

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)  
LYNDON B. JOHNSON SPACE CENTER (JSC)

JUSTIFICATION FOR OTHER THAN FULL AND OPEN COMPETITION (JOFOC)  
Pursuant to 10 United States Code (U.S.C.) 2304(c)(1) and Federal Acquisition Regulation  
(FAR) 6.302-1

For the International Space Station (ISS) United States Vehicle Sustaining Engineering  
Contract NAS 15-10000

**FAR 6.303-2(b)(2) – The nature and/or description of the action being approved:** This justification provides the rationale for contracting by other than full and open competition with The Boeing Company (hereafter referred to as “Boeing”) to extend the International Space Station (ISS) Vehicle Sustaining Engineering Contract (hereafter referred to as the “Boeing 10K Contract”). In accordance with Public Law 111-267, (signed October 11, 2010); the Government intends to take steps to maximize the productivity and the use of the ISS with respect to scientific and technological research and development, advancement of space exploration, and international collaboration. With this approval, NASA/JSC intends to have the authority to issue a hybrid Cost-Plus-Award-Fee (CPAF) and Firm-Fixed-Price Performance Incentive contract modification for Boeing to perform integration, verification, sustaining engineering, and post-production support of the ISS Vehicle. This includes the authority to extend the current contract by 5 years from October 1, 2015, through September 30, 2020.

**FAR 6.303-2(b)(3) – A description of the supplies or services required, to meet the Agency’s needs (including the estimated value):** This contract extension will provide services needed to support the basic operation of the ISS vehicle, and technologies used as a test bed aboard the vehicle.

The requirements to be performed in support of the ISS Program for this contract include:

- Design, development, certification and production of hardware and software for the ISS Vehicle, including common hardware to be used by Visiting Vehicles, Payloads, Government Furnished Equipment (GFE) providers and International Partners/Participants (IP/P).
- Sustaining engineering of United States On-Orbit Segment (USOS) hardware and software and common hardware provided to IP/P, GFE owners, and Payload Developers.
- Integration of the USOS with the IP/P, GFE, payload, and visiting vehicle hardware and software.
- Post Production Support (PPS) of USOS hardware and common hardware provided to the IP/P and GFE providers.
- Technical integration across all of the ISS segments (USOS, IP/P segments, and visiting vehicles).
- ISS end-to-end subsystem management for the majority of ISS subsystems and specialty engineering disciplines (materials and processes, electric, electronic and electromechanical parts, environments, electromagnetic effects).
- USOS and integrated system certification of flight readiness.

This extension will include the above mentioned functions to allow for continual operation of the ISS vehicle.

Also included in the contract is the H.57 clause, *Deliverables After Contract Period of Performance*, which contains a list of deliverables and the associated negotiated values that will be added to the contract with an extension. Hardware that is purchased under this contract often requires a long lead time, and is scheduled for delivery beyond the current period of performance of the contract. The current contract has a period of performance through September 30, 2015. The clause currently contains \$200 million worth of hardware deliveries dating through December 15, 2019. This value is expected to increase as the ISS approaches the end of the current period of the performance as more hardware and spares are negotiated and added to support the ISS.

The basic period of performance for this contract extension is expected to be 5 years, from October 1, 2015, through September 30, 2020. If a de-orbit date is finalized for the end of the ISS life prior to September 30, 2020, the requirements will be updated specifically for the de-orbit scenario and a contract change will be negotiated. The estimated value of this extension period is \$1.9 billion, which includes hardware and software development, sparing procurements, and sustaining engineering and PPS services to enable utilization of the ISS as a national laboratory.

**FAR 6.303-2(b)(4) – An identification of the statutory authority permitting other than full and open competition:** 10 U.S.C. 2304 and 41 U.S.C. 3301 require, with certain limited exceptions, that agencies shall promote and provide for full and open competition in soliciting offers and awarding Government contracts. Under limited circumstances, agencies are authorized to award contracts that restrict competition on a sole-source basis.

