Task Order 48-12 Rev. 1

1.0 TITLE OF EFFORT: International Low Impact Docking System (iLIDS) Government Furnished Equipment (GFE) Projects and Quality Support

2.0 TASK DESCRIPTION:

The contractor shall coordinate and conduct S&MA activities for authorized iLIDS Project quality and flight equipment projects, provide and discuss S&MA topics and issues, and participate in all S&MA activities associated with the GFE life-cycle as defined in Engineering Directorate Work Instructions EA-WI-023, Program Management of GFE Flight Projects and EA-WI-025, GFE Flight Project Software & Firmware Development. The contractor shall provide support to on-orbit operations including integrated operations assessments. The contractor shall review proposals and change requests for system designs and design modifications in order to assess S&MA impacts and identify S&MA issues for GFE assets.

2.1 STATEMENT OF WORK REFERENCE:

Section 5.0 - Program Support
Section 6.0 - JSC Project Support
Section 8.0 - Advanced Programs, Assurance Methodologies, and Special Processes

2.2 ISS Low Impact Docking System (iLIDS) Project Assurance Support (WBS 1.5.7.1)

2.2.1 iLIDS Project GFE Safety and Reliability (WBS 1.5.7.1)

The contractor shall perform flight safety, reliability, and mission assurance for GFE; provide safety and mission assurance for GFE payloads; participate in development and modification of hardware to identify and discuss hardware criticality assessments and define S&MA requirements. The contractor shall identify design problems and provide design solutions or improvements. Other duties include:

a. Participate in design reviews, participate in project Integrated Product Teams **(**IPTs), participate in iLIDS panels and working groups (as required), review provided data and documentation, and provide Review Item Dispositions (RIDs) on S&MA-related issues and deficiencies.
b. Identify potential hazards, evaluate proposed hazard controls, and evaluate methods for verification of hazard controls.
c. Identify potential critical items list failure modes, causes, effects, methods of verification, and acceptance rationale.
d. Track and provide status on requirements verification, system qualification, and design certification activities.
e. Identify missing or non-compliant S&MA requirements as well as performance requirements that cannot be verified.
f. Conduct S&MA assessments, prepare presentations, and present results of those assessments to S&MA management, project management, and the iLIDS Project for discussion.
g. Assure that hardware operational uses, operating limits, hazard controls, and fault tolerance are verified prior to flight.
h. Participate in problem/anomaly investigations during all phases of a project to assure that the problems are appropriately documented; adequate and appropriate investigation

is planned and conducted; closure rationale is acceptable and complete; and visibility of the problem/anomaly is elevated to the appropriate S&MA management level.

i. Support operational use of hardware.

2.2.2 iLIDS Project GFE Quality Assurance (WBS 1.5.7.1)

The contractor shall provide Quality Assurance support for GFE which includes the following:

a. Perform non-RITF (Receiving Inspection Test Facility) related hardware inspection, verification, and documentation tasks associated with receiving, inspecting, fabricating, assembling, testing, processing, and shipping of GFE at JSC facilities.
b. Perform designated Government Mandatory Inspection Points (GMIP's).
c. Oversee facility maintenance on human-rated chambers and testing labs, and support fit-checks, installation, test readiness, test, and checkout of hardware at JSC and other NASA and contractor facilities.
d. Conduct surveillance of flight systems handling and processing as well as ground facilities with regard to receiving, inspecting, fabricating, assembling, testing, processing, and shipping of GFE at JSC facilities.
e. Participate as team members or team leaders of process and requirements implementation audits conducted at JSC and contractor facilities.
f. Prepare and submit QREX Reports as required.

2.2.3 iLIDS Project GFE Quality Engineering (WBS 1.5.7.1)

The contractor shall provide Quality Engineering support for GFE.

a. Assess design as well as implementation and verification of S&MA requirements.
b. Assess plans and procedures for manufacturing and test of hardware.
c. Perform documentation reviews and evaluation tasks associated with receiving, inspection, fabrication, assembly, test, processing, and shipment of GFE at JSC facilities.
d. Conduct surveillance of flight hardware with regard to receiving, inspecting, fabricating, assembling, testing, processing and shipping of GFE at JSC facilities.
e. Perform readiness assessments prior to shipment of flight hardware.
f. Support special teams conducting assessments and investigations.

2.2.4 iLIDS Project GFE Software Assurance (WBS 1.5.7.1)

The contractor shall provide Software Assurance, including software safety, software reliability, software quality engineering, software quality assurance, and software verification and validation, for GFE iLIDS flight and ground systems per NT-SQA-021 Software Assurance Processes.

a. Perform inline software quality activities
b. Perform software safety and reliability assurance activities
c. Develop software safety and reliability products (NASA will provide products assurance of the products that SAIC develops).
d. Provide Capability Maturity Model® Integration (CMMI) Process and Product Quality Assurance support IAW CMMI® for Development, Version 1.3 (CMMI-DEV, V1.3) . This includes appraisal support where requested (provided appraisal support does not conflict with iLIDS project schedule)

2.2.5 iLIDS CFE Quality Engineering (QE) (WBS 1.5.7.1)

