Marshall Space Flight Center
Engineering, Science & Technical Services

JACOBS ESTS Group

Task Order Plan (TOP)

Contract Number: *NNM05AB50C*
TO Title: *Space Materials Selection and Control Evaluation*
TO Number: *34-000301* **Revision:** *16*

Period of Performance: *10/02/2010* to *09/30/2011*

MSFC Initiator: *Dennis Griffin*

(b)(4)

Emergency: *No*

Revision 16: This revision opens and adds resources for Sublelement-02 for MAPTIS Development Support and Subelement-SI for Shuttle PSE&I support. The labor estimate for Subelement-00 is being revised to increase (b)(4) support for MAPTIs-II development support that is being continued until this T.O. release and increase ES-7 support for general materials selection & control support. Subelements-SB, -SM, and –ST are being revised to reduce (b)(4) hours by half due to an error with Rev. 15. The travel estimate for Subelement-00 in October has been revised and has been added to Section 7. Additionally, the Schedule has been revised to reflect these changes.

Revision 15: The purpose of this revision is to extend this task into Contract Year 6 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period October 2, 2010 through September 30, 2011. Additionally, the Schedule and Performance Plan have been revised to reflect changes in task activities for the new period of performance by adding new Shuttle subelements SB, SM, and ST and deleting subelement AC.

Revision 14: The purpose of this revision is to account for the Constellation labor re-plan, extend support for Subelement AC, and add new scope of work for MAPTIS-II support to Subelement 00. Subelements CA, CO, and CQ were administratively closed and the work corresponding to these is being continued under the new TO 34-000001 Subelement CA. Subelements CE and CQ were administratively closed and the work was terminated. The schedule has been revised to reflect the extended subelement and the closed subelements. The costs for the Ares subelements have been updated administratively.

Revision 13: The purpose of this revision is to extend this task into Contract Year 5 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period October 3, 2009 through October 14, 2010. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance. This revision affects the following APO elements: Ares I First Stage (Subelement-CE), Ares I Upper Stage (Subelements-CA, CO & CQ), Ares I-X (Subelement-CG), and Ares V Core Stage (Subelement-AC). Subelement-AA was closed and Subelement-AC was added by this revision. The estimate for Subelement-AC is (b)(4), which includes (b)(4) for CY5 support plus (b)(4) in subcontractor invoices for the end of CY4 that were paid in CY5. The funding is being transferred from closed subelements (-AA and 34-030001-AM) to cover the cost for the CY4 subcontract invoices.

Revision 12: This revision changes labor and travel estimate to more accurately reflect the current scope of the task. Additional labor estimate was added to subelement-00 (b)(4) to support additional materials selection and evaluation requirements. Additional (b)(4) and subcontractor estimate (b)(4) was added for Subelement-AA (WBS 206518.01.01.08) to support additional Ares V Core Stage architecture and design study requirements. (b)(4) labor estimate was added under subelement-CA (WBS 136905.08.05.12.01.08) for a new Manufacturing Support Engineer to provide support to the M&A team regarding MAF facilities construction, modifications, and tooling installation, but overall labor estimate was reduced (b)(4) because less support is required from other resources. Added (b)(4) estimate (b)(4) to subelement-CE (WBS 136905.08.01.11) to cover increased Ares I First Stage materials selection requirements. Travel estimate of (b)(4) was added to Subelement-CE for to cover costs of attending the (b)(4) (b)(4). Subelement-CG (WBS 136905.08.01.09) was created to provide for Ares I-X M&P support, and labor resources were added to support this effort. Closed subelement-CN for Ares I Vehicle Integration Core Review Team M&P Support because this effort is complete.

Revision 11: This revision adds (b)(4) labor resources for a (b)(4) under Subelement-CA and reallocates labor resources for Subelements-00, -CA, and -CN (b)(4)). The additional (b)((b labor resources added to -00 and -CN were taken from -CA resources. Additional travel resources were added to Subelement-CA for (b)(4) to cover actual costs. Subelement-CD for J2-X M&P support has been closed and the (b) hours (b)(4) were transferred to Subelement-CA. Additionally, the Schedule and Performance Plan have been revised to reflect these changes in task activities. This revision affects the following APO elements: Upper Stage (Subelement-CA), Upper Stage Engine (Subelement-CD), and Vehicle Integration (Subelement-CN).