The statutory authority for proceeding with this acquisition under other than full and open competition is 10 U.S.C. 2304(c)(1) and 41 U.S.C. 3304(a)(1) as contemplated by the provision of FAR 6.302-1(a)(2)(ii), which states that full and open competition need not be provided when “supplies may be deemed to be available only from the original source in the case of a follow-on contract for the continued development or production of a major system or highly specialized equipment, including major components thereof.” The provision also states that this exception is applicable when it is likely that award to any other source would result in “substantial duplication of cost to the Government that is not expected to be recovered through competition, or unacceptable delays in fulfilling the Agency’s requirements.”

**FAR 6.303-2(b)(5)&(9) – A demonstration that the proposed contractor’s unique qualifications or the nature of the acquisition requires use of the authority cited and any other facts supporting the use of other than full and open competition:** Boeing has been performing under the ISS Contract since November 1993. Under this contract Boeing is responsible for design, development, testing, and evaluation of the USOS elements and common ISS hardware used by the USOS, IP/P, and Government-furnished equipment providers, as well as the sustaining engineering and post-production support of this hardware and software.

Much of the ISS hardware is complicated, unique, one-of-a-kind hardware, developed specifically for the ISS. The ISS has unique on-orbit environmental, operational, life and crew-tended requirements. Boeing has developed requirements for, and designed, developed, and certified, the ISS USOS hardware and software, both stand-alone and with the integrated system.

This experience makes them unique in their ability to quickly understand the on-orbit performance of the hardware and software, identify anomalies, and resolve issues and anomalies in a timely manner to ensure the safety of the crew and vehicle, and mission success.

Knowledge of the hardware and software systems is essential for quick reaction to problems and is cost effective in minimizing investigation of known conditions. This knowledge is also critical for supporting the integration and operation of payloads and visiting vehicles, including commercial vehicles.

Additionally, the Boeing software team has assembled and maintains highly skilled software developers with extensive Ada programming experience. In addition to the critical knowledge Boeing's software developers have accumulated, the availability of Ada programmers is a critical factor affecting the software sustaining aspect of this contract. The supply of software programmers on the current open market with Ada programming experience is extremely low, since the Ada programming language is not widely used in mainstream industry. This situation poses a risk for a new contractor recruiting replacements. It would be difficult to replace these programmers without suffering a significant drop in quality and efficiency if a transition to a new software contractor is required. Boeing's acquired knowledge of the systems currently being used aboard the ISS and experience with Ada and other programming would be extremely difficult to duplicate. A transition to a new software contractor would also create unwarranted risk and could potentially impact on-orbit operations and safety. This is due to the amount of experience Boeing's software team maintains in regards to on-orbit anomaly resolutions.

Boeing is currently in the process of building spares, hardware, and software required for the ISS vehicle to operate in the post-Shuttle era and with commercial vehicles. This includes new, complicated hardware such as a NASA Docking System for commercial vehicles and lithium ion batteries to replace the current nickel-hydrogen batteries. In addition, several spare builds are in process. Some of this hardware will not be completed and/or activated until late in the contract or after the current contract period of performance. Transitioning effort to another contractor prior to completing this work could have substantial cost impacts due to the duplication of contract costs, and could also cause unacceptable delays in product and service delivery.

Boeing's hardware and software teams have worked extensively with the IP/P (Europe, Japan, Russia, and Canada) and the commercial vehicle providers (SpaceX and Orbital), establishing working relationships and developing the hardware and software interfaces for the IP/P modules and commercial vehicles. The ability to efficiently troubleshoot, identify, and resolve software and hardware issues would be impacted while a new contractor gained experience and established working relationships with the IP/P and the commercial vehicle providers.

The ISS Program is the most complex, international civil engineering collaboration undertaken to date. Boeing, under the Boeing 10K contract, designed, tested and built the majority of the hardware for the USOS. Additionally, Boeing integrated all the international elements and commercial vehicles into the ISS configuration. Given the complexity of the ISS elements and system architectures, the continuous on-orbit operations of the ISS vehicle, and the reality that the ISS Program did not design the original contract scope with the intent to transition sustaining engineering to a different company, transferring this responsibility to a new contractor could pose serious impediments to the operation of the ISS and integration of payloads and new commercial vehicles into the ISS system.

