2009.

[20] NASA Award Fee Contracting Guide, 3.5.4, "Interim and Final Evaluations," June 27, 2001.

> These (employees) have a critical role. . . and have a direct impact on the safety of the ISS crew and vehicle. . . (The employees') ability to react suddenly and unexpectedly to an onboard ISS emergency would have been seriously degraded had an emergency occurred while the (employees) were asleep.

NASA contracting officials expressed the view that the actual risk posed by the incidents were less significant than depicted in the evaluation reports. However, these same officials noted that as a result of feedback provided to the contractor, a corrective action plan was put in place that included the dismissal of a contractor employee.

Further, we found NASA did not consider these incidents when evaluating the contractor on the Safety and Health Factor for the evaluation periods and gave the contractor an "excellent" rating for this Factor.[21] Instead, the Agency considered the incidents as part of the Program Management and Technical Performance Factor, for which the contractor received a "very good" rating in the first period and an "excellent" rating in the second period. In the Agency's view, the incidents did not meet the intent of the Safety and Health Factor requirements and that all the strengths and performance facts in the periods were appropriately considered and weighted when calculating the final score. Therefore, NASA stands by its award-fee ratings for these two periods.

In our judgment, the incidents meet NASA's criteria for a close call, which is defined as an "event in which there is no injury . . . and/or no equipment or property damage . . . but which possesses a potential to cause a mishap."[22] Accordingly, and given the seriousness of the incidents as described in the evaluation report, we do not believe an "excellent" rating was appropriate for these award periods and therefore the contractor should have received less than the $200,000 to $300,000 it was awarded for those two periods.

CONCLUSION

To its credit, NASA has taken steps to reduce and control the operations and maintenance costs of the ISS, including competing contracts and eliminating some unneeded requirements. However, due to the unique operating environment of the ISS, in many cases the Agency continues to use incumbent contractors and obtain most services via cost-reimbursement contracts. We acknowledge the difficulty associated with contracting for ISS operations and urge NASA to continue to seek opportunities to control Station operations and maintenance costs, including revisiting the fixed-price option when appropriate.

[21] In the Award Fee Plan, safety and health performance includes safety and health program implementation, adherence to the approved safety and health plan, management of safety incidents and injuries, and environmental compliance.

[22] NASA criteria requires safety issues to be documented and reported to the Safety, Health, and Environmental Office; however, we were unable to verify this occurred. NASA Procedural Requirements 8621.1B, "NASA Procedural Requirements for Mishap and Close Call Reporting, Investigating, and Recordkeeping w/Change 7 (07/15/2013)," May 23, 2006.

RECOMMENDATIONS, MANAGEMENT'S RESPONSE, AND OUR EVALUATION

To improve ISS contracts, we recommended NASA's Assistant Administrator for Procurement, in conjunction with the ISS Program Manager,

1. take steps to remedy the questioned award-fee payments as appropriate and

2. ensure future award-fee evaluation scores are in alignment with Federal and Agency guidance and properly documented to accurately reflect contractor performance in award fees paid.

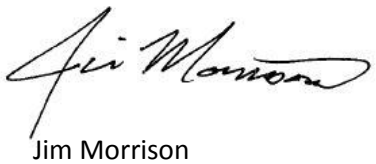
We provided a draft of this memorandum to NASA management for review and comment. Management concurred with our recommendations and described corrective actions they have taken to address them. Management's full response to our report is reproduced in Enclosure III. Technical comments provided by the Agency have also been incorporated, as appropriate.

We do not find NASA's comments responsive to our first recommendation as it applies to the Johnson contract, and therefore the recommendation is unresolved. Although officials have provided the OIG with an oral explanation for the award fee, the contract file has not been documented to support the award. With regard to the Marshall contract, we accept the Agency's explanation regarding the contract modification. However, going forward we urge NASA to use available mechanisms to ensure that award fees accurately reflect contractor performance during particular award-fee periods.