Revision 10: The purpose of this revision is to extend this task into Contract Year 4 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period September 27, 2008 through October 2, 2009, by adding Subelements-CE, -CO- and -CQ, and closing Subelement-CB. Additionally, the Schedule, Performance Plan, and Risk Assessment have been revised to reflect these changes in task activities for the new period of performance. This revision affects the following APO elements: First Stage (Subelement-CE), Upper Stage (Subelements-CA, -CO, and -CQ), Upper Stage Engine (Subelement-CD), Vehicle Integration (Subelement-CN), and Core Stage (Subelement-AA).

Revision 09 reallocates labor resources to more accurately reflect the effort required during this period of performance and adds travel and ODC resources. The reallocation is partially due to a later than anticipated start date for the replacement (b)(4) engineer. Labor estimate on Subelement-00 was increased by (b)(4 hours with a corresponding increase in cost of (b)(4). Labor estimate on Subelement-CA was reduced (b)(hours with a corresponding reduction in cost of (b)(4). Labor estimate on Subelement-CB was reduced (b) hours with a corresponding reduction in cost of (b)(4. Labor estimate on Subelement-CN was reduced by (b)(4 hours with a corresponding reduction in cost of (b)(4). The travel resource on Subelement-AA increased by (b)(4) and on Subelement-CA by (b)(4) both for travel to MAF. The ODC on Subelement-00 increased by (b)(4) for job advertising. The Schedule, Performance Plan and Risk Assessment have not been revised since there are no expected changes in task activities for this period of performance. No additional budget is required.

This revision (08) reduces the scope of subelement-AA to cover only Ares V Core Stage support, changes the labor category supporting Subelement–AA from (b)(4) for future support, adds approximately (b)(4) subcontractor costs for manufacturing support on Subelement-AA, and corrects WBS specified for Subelement-AA. The (b)(4 hours for July are being deleted due to loss of employee and the anticipated vacancy during recruitment period. The other documents did not require revision.

Revision 07 adds new Subelement AA for Ares V Manufacturing & Operations support, Subelement-CB for MAPTIS-II Development Support, and Subelement CN for Ares I Vehicle Integration Design Review Core Team M&P support. Labor resources added for those subelements are (b)(4) for Subelement AA, (b)(4) for Subelement CB, and (b)(4) for Subelement CN. The scope for Subelement 00

has been revised to include support for development of a new NASA standard for protective finishes and MAPTIS-II Development Support. Labor resources totaling (b)(4) were added to Subelement 00 for this work and completion of the ISS payload Agricultural Camera. The Performance Plan and Schedule have been revised accordingly. The work previously accomplished under Task Order 34-000302 for MAPTIS-II Development Support has been added to this task per the following mapping.

Existing TO/Subelement	New TO/subelement
34-000302-00	34-000301-00
34-000302-CB	34-000301-CB

This revision (06) reduces the estimate to reflect the actual start date for the (b)(4) engineer and that no relocation or interviewee travel expenses were necessary. No changes were required to the Schedule, Risk Assessment or Performance Plan.

The purpose of this revision (05) is to extend this task into Contract Year 3 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period 29 September 2007 through 26 September 2008. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance.

This revision (04) adds scope to subelement-CA for Upper Stage Manufacturing and Assembly (M&A) Integrated Product Team M&A engineer support, reallocates the (b)(4) labor resource, and changes the title of subelement-CA. No changes were required to the Risk Assessment or Performance Plan.

Revision (03) adds (b)(4) labor resources to subelement-00 for resolving technical comments to NASA-HDBK-6009, adds (b)(4) labor resources to subelement-00 to capture available manpower due to reorganization, adds subelement-CD for J-2X support, and closes subelement –R1 in May due to exhaustion of funding. No changes were required to the Risk Assessment or Performance Plan.

The purpose of this revision (02) is to extend this task into Contract Year 2 of the NNM05AB50C ESTS contract. This revision defines and estimates work for the period 30 September 2006 through 28 September 2007. Subelement CA has been added for CLV support. Additionally, the Schedule, Performance Plan and Risk Assessment have been revised to reflect changes in task activities for the new period of performance. This work is funded through PR 4200173425.