Boeing has been performing under this contract since 1993. To transition this contract to another company while ensuring uninterrupted operations would not be practical, given the frequency of system issues and anomalies. These anomalies require timely resolution and Boeing possesses the experience required to quickly resolve anomalies which mitigates unwarranted risk aboard the ISS. Additionally, it would involve a high transition cost and significantly increase the risk to successful operation and safety of the ISS vehicle and crew. Boeing's years of experience and expert understanding of the USOS hardware and software, ISS end-to-end subsystem design, performance requirements, IP/P hardware designs, and visiting vehicle designs and certification requirements make them the only company currently able to satisfy the unique needs of the ISS. Therefore, it is recommended that the ISS Vehicle Sustaining contract be sole sourced to Boeing.

**FAR 6.303-2(b)(6) – A description of the efforts made to ensure that offers are solicited from as many potential sources as practicable, including whether a notice was or will be publicized as required by Subpart 5.2 and, if not, which exception under 5.202 applies:** On July 23, 2013, a Non-Competitive Synopsis was issued on the NASA Acquisition Internet Service (NAIS) for ISS Vehicle Sustaining Engineering management and support with a closing date of August 8, 2013. The NAIS was linked to the GPE (Government Point of Entry) – Federal Business Opportunities Page. This synopsis stated the Government's intent to extend the current contract for the ISS vehicle requirements on a sole source basis to Boeing with an anticipated period of performance from October 1, 2015, for a period up to the end of the ISS Program (2020 or beyond). Only one response was received by a small business expressing interest in subcontracting opportunities. No other companies expressed any concerns with or interest in competing for this extension.

**FAR 6.303-2(b)(7) – A determination by the contracting officer that the anticipated cost to the Government will be fair and reasonable:** In order to demonstrate that the Government has received a fair and reasonable price for the cost reimbursable and fixed-price portions the contractor will be required to provide the Government with cost and pricing data in accordance with FAR 15.403-4, and will be required to provide a certificate of current cost or pricing data in accordance with FAR 15.406-2. In addition the technical evaluation being performed by the requiring technical organizations, an Independent Government Estimate of the proposal will be conducted by the ISS Assessments, Cost Estimating and Schedules Office. A Peer Review Team (PRT) has been assigned to support the ISS Negotiation Team (INT) in the development of a sound and thorough cost analysis and negotiation on the fixed-price work. The PRT will be responsible for reviewing the Request for Proposal relative to the cost volume and cost data provided by Boeing.

Over the past three years the ISS Program Office has negotiated over 88 change modifications (value of \$700K+), with a proposed value of \$1.7 billion. This robust change traffic has provided the ISS Program the ability to thoroughly evaluate proposals. Currently a majority of the Boeing subcontractors are operating under a Defense Contract Management Agency (DCMA) Forward Pricing Rate Agreement or Forward Pricing Rate Recommendation, which aids the Contracting Officer in establishing price reasonableness. The Government currently has sufficient insight to Boeing's proposal methods including rates, factors, and algorithms being used in their proposals. The ISS Program has extensive history in evaluating Boeing to include any subcontract efforts. Boeing is currently operating under approved systems, and there have been no significant deficiencies note by DCMA or the Defense Contract Audit Agency to date. An accounting

system audit is scheduled in Fiscal Year (FY) 2016, and an estimating system audit is to occur in FY2015.

The PRT will review the cost/price analysis strategy as it is deployed and offer further observations/recommendations, as well as the technical evaluation report, audit reports received, subcontractor cost analysis reports, and documentation developed relative to the Firm-Fixed-Price Performance Incentive Plan. In addition the PRT will review the Pre-Negotiation Position Memorandum and supply written feedback to the INT as well as the negotiation strategy.