We do not find NASA's comments fully responsive to our second recommendation, and therefore the recommendation is unresolved. We believe the Agency needs to take additional steps to ensure award-fee evaluation scores align with Federal and Agency guidance and are properly documented to reflect contractor performance. Such steps could include a memorandum from the Assistant Administrator for Procurement emphasizing existing guidance or additional training for contracting officers and other participants in the award-fee evaluation process.

If you have questions or wish to comment on the quality or usefulness of this memorandum, contact Laurence Hawkins, Audit Operations and Quality Assurance Director, at (202) 358-1543 or laurence.b.hawkins@nasa.gov. The memorandum's distribution list can be found in Enclosure IV.

Sincerely,



Jim Morrison
Assistant Inspector General for Audits

Enclosures – 4

Enclosure I: Scope and Methodology

We performed this audit from September 2014 through June 2015 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

In September 2014, we initiated our audit to examine whether NASA's contract administration and oversight processes are sufficient to avoid incurring unnecessary costs on operations and maintenance ISS contracts. The ISS Program Office supplied a list of 31 contracts to which it provides some portion of the funding from 21 percent to 100 percent. The contracts were for operations as well as research and crew and cargo transportation. We focused our review on nine operations and maintenance cost-reimbursable type contracts at Johnson, which the Program provided at least 90 percent of the funding. Our review also included two contracts at Marshall that the ISS Program provided funding. See Table 3 and 4 in Enclosure II for a list of the contracts we did and did not review. The primary audit locations were at Johnson and Marshall.

To evaluate the Program's management of its contracts and determine the oversight processes and actions implemented to control and avoid unnecessary costs, we interviewed ISS Program officials, including the ISS Division Director, the Program Planning and Control Office Manager, and the Procurement Manager. We also interviewed contracting officers and the contracting officer's representatives to determine what methods they utilize to perform contractual oversight. Finally, we interviewed NASA's Contract and Grant Policy Division Personnel, who serves as NASA's liaison to the Defense Contract Audit Agency to obtain a status of Defense Contract Audit Agency audits. We also reviewed supporting documentation, including ISS Program Monthly Program Reviews, monthly and quarterly contractor financial management reports, monthly project and contractor reviews, Defense Contract Audit Agency reports, and contract delegations to Defense Contract Management Agency.

To determine the extent NASA is identifying routine and low risk activities performed under cost-reimbursable contracts and if the services could be obtained as fixed priced, we interviewed contracting officers and contracting officer's representatives. We also reviewed the FAR, NASA FAR Supplement, procurement strategy, price negotiation, justification for other than full and open competition, and source selection memorandums for the contracts

To determine the extent that NASA is identifying and, where appropriate, descoping those ISS contracts with tasks and missions that are no longer performed or needed, we reviewed the contracts' Statements of Work, contract modifications, and Space Station Change Notices. We spoke with the ISS Program Planning and Control Office Manager to understand the actions the Program takes to identify work that may no longer be necessary to operate and maintain the Station. In addition, we interviewed contracting officers and contracting officer's representatives to determine if implemented contract modifications to remove work from the contract.

To determine whether NASA's use of award fees are transparent and in compliance with established policies, we reviewed the FAR, NASA FAR Supplement, NASA Award Fee Contracting Guide, NASA Procurement Notice - Technical Evaluation Template and Guide, Johnson Award Fee Guidance, and Marshall's work instructions on the acquisition processes and procedures. Further, we reviewed the contract's Award Fee Plans, evaluations from the Performance Evaluation Board, the Fee Determination

Official's determination memorandums, contract modifications authorizing award fee payments to contractors, and award-fee payments. In addition, we interviewed ISS Program Management, Contracting Officers, and Contracting Officer's Representatives to determine their knowledge and understanding of the award-fee process, calculating award fees, and award-fee scoring.