The revision (01) reduces labor resources to reflect labor reallocation between EM03 tasks following funding reductions and changes in personnel. No other changes were required to the task documents. The purchase request number is PR#4200160379.

1.0 Task Order Description & Objectives

Subelement -00: Materials Selection and Control Evaluation
Support will be provided for the Materials & Processes (M&P) Laboratory, Materials Selection Control & Evaluation and Small Projects Branch (formerly Lab Lead Engineers Office). Activities will include the following: the generation, evaluation and/or assessment of materials and processes specifications/ standards, material control plans, engineering change proposals, hardware manufacture support, post flight evaluations, design reviews, review of metallic and non-metallic specifications/ standards, Materials and Processes Technical Information System (MAPTIS-II) Development Support, Technical Interchange Meetings (TIMs), Material Usage Agreements (MUA) and Materials Analysis and Evaluation Board (MAEB) review participation, Data Requirement (DR) deliverables for all projects/programs other than Ares, Shuttle elements, and any type of Heavy Lift Vehicle. These deliverables include, but are not limited to, Materials Identification and Usage Lists (MIULs) and MUAs which will require access to the MAPTIS database.
Technical support will be provided for the development of a new NASA standard for protective finishes. This will consist of supporting the Topic Working Group developing the new standard by attending MSFC and off-site meetings, recording meeting minutes, recording/tracking action items, producing the draft standard, reviewing the draft standard, and discuss/resolve comments from other Topic Working Group members.

Subelement-R1
Closed by Rev. 03 that was released June 5, 2007.

Subelement-02: Materials and Processes Technical Information System (MAPTIS-II) Development Support
Provide for the augmentation, facilitation, automation, implementation, integration, and improvement of materials and processes selection, verification, and control processes, tools, and data applicable to current and future programs utilizing MAPTIS-II and other data management resources and design systems. Work closely with the MAPTIS IT contractor to develop and provide engineering requirements and assistance for advanced materials tools and data management systems.

Subelement-AA: Ares V Core Stage Manufacturing & Operations Support **(Closed by Rev. 13)**
Manufacturing and operations support will be provided to the team performing Ares V Core Stage architecture and design studies. This work is covered by WBS 206518.01.01.08.

Subelement-AC: **(Closed by Rev. 15)**
Ares V Core Stage Manufacturing, Integration, Test & Operations Support
Manufacturing, integration, test, and operations support will be provided to the team performing Ares V Core Stage architecture and design studies. This work is covered by WBS 206518.08.03.20.

Subelement-CA: **(Closed administratively in CY5 due to the Constellation labor re-plan)**
Ares I Upper Stage Materials, Manufacturing and Assembly Support
Support will be provided to the Ares I project Upper Stage element Integrated Manufacturing and Assembly (M&A) activities through the Materials & Processes (M&P) Laboratory, Lab Lead Engineers Office. Activities will include the following: the generation, evaluation and/or assessment of materials and processes specifications/ standards, control plans, engineering change proposals, hardware manufacture support, post-flight evaluations, design reviews, review of metallic and non-metallic specifications/standards, Technical Interchange Meetings (TIMs), Material Usage Agreements (MUA) and Manufacturing & Assembly Control Board (MACB) review participation, and Data Requirement (DR) deliverables. These deliverables include, but are not limited to, Materials Identification and Usage Lists (MIULs) and MUAs which will require access to the Materials and Processes Technical Information System (MAPTIS) database.
This subelement supports the Upper Stage Manufacturing and Assembly (M&A) Integrated Product Team (IPT) and subsystem IPTs in the development of the manufacturing and assembly plans and schedules for the Ares I Upper Stage (US) at both the Marshall Space Flight Center and Michoud Assembly Facility (MAF). In particular, to coordinate the development of manufacturing and assembly approaches, flows, and schedules. Assist the Integrated Manufacturing and Assembly (M&A) Subproduct Lead with the development of a plan, schedule and management of the activities required to develop the material and welding allowables for the US project in a timely manner that supports project milestones. Provide engineering support to the M&A team regarding MAF facilities construction, modifications, and tooling installation.
This work is covered by WBS 136905.08.05.12.01.08.