The Government has successfully negotiated 5 contract extensions with Boeing under this contract. Based upon past experiences and the data and resources available to the Contracting Officer (to include audited rates with the prime contractor), it is anticipated that the Government will be able to negotiate a fair and reasonable price for these services.

**FAR 6.303-2(b)(8) – Description of the market survey conducted, and the results, or a statement of the reasons a market survey was not conducted:** A Non-Competitive Synopsis was issued on July 23, 2013, with a closing date of August 8, 2013, that serves as a market survey for the proposed contract modification. As a result of this market survey, no company has been identified, nor has expressed an interest in the work, that could acquire the skills and knowledge necessary to perform the critical and complex activities associated with this contract in such an abbreviated period of time. A contractor's failure to perform these critical functions would place the mission and crew at risk. One small business expressed interest in a subcontracting opportunity under the prime contract.

**FAR 6.303-2(b)(9)(ii) – When 6.302-1 is cited for follow on acquisitions as described in 6.302-1(a)(2)(ii), an estimate of the cost to the Government that would be duplicated and how the estimate was derived:** Since 1993, Boeing has been performing as the prime contractor and has the corporate knowledge of this program within its current workforce. Much of the data produced for the program was delivered in the contractor's own formats and is not packaged for transition to another contractor. Packaging and delivering this data in a format usable to a successor contractor is an extremely complex and time-intensive task that is currently not planned or budgeted for. It would be necessary for the ISS Program to spend in the magnitude of several hundred million dollars and several months, or even years, to obtain data of this type. This estimate is based on actual experience back in 2004, when the ISS Program was directed by NASA Headquarters to pursue the feasibility of competing the Boeing contract after assembly complete of the ISS. The ISS Program issued program direction to Boeing to request an estimate for the cost of creating the re-procurement data set as well as a description and cost estimate to transition the 10K contract if Boeing did not win. A Rough Order of Magnitude based on 2004, estimates and inflation rates resulted in an estimate to re-compete of approximately [REDACTED]. The cost to transition Boeing personnel for a 1-year transition period was [REDACTED] for a total re-competition cost in 2004, dollars of [REDACTED]. Additionally, the magnitude of the data alone would require an incoming contractor to spend months reviewing the data to ensure it was complete and to understand it. Boeing would need to be available to address concerns associated with the data for a substantial length of time. The ISS Program has experienced transition of flight support equipment hardware from Boeing to the Cargo Mission Contract (CMC) and months transpired before the CMC contract could operate without Boeing's assistance. The amount of hardware (and associated data) transferred from Boeing to CMC was minor compared to the amount of hardware and software Boeing is currently sustaining.

In addition to costs associated in data packaging, Boeing would be responsible for transitioning the USOS hardware and software to the incoming contractor. To transition this hardware and software to a new contractor would require additional costs by the Program, which was not captured in the previously mentioned estimate. By the contract remaining with Boeing, it removes the costs associated with duplicating data packages and transitioning hardware and software to a new contractor.

**FAR 6.303-2(b)(10) – A listing of the sources, if any, that expressed an interest in writing in the acquisition:** No responses received. To date, no potential contractor has contacted the Contracting Officer expressing an interest in performing this work as the prime contractor.

**FAR 6.303-2(b)(11) – A statement of actions, if any, the agency may take to remove or overcome any barriers to competition before any subsequent acquisition for the supplies or services required:** Removing barriers to competition would be cost prohibitive because Boeing has possession of much of the data and tools produced for the ISS Program. Most of the data and tools that were delivered by Boeing are in the contractor's own formats and are not packaged for transition to another contractor. Packaging and delivering this data and tools in a format usable to a successor contractor is necessary to allow for a competition and transition of this contract, and would be very costly. Additionally, a lengthy transition period would be required to ensure a new contract was sufficiently prepared to sustain the ISS Vehicle without compromising safety or operations. As stated above, removing barriers to competition would be cost prohibitive for Boeing to sustain the ISS.