Use of Computer Processed Data

We relied on computer-processed data such as budget data, contract award documents, ISS contract files, memorandums, monthly contractor financial management reports, monthly program and project management reviews, Performance Evaluation Board award-fee analyses, and Fee Determination Official letters. Generally, we concluded that we could rely upon this data because we were able to compare the documents to other appropriate supporting documents.

Review of Internal Controls

We reviewed the appropriate internal controls such as FAR, NASA FAR Supplement, NASA Award Fee Contracting Guide, NASA Procurement Notice related to NASA Technical Evaluation Template and Guide, and Center guidance for acquisition processes and procedures. Further, we reviewed NASA's agreements with the Defense Contract Management Agency delegating reviews to ensure that contractors provide products, which meet NASA requirements. We concluded that the internal controls were adequate, except for those discussed in the report. Our recommendations, if implemented, should correct the weaknesses identified.

Prior Coverage

During the last 5 years, the NASA Office of Inspector General issued three reports of significant relevance to the subject of this report. Unrestricted reports can be accessed at https://oig.nasa.gov/audits/reports/FY15.

NASA Office of Inspector General

Costs Incurred on NASA's Cost-Type Contracts (IG-15-010, December 17, 2014)

Extending the Operational Life of the International Space Station until 2024 (IG-14-031, September 18, 2014)

NASA's Use of Award-fee Contracts (IG-14-003, November 13, 2013)

Enclosure II: ISS-Funded Contracts

Table 3: Major ISS Cost-Reimbursable Type Operations and Maintenance Contracts Reviewed During the Audit

ISS Contract Name and Description	Contractor	Contract Type (percentage funded in FY 2014)	Period of Performance	Contract Value as of May 2015[a]
Vehicle Sustaining Engineering Contract (NAS15-10000) – provides vehicle segment sustaining engineering, end-to-end subsystem management, and post production support	The Boeing Company	cost-plus-award-fee (100%)	1/13/1995 through 9/30/2015	$17.7 billion
Facilities Development and Operations Contract (NNJ09HD46C) – develops and operates the Mission Control Center, mission training, and data reconfiguration	Lockheed Martin Corporation	cost-plus-award-fee (97%)	1/1/2009 through 9/30/2016 (1-year option through 9/30/2017)	$1.43 billion
NBL/SVMF Operations Contract - (NNJ10HD35C) – supports the training of astronauts for intravehicular and extravehicular space operations; manufacture, repair, and maintain mockup	Raytheon Technical Services Company, LLC	cost-plus-award-fee/cost-plus-incentive-fee with indefinite delivery indefinite quantity (IDIQ) (94%)	8/1/2010 through 9/30/2015; extension in work through 9/30/2017 with two, 1-year options to 9/30/2019)	$111 million (current) $191 million (potential) $16.1 million IDIQ
Extravehicular Space Operations Contract (NNJ10TB01C) – supports the extravehicular operations requirements sustaining engineering, enhancing hardware mission/ increment planning, and on-orbit extravehicular operations support	Hamilton - Sundstrand Space Systems International, Inc.	cost-plus-award-fee with IDIQ (100%)	10/1/2010 through 9/30/2015 (five, 1-year options through 9/30/2020)	$400 million (current) $749 million (potential)
Constellation Space Suit System Contract (NNJ09TA40C) – designs, develops, tests, evaluates, certifies, produces, and processes space suits	Oceaneering International, Inc.	cost-plus-award-fee with IDIQ (100%)	3/9/2009 through 9/30/2015 (options through 9/30/2020)	$262.1 million (current) $1.23 billion (potential)
New Cargo Mission Contract (NNJ10GA35C) – provides analytical and physical processing activities to support pressurized cargo requirements for visiting vehicle flights to and from the ISS	Lockheed Martin	cost-plus-award-fee with IDIQ (100%)	12/10/2010 through 3/31/2016 (two, 1-year options through 3/31/2018)	$128.7 million (current) $188.7 million (potential) $20 million IDIQ pool