The contractor shall perform Quality Engineering (QE) functions at the Project-level which includes:

a. Participate in design reviews, review provided data and documentation, and provide RIDS on S&MA-related issues and deficiencies.
b. Review proposed implementation of quality requirements.
c. Ensure effective performance of Government Contract Quality Assurance for work performed by NASA prime contractors
d. Identify the processes needed for the quality management system and their application throughout the iLIDS Project. Determine the sequence and interaction of these processes. Determine criteria and methods needed to ensure that both the operation and control of these processes are effective. Ensure the availability of resources and information necessary to support the operation and monitoring of these processes. Monitor, measure and analyze these processes.
e. Implement actions necessary to achieve planned results and continual improvement of these processes
f. Review plans for production.
g. Ensure readiness to proceed with design, development, or manufacturing, as well as Certification of Flight Readiness (CoFR) Reviews Assure inclusion of necessary quality requirements flowdown to suppliers.
h. Review and approve waivers and deviations against iLIDS Quality Assurance requirements
i. Ensure that verifications of Government Mandatory Inspection Points (GMIPs) are properly identified and executed during vehicle processing Ensure the implementation of Foreign Object Debris (FOD)/Contamination Control Plans by the i Project and its prime contractors, and verify compliance.

2.2.6 iLIDS Project GFE and CFE Audits (WBS 1.5.7.1)

The contractor shall participate in NASA-sponsored audits. Specific tasks include:

a. Perform process assessments and audits, and prepare reports documenting results.
b. Perform statistical analyses, and benchmark S&MA processes.
c. Perform technical and metric analyses, and present results.
d. Participate in joint audits with other NASA Centers or government entities to verify S&MA requirements and implementations at NASA contractors, subcontractors, and vendors.
e. Perform independent surveillance and periodic audits of contractor and subcontractor on S&MA products and processes.

2.2.7 Pyrotechnics Support (WBS 1.5.7.1)

The contractor shall provide Pyrotechnics expertise to conduct all safety and reliability requirement assessments, reviews, evaluations, reporting, and recommendations related to all aspects of the Pyrotechnics Subsystems associated with iLIDS, the host vehicle and the associated launch vehicle. This will cover storage, transportation, installation, testing, activation/deployment, and safing of the Subsystems, hardware and software/firmware components. This also covers all pyrotechnic applications, support requirements and

operations for all mission phases to include: storage, transportation, installation, pad escape, launch, assent staging, mission aborts, mission uses, re-entry and recovery.

2.3 Production of Products

2.3.1 iLIDS Project GFE Safety and Reliability Products (WBS 1.5.7.1)

The contractor shall prepare products in support of Hardware Assurance, including safety, reliability, hardware quality engineering, hardware quality assurance, and hardware testing for iLIDS GFE flight and ground systems.

a. Participate in design reviews, participate in project Integrated Product Teams (IPTs) participate in iLIDS panels and working groups (as required), review provided data and documentation, and provide RID'S on S&MA-related issues and deficiencies.
b. Identify and document potential hazards, evaluate proposed hazard controls, and evaluate methods for verification of hazard controls.
c. Identify and document potential critical items list failure modes, causes, effects, methods of verification, and acceptance rationale.
d. Identify missing or non-compliant S&MA requirements as well as performance requirements that cannot be verified.
e. Conduct S&MA assessments, prepare presentations, and present results of those assessments to S&MA management, project management, and the iLIDS Project for discussion.
f. Identify and document operational use of hardware.

2.3.2 iLIDS Project GFE Software Assurance Products (WBS 1.5.7.1)

The contractor shall prepare products in support of Software Assurance, including software safety, software reliability, software quality engineering, software quality assurance, and software verification and validation, for iLIDS GFE flight and ground systems per NT-SQA-021 Software Assurance Processes.

2.4 PRODUCTS

The contractor shall provide products, reports and analysis as required by this task order including the following:

a. Safety Data Package
b. Safety Analysis
c. Reliability Analysis
d. Hazard Reports
e. FMEA/CIL Worksheets
f. Software Safety Analysis & Computer Based Control System (CBCS) Requirements Compliance Matrix
g. Capability Maturity Model Integration (CMMI) Product and Process Quality Assurance (PPQA) assessments
h. Ground System Safety Analysis
i. Probabilistic Risk Assessment (PRA)
j. Test Facility Safety Analysis
k. Non-Compliance Reports (NCRs)
l. Failure, Detection, Isolation and Recovery (FDIR) Analysis
m. S&MA Assessments and Presentations
n. RIDs (Review Item Disposition)

o. Acceptance Data Pack (ADPs)
p. Government Certification Acceptance Request (GCARs)
q. CoFR status
r. Software classification and safety criticality assessment
s. Software traceability assessments
t. NPR 7150.2 compliance matrix

3.0 PERIOD OF PERFORMANCE: October 1, 2011 – September 30, 2012

4.0 ESTIMATED COST

Contractor may provide travel, training, materials, and other non-labor resources as necessary to support task order requirements. Training may include selected professional discipline-based or spaceflight-based conferences with approval of the TMR.