Subelement-CB: MAPTIS-II Development Support **(Closed under Rev. 10)**
Provided engineering support the MAPTIS Information Technology contractor that is implementing changes and new tools into the system. Specific development and sustaining support is being provided to the MUA Tool and MIUL Tool. This work is covered by WBS 136905.08.05.12.02.08.

Subelement-CD: Ares I J-2X Materials Selection and Control Evaluation **(Closed under Rev. 11)**
Support will be provided to the Ares I project J-2X engine project through the Materials & Processes (M&P) Laboratory, Lead Engineer Office. Activities will include the following: the evaluation and/or assessment of materials and processes specifications/standards, engineering change proposals, design reviews, review of metallic and non-metallic specifications/standards, Technical Interchange Meetings (TIMs), and review of Data Requirement (DR) deliverables. These deliverables include, but are not

limited to, Materials Identification and Usage Lists (MIULs), control plans, and MUAs which will require access to the MAPTIS-II database. This work is covered by WBS 136905.02.99.02.08.02.

Subelement-CE: **(Closed administratively in CY5 due to the Constellation labor re-plan)**
Ares I First Stage Materials Selection and Control Evaluation
Support will be provided to the First Stage element for review and approval of materials and processes information generated by the prime contractor or their vendors. The support will include the same type of work that is described for Subelement-CA. This work is covered by WBS 136905.08.01.11.

Subelement-CG: **(Closed administratively in CY5 due to the Constellation labor re-plan)**
Ares I-X Materials Selection and Control Evaluation
Support will be provided to the Ares I-X for review and approval of materials and processes information generated by the prime contractor or their vendors. The support will include the same type of work that is described for Subelement-CA. This work is covered by WBS 136905.08.01.09.

Subelement-CN: Ares I Vehicle Integration Core Review Team M&P Support **(Closed under Rev. 12)**
Expert level support will be provided to the Ares I Vehicle Integration Review Core Team for First Stage and Upper Stage Preliminary Design Reviews to ensure that M&P requirements are flowed down appropriately and applied consistently to all systems and subsystems. This work is covered by WBS 136905.02.08.08.06.

Subelement-CO: **(Closed administratively in CY5 due to the Constellation labor re-plan)**
Ares I Upper Stage Structural Development Test Article (SDTA) Sub-Product Lead
Support will be provided to the Ares I project Upper Stage element Integrated Manufacturing and Assembly activities for the SDTA. This work is covered by WBS 136905.08.05.12.03.08.

Subelement-CQ: **(Closed administratively in CY5 due to the Constellation labor re-plan)**
Ares I Upper Stage Structural Qualification Test Article (SQTA) Sub-Product Lead
Support will be provided to the Ares I project Upper Stage element Integrated Manufacturing and Assembly activities for the SQTA. This work is covered by WBS 136905.08.05.12.05.08.

Subelement-SB: Material Selection & Control Evaluation for Shuttle Solid Rocket Booster (SRB)
Support will be provided for the Materials & Processes (M&P) Laboratory, Materials Selection Control & Evaluation and Small Projects Branch. Activities will include the following: the evaluation and/or assessment of materials and processes specifications/ standards, control plans, engineering change proposals, hardware manufacture support, post-flight evaluations, design reviews, Materials and Processes Technical Information System (MAPTIS-II) Development Support, Technical Interchange Meetings (TIMs), Material Usage Agreements (MUA) and Materials Analysis and Evaluation Board (MAEB) review participation. Review of Data Requirement (DR) deliverables, including but not limited to, Materials Identification and Usage Lists (MIULs) and MUAs which will require access to the MAPTIS database. This work is covered by WBS 522632.

Subelement-SI: Material Selection & Control Evaluation for Shuttle Propulsion Systems Engineering and Integration (PSE&I)
Support will be provided for the Materials & Processes (M&P) Laboratory, Materials Selection Control & Evaluation and Small Projects Branch. Activities will include the following: the evaluation and/or assessment of materials and processes specifications/ standards, control plans, engineering change proposals, hardware manufacture support, post-flight evaluations, design reviews, Materials and Processes Technical Information System (MAPTIS-II) Development Support, Technical Interchange Meetings (TIMs), Material Usage Agreements (MUA) and Materials Analysis and Evaluation Board (MAEB) review participation. Review of Data Requirement (DR) deliverables, including but not limited to, Materials Identification and Usage Lists (MIULs) and MUAs which will require access to the MAPTIS database.