Mission and Program Integration Contract (NNJ12GA46C) – provides products and services to support mission and program integration and necessary infrastructure operations functions	Barrios Technology, Ltd.	cost-plus-award/ incentive-fee with IDIQ (100%)	1/1/2013 through 9/30/2016 (two, 2-year options through 9/30/2020)	$153.8 million (current) $370.6 million (potential) $50 million IDIQ Pool
Russian Language and Logistics Contract (NNJ12GA47C) – translates, interprets, and teaches foreign language	Tech Trans International, Inc.	cost-plus-award/ incentive-fee with IDIQ (99%)	10/1/2012 through 6/30/2016 (three options through 6/30/2020)	$37.1 million (current) $81.6 million (potential) $20 million, not to exceed IDIQ pool
Integrated Missions Operations Contract II (NNJ14RA01B) – provides support and products for spaceflight operations capability development and execution such as mission preparation, crew, flight controller, instructor, and analyst training	Stinger Ghaffarian Technologies, Inc.	cost-plus-award-fee with IDIQ (88%)	10/1/2014 through 9/30/2019 (option 1 through 9/30/2021; option 2 through 9/30/2023)	$96.7 million (current) $1.31 billion (potential)
Mission Operations and Integration Contract (NNM13AA29C) – provides support and products for the developing and executing of spaceflight operations (Marshall-managed)	Teledyne-Brown Engineering, Inc.	cost-plus-award-fee with IDIQ (95%)	3/1/2013 through 9/30/2015 (two, 1-year options through 9/30/2017; one, 5-month option through 2/28/2018)	$67 million (current) $132 million (potential) not to exceed $30 million IDIQ pool
Huntsville Operations Support Center (NNM12AA10C) – ensures the availability, integrity, and reliability of mission ground system development and operations (Marshall - managed)	COLSA Corporation	cost-plus-award-fee (87%)	4/1/2012 through 9/30/2015 (1-year option through 9/30/2016; one, 6-month option through 3/31/2017)	$82 million (current) $114 million (potential)

Source: NASA Office of Inspector General representation of ISS Program information.

[a] Current value represents the value of the contract from inception through any exercised options. Potential value represents how much the contract would be worth if the Agency exercises all the available options.

Table 4: Major ISS Contracts Not Reviewed During the Audit

ISS Contract Name and Description	Contractor	Contract Type (percentage funded in FY 2014)	Period of Performance	Contract Value as of May 2015[a]
Bioastronautics and Occupational Medicine Occupational Health Contract (NAS9-02078) – Human Health and Performance Contract for the health and productivity of crews living and working in space	Wyle Laboratories, Inc.	cost-plus-award-fee (37%)	3/11/2004 through 9/30/2015 (follow-on est. award date 10/1/2015; 5 year base through 9/30/2020 with options through 9/30/2025)	$1.51 billion (current)
JSC Engineering, Technology, and Science Contract (NNJ13HA01C) – engineering design and development; sustaining engineering; engineering analysis and assessment, technology development	Jacobs Technology, Inc.	cost-plus-award-fee (51%)	5/1/2013 through 4/30/2018 (two, 2-year options through 4/30/2022)	$1.01 billion (current) $1.93 billion (potential)
Crew, Robotics, Avionics, and Vehicle Equipment (CRAVE) 2 (NNJ10HB13 – NNJ10HB16 multiple award IDIQ with 4 contractors) extravehicular equipment, flight crew equipment, crew health and conditioning systems, extravehicular robotics equipment, environmental control and life support equipment, active thermal control systems, avionics equipment, and ground support systems[b]	ATK Space System Oceaneering Wyle University of Alabama - Birmingham	cost-plus-fixed-fee/firm-fixed-price IDIQ (74%)	7/1/2010 through 6/30/2015	not to exceed $70 million
Safety and Mission Assurance Engineering Contract (NNJ13RA01B) – safety and mission assurance	Science Applications International Corporation	cost-plus-award-fee (64%)	11/1/2013 through 9/30/2016 (two, 1-year options through 9/30/2018	$150 million not to exceed $53.5 million IDIQ
Test and Operations Support Contract (NNK13MA14C) – at Kennedy Space Center, provides program management and control; safety and mission assurance; information management; processing support systems and integration; flight hardware processing; and ground system operations, maintenance, and sustaining engineering	Jacobs Technology, Inc.	cost-plus-award-fee (22%)	3/1/2013 through 9/30/2016 (one, 2-year options to 9/30/2018; four, 1-year options to 9/30/2022)	$1.4 billion with options
Roscosmos, Moscow (NAS15-10110) – joint U.S./Russian human space flight activities	Roscosmos	firm-fixed-price (100%)	12/16/1993 through 6/30/2018	$3.9 billion
European Space Agency (NNJ04GC06C) – engineering services and products for changes to requirements, functionality or resolution	European Space Research and Technology Centre	firm-fixed-price (100%)	9/17/2004 through 12/31/2020	$40.8 million (current) not to exceed $65.5 million