Subelement-SM: Material Selection & Control Evaluation for Shuttle Reusable Solid Rocket Motor (RSRM)

Support will be provided for the Materials & Processes (M&P) Laboratory, Materials Selection Control & Evaluation and Small Projects Branch. Activities will include the following: the evaluation and/or assessment of materials and processes specifications/ standards, control plans, engineering change proposals, hardware manufacture support, post-flight evaluations, design reviews, Materials and Processes Technical Information System (MAPTIS-II) Development Support, Technical Interchange Meetings (TIMs), Material Usage Agreements (MUA) and Materials Analysis and Evaluation Board (MAEB) review participation. Review of Data Requirement (DR) deliverables, including but not limited to, Materials Identification and Usage Lists (MIULs) and MUAs which will require access to the MAPTIS database. This work is covered by WBS 520871.

Subelement-ST: Material Selection & Control Evaluation for Shuttle External Tank (ET)
Support will be provided for the Materials & Processes (M&P) Laboratory, Materials Selection Control & Evaluation and Small Projects Branch. Activities will include the following: the evaluation and/or assessment of materials and processes specifications/ standards, control plans, engineering change proposals, hardware manufacture support, post-flight evaluations, design reviews, Materials and Processes Technical Information System (MAPTIS-II) Development Support, Technical Interchange Meetings (TIMs), Material Usage Agreements (MUA) and Materials Analysis and Evaluation Board (MAEB) review participation. Review of Data Requirement (DR) deliverables, including but not limited to, Materials Identification and Usage Lists (MIULs) and MUAs which will require access to the MAPTIS database. This work is covered by WBS 524238.

2.0 Technical Approach (Including required input, guidelines & assumptions)

The following approach applies to Materials & Processes support for Subelements-00, -CA, -CD, -CE, -SB, -SI, -SM, and -ST.

a. Data packages for evaluation/assessment may be received from the cognizant MSFC M&P engineer or from project personnel with notification of receipt sent to the cognizant M&P engineer. The data packages may be materials and processes specifications/standards, control plans, engineering change proposals, engineering drawings/parts lists, MIUL, MUA, or other M&P related documentation. The package shall be reviewed for compliance to NASA, MSFC, and the particular program's requirements, as applicable, and comments provided.
b. Engineering change proposals and engineering drawings/parts lists shall be reviewed for appropriate material selection based on the application and applicable material requirements for non-metallic and metallic materials. When appropriate this review will be documented via an MIUL and MUA (if an MUA is required).
c. Hardware manufacturing support will be provided in accordance with individual project requirements at MSFC or the subcontractor location.
d. Post-flight evaluation support will be provided in accordance with individual project requirements at MSFC, other NASA facility, or the subcontractor location and conducted per established criteria/procedures.
e. Support for design reviews will be provided in accordance with individual project requirements at MSFC, other NASA facility, or the subcontractor location.
f. Support for TIM will be provided in accordance with individual project requirements at MSFC or other locations.
g. MAEB & MACB review participation will be provided in accordance with individual project requirements.
h. Subelement-CA only: Generate material and process specifications for Upper Stage development and manufacturing at MSFC.
i. Subelement-00 only: Provide technical review and input to the new NASA standard, NASA-STD-6012, for protective finishes that is replacing MSFC-SPEC-250. Project support activities will also be provided by recording meeting minutes, tracking action items, and managing working group draft of new standard.
j. Subelement-CE only: First Stage Engineering Review Board support as EM alternate; includes ECP mandatory review, support First Stage Integration Working Group weekly telecom, and support First Stage M&P IPT (formerly Working Group) telecon.

k. Provide materials engineering expertise for MAPTIS development activities. Interface with personnel in EM, at MAPTIS IT contractor, Shuttle elements, at other NASA centers, at other government agency facilities, and at commercial launch vehicle companies to obtain M&P related information for inclusion in or link to in MAPTIS.

The following approach applies to Subelement-02: MAPTIS-II Development Support

Work closely with the MAPTIS IT contractor to develop and provide engineering requirements and assistance for advanced materials tools and data management systems by:

a. Providing engineering evaluation and validation of M&P data for projects, programs, and inclusion/augmentation of MAPTIS.

b. Supporting the development of timely, efficient, and cost effective processes, approaches, and solutions for collecting, disseminating, evaluating, documenting, verifying, and certifying the acceptability, safety, and integrity of M&P used in space flight hardware.

c. Supporting the integration of MAPTIS capabilities, M&P selection data, and tools with CAD, CAE, and other PLM tools and systems to proactively aid designers and analysts in their M&P selection and analysis decisions.

d. Supporting the development of automated systems and tools that will lower the costs and improve the effectiveness of producing deliverable data requirements, such as MIULs, MUAs, preferred materials lists, limited usage materials lists for various environments, vetted and validated design properties, etc. – and evaluate their products as needed.

e. Travel, as required, to participate in and/or provide training, workshops, consortia meetings, and user group meetings to improve MAPTIS capabilities, provide a more user friendly interface, respond to user suggestions, and promote the utilization of MAPTIS.

f. Working with other agencies and contractors as required to collaborate on the development of mutually useful M&P tools and data management solutions.

g. As required, assess, evaluate, and verify the appropriateness of M&P selection and control systems and the implementation of M&P requirements for various current and future projects/programs.

h. Supporting the development of innovative/sustainable materials tools and advanced materials information systems to proactively preclude the impact and assess the risk of ESH regulations and restrictions on materials sustainability and obsolescence for the design, manufacturing, and operations of space flight hardware systems.

The following approach applies to Subelement-AA: Ares V Core Stage Manufacturing & Operations Support. **(Closed by Revision 13)**

a. Participate in all Ares V Core Stage architecture and design study team meetings and provide manufacturing & assembly expertise. Participation may be in-person or by teleconference/Webex.

b. Modify / mature Ares V Core Stage manufacturing plans and flow charts.

The following approach applies to Subelement-AC: Ares V Core Stage Manufacturing & Operations Support. **(Closed administratively in CY5 due to the Constellation labor re-plan)**

a. Participate in all architecture and design study team meetings and provide manufacturing & assembly expertise. Participation may be in-person or by teleconference/Webex.

b. Modify / mature manufacturing plans and flow charts.

c. Support high level discussions regarding integration.

d. Support high level discussions regarding test.

The following approach applies to Subelement-CA: Ares I Upper Stage Manufacturing & Assembly engineer support. **(Closed administratively in CY5 due to the Constellation labor re-plan)**

a. Communicate pertinent M&A issues to other M&A team members as required.

b. Provide M&A expertise to the US M&A Integrated Product Team (IPT).

c. Provide M&A expertise and M&A interface to specific US Design Integrated Product Teams at MSFC.

d. Lead resolution of M&A issues and coordinate inputs from other M&A team members.

e. Assist the M&A IPT with planning activities for both MSFC and MAF.

f. Interface with US Production Contractor personnel on M&A issues at MSFC and MAF.

g. Review US Production Contractor M&A documentation, including the Upper Stage M&A Plan and associated flow charts.

The following approach applies to Subelement-CA: Upper Stage Sr. Manufacturing Planner support. **(Closed administratively in CY5 due to the Constellation labor re-plan)**

a. Assist with generation and revision of the Development Plans for the manufacturing development activities planned at MSFC and with the US M&A Plan for MAF.
b. Assist M&A Management Team with the development of the M&A Integrated Master Schedule (IMS) for MSFC lead activities and insight into the US Production Contractor's Integrated Contractor Schedule (ICS).
c. Assist the M&A Management Team with coordinating, tracking, and updating all aspects of the IMS for the MSFC lead tasks and ensure the IMS accurately reflects the plan and schedule.
d. Represent M&A to the Design Product Teams to insure the resulting design can be manufactured in the most timely, cost effective manner.
e. Coordinate with the various EM Branches that support M&A to plan, track, and update the tasks associated with developing the material and welding allowables that are necessary to design and analyze the Ares I US.
f. Assist the M&A Management Team with estimating the resource requirements necessary to manufacture and assemble the Ares I US and develop the necessary materials, properties, and processes.
g. During the development and/or manufacturing processes, assist with the development and implementation of mitigation plans and schedules to resolve issues or problems encountered.
h. Assist the M&A Management Team with defining manufacturing related risks and developing mitigation plans.
i. Assist the M&A Management Team with assessing the cost and schedule performance from an Earned Value Management standpoint.
j. Report the status of the manufacturing and assembly product team activities in all venues including the Product Team, Control Board, Engineering Management, Sub Product Lead, and Working Group meetings.

The following approach applies to Subelement-CA: Upper Stage Manufacturing Support. **(Closed administratively in CY5 due to the Constellation labor re-plan)**

a. Develop requirements for manufacturing and assembly facilities at MAF.
b. Coordinate schedule milestones between the US Manufacturing & Assembly Subsystem, the US Logistics Subsystem, and the US Production Contractor.
c. Monitor progress of MAF facility modifications and construction, acquisition and installation of manufacturing and assembly tooling, and facility readiness reviews.
d. Participate in facility and tooling design and construction reviews.
e. Coordinate Construction of Facilities inputs for the US Manufacturing and Assembly subsystem.
f. Report status and issues to the US Manufacturing and Assembly Product Team management.
g. Support facility related meetings and US Manufacturing and Assembly team meetings.

The following approach applies to Subelement-CG: Ares I-X Materials Selection and Control Evaluation **(Closed administratively in CY5 due to the Constellation labor re-plan)**

a. Review and comment on Material Usage Agreements.
b. Review and comment on Material Identification and Usage Lists.
c. Engineering Review Board support as EM alternate; includes ECP mandatory review.
d. Support Forward Skirt weekly telecom.
e. Support First Stage Integration Working Group weekly telecon.
f. Support Aft Skirt & Systems Tunnel weekly telecon.
g. Support First Stage M&P IPT (formerly Working Group) telecon.
h. Support Avionics "MSFC Engineering Internal" Acceptance Review.
i. Review and comment on material-related test reports.
j. Participate in post-flight analysis as requested.

The following approach applies to Subelement-CN: Ares I Vehicle Integration Design Review Core Team M&P Support. **(Closed under Rev. 12)**

a. Participate in all Ares I Preliminary Design Reviews including First Stage, Upper Stage, Orion, and Ground Support Equipment. Participation may be in-person or by teleconference/Webex.
b. Support Design Review Core Team meetings.
c. Review documents and specification for M&P concerns.
d. Submit and present findings to the Design Review Core Team.
e. Meet with element and component leads to discuss identified issues.
f. Use appropriate system/format to document discrepancies where issues could not otherwise be resolved.

The following approach applies to Subelements-CO and –CQ: Ares I Upper Stage SDTA and SQTA Sub-Product Lead. **(Closed administratively in CY5 due to the Constellation labor re-plan)**

a. Serve as the point of contact for all assigned Upper Stage test articles for Manufacturing and Assembly (M&A) to the Structures and Thermal (S&T), Logistics, and Quality groups.
b. Represent M&A to design and stress analysis teams to ensure the resulting design of assigned test articles can be manufactured in the most timely, cost-effective manner.
c. Understand the resource requirements, in terms of manpower and budget, necessary to manufacture and assemble the assigned test articles and to make recommendations to the Ares I US program to ensure that the proper resources are assigned.
d. Coordinate activities of component lead personnel and component vendors to ensure the necessary components are produced in the proper form and temper to match the test article drawing requirements and to ensure delivery of these components to meet the schedule requirements.
e. Coordinate, track, and update all aspects of the schedule for the manufacturing and assembly of these assigned test articles and ensure the Integrated Master Schedule accurately reflects that schedule.
f. Understand the material resource requirements necessary to produce the necessary components to build the assigned test articles and to make recommendations as to acquiring these material resources.
g. Coordinate acquisition of drawings from the design and stress analysis teams.
h. During the manufacturing process, coordinate the activities of the welding, corrosion protection, cleaning, non-destructive evaluation, and thermal protection groups in regards to these test articles.
i. Report the status of the manufacturing and assembly of these development test articles in all venues including Integrated Product Team, Control Board, Engineering Management, Sub Product Lead, and Integrated Test meetings.
j. As a Senior Materials Engineer, support the Upper Stage Ares I project in development of additional development projects including Integrated Stage Test Article, Ground vibration Test Article, and Flight Test articles.