Common Communication for Visiting Vehicles (NNJ12GA69C) – designs, manufactures, certifies, and delivers a two-way communications unit	L-3 Communications Cincinnati Electronics Corp.	cost-plus-incentive-fee (100%)	8/21/2012 through 12/31/2015	$40.1 million
Gagarin Research and Test Cosmonaut Training Centre Contract (NNJ11GA50C) – leasing for office and living quarters	Miscellaneous Foreign Awardees	firm-fixed-price (100%)	1/1/2012 through 9/30/2015; option three through 9/30/16	$1.69 million
Energia Contract (NNJ06GA16C) – provides hardware and services	S P Korolev Rocket and Space Public Corporation Energia	firm-fixed-price IDIQ (100%)	8/4/2006 through 6/30/2016	$81.4 million (current) not to exceed $82.0 million
Prox Ops Services Follow-on (Orbital missions 3-8) (NNJ14GA06C) – procurement of Japan Aerospace Exploration Agency proximity system for visiting vehicle proximity operations communications	Japan Aerospace Exploration Agency	firm-fixed-price IDIQ (100%)	9/16/2014 through 12/31/2016	not to exceed $6.5 million
Agenzia Spaziale Italiana (NJ13GA16B) – engineering services and products for the Permanent Multipurpose Module	Miscellaneous Foreign Awardees	firm-fixed-price IDIQ (100%)	2/24/2014 through 2/23/2019	$584,000 (current) not to exceed $6.5 million
Commercial Resupply Services (NNJ09GA04B) – commercial cargo resupply services	Space Exploration Technologies	firm-fixed-price IDIQ (99%)	12/31/2008 through 12/31/2016 (one, 1-year option to 12/31/2017)	$2.17 billion (current); not to exceed $3.1 billion
Commercial Resupply Services (NNJ09GA02B) – commercial cargo resupply services	Orbital Sciences Corp.	firm-fixed-price IDIQ (99%)	12/31/2008 through 12/31/2016 (1-year option to 12/31/2017)	$2.19 billion (current) not to exceed $3.1 billion
International Emergency and Other Relief Services "Medevac" (NNJ12GA06B) – JSC international emergency and other relief services	Global Rescue, LLC	firm-fixed-price IDIQ (100%)	12/5/2011 through 9/30/2015 (option 4, 10/1/2015 through 9/30/2016	$407,500 (current) $510,00 (potential)
Canadian Commercial Corp. (NNJ13GA12C) – ISS mobile servicing system	CCC/MacDonald Dettwiler & Associates	firm-fixed-price IDIQ (100%)	1/1/2013 through 3/31/2015 (option 2B 4/1/2015 through 9/30/2015)	$9.3 million
Human Health and Institutional Management (NNJ13HB53B) – human health and institutional management support	All Points Logistics, LLC	firm-fixed-price (38%)	5/1/2013 through 4/30/2018	not to exceed $16 million

Source: NASA Office of Inspector General representation of ISS Program information.