3.0 Discussion of Skills Required

The (b)(4) position for Subelements-00, -02, -CA, -CD, -CE, -CG, -SB, -SI, -SM, and –ST requires minimum (b)(4) (b)(4) Skills should include expertise in processing, manufacturing, and refurbishment.

The (b)(4) position for Subelements-CA and -AC requires a minimum education of a (b)(4) (b)(4) Familiarity with software such as MS Visio and Sharepoint is desired.

(b)(4) . Requires a demonstrated ability to work with technical and non-technical personnel from diverse backgrounds and experience levels to plan, schedule, and manufacture aerospace ve-

hicles, develop materials and manufacturing processes within defined budgets and schedules, and to provide general manufacturing oversight to selected areas within the Ares I Upper Stage program. An in-depth understanding of large scale manufacturing, including friction stir welding and process development is required. In addition the task requires an in-depth knowledge of Microsoft Project and Power Point. A working knowledge of other manufacturing and inspection processes such as NDE techniques, cleaning, corrosion protection, assembly processes, Thermal Protection Systems, and design allowable statistics is also required.

The (b)(4) for Subelement-CA requires a (b)(4) (b)(4) (b)(4) Familiarity with software such as MS Excel and Project is desired.

(b)(4) An understanding of large scale manufacturing including bump forming, spin forming, stretch forming, and large scale machining is required. Requires good knowledge of aluminum alloys 2219 and 2195. Requires demonstrated leadership abilities and ability to bring together technical and non-technical personnel into a functioning group to produce and deliver a product within defined budgets and schedules.

4.0 Special Tools Required

Access to the Materials and Processes Technical Information System (MAPTIS-II) for Subelements-00, -02, -SB, -SI, -SM, and -ST.

5.0 Participating Subcontractors

None

6.0 Milestones & Deliverables

a. Evaluation of Engineering Change Packages, Materials and Processes Specifications/Standards, and MIULs and MUAs.
b. Generation of MIUL and MUA for MSFC in-house projects.
c. Submission of Monthly Reports
d. Submission of Bi-weekly Notes for significant activities

7.0 Special Considerations (Recruiting, Special Equipment / Material, Safety, etc.)

For Subelement-00, travel for three persons to participate in the face-to-face meeting at JSC to generate the draft of NASA-STD-6012.

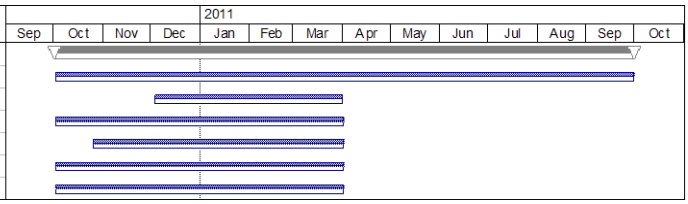
8.0 Work Shelf

The following activities could be accomplished as part of the Task Order performance by personnel that are temporarily available due to program or funding delays on other Tasks. Specific assignments will be coordinated with the Task Initiator to ensure appropriate skills and experience.

TO/Subelement	Description	Due Date	Skill

9.0 Schedule

Task Order #	Subelement	Task Work Element
34-000301	**00**	**Space Materials Selection Control and Evaluation**
34-000301	00	Materials Selection Control and Evaluation - General
34-000301	02	MAPTIS-II Development Support
34-000301	SB	Materials Selection Control and Evaluation - SRB
34-000301	SI	Materials Selection Control and Evaluation - PSE&I
34-000301	SM	Materials Selection Control and Evaluation - RSRM
34-000301	ST	Materials Selection Control and Evaluation - ET



ESTS Contract Task Order Request Performance Plan

Task Order Title: Space Materials Selection and Control Evaluation

Task Order Number: 34-000301 Revision: 16

Category	Weighting Technical %	End of Period Technical Score
Technical