[a] Current value represents the value of the contract from inception through any exercised options. Potential value represents how much the contract would be worth if the Agency exercises all the available options.

[b] This contract is counted as four different contracts since there are four different contractors.

Enclosure III: Management Comments

National Aeronautics and Space Administration
Headquarters
Washington, DC 20546-0001

July 10, 2015

Reply to Attn of: Office of Procurement

TO: Assistant Inspector General for Audits

FROM: Assistant Administrator for Procurement

SUBJECT: Response to OIG Draft Memorandum "Audit of NASA's Management of International Space Station Contracts" (A-14-023-00)

NASA appreciates the opportunity to review the Office of Inspector General (OIG) draft report entitled, "Audit of NASA's Management of International Space Station Contracts" (A-14-023-00) dated June 10, 2015.

In the draft report, the OIG makes two recommendations addressed to the Assistant Administrator of Procurement, in conjunction with the International Space Station (ISS) Program Manager. Management's response to the OIG's recommendations, including planned corrective actions, follows:

Recommendation 1: Take steps to remedy the questioned award-fee payments as appropriate.

Management's Response: Concur. Johnson Space Center (JSC) and Marshall Space Flight Center (MSFC) provided clarifications and additional information to the OIG for the award-fee periods in question, which corrected key facts and offered critical facts that were missing in the OIG understanding of the documentation provided.

NASA believes the contract actions taken in both cases were appropriate and no further action is required pertaining to award-fee payments.

Estimated Completion Date: Not applicable. Corresponding corrective actions as cited above have been completed.

Recommendation 2: Ensure future award-fee evaluation scores are in alignment with Federal and Agency guidance and properly documented to accurately reflect contractor performance in award fees paid.

Management's Response: Concur. NASA will continue to follow the Federal Acquisition Regulation (FAR), NASA FAR Supplement (NFS), Agency, and Center guidance as well as the individual contract award-fee plans during Performance Evaluation Board processes. As explained during the audit, MSFC and JSC provided additional information to the OIG to demonstrate the award-fee evaluation scores for the award-fee periods in question were in alignment with Federal and Agency guidance and the respective contract award-fee plans.

Estimated Completion Date: Not applicable. Corresponding corrective actions as cited above have been completed.

We have reviewed the draft report for information that we believe should not be publicly released. We have communicated our concerns regarding the public release of information contained in your report.

Thank you for the opportunity to review and comment on the subject draft report. If you have any questions or require additional information regarding this response, please contact Laverne Randolph, Office of Procurement, at 202-358-4801.

William P. McNally

cc:
Human Exploration and Operations Mission Directorate/Mr. Gerstenmaier

Enclosure IV: Memorandum Distribution

National Aeronautics and Space Administration

Administrator
Deputy Administrator
Chief of Staff
Associate Administrator, Human Exploration and Operations
Associate Administrator, Mission Support
Assistant Administrator, Procurement
Program Manager, International Space Station Program
Director, Johnson Space Center
Director, Kennedy Space Center
Director, Marshall Space Flight Center

Non-NASA Organizations and Individuals

Office of Management and Budget
    Deputy Associate Director, Energy and Space Programs Division

Government Accountability Office
    Director, Office of Acquisition and Sourcing Management

Congressional Committees and Subcommittees, Chairman and Ranking Member

Senate Committee on Appropriations
    Subcommittee on Commerce, Justice, Science, and Related Agencies

Senate Committee on Commerce, Science and Transportation
    Subcommittee on Science and Space

Senate Committee on Homeland Security and Governmental Affairs

House Committee on Appropriations
    Subcommittee on Commerce, Justice, Science, and Related Agencies

House Committee on Oversight and Government Reform
    Subcommittee on Government Operations

House Committee on Science, Space, and Technology
    Subcommittee on Oversight
    Subcommittee on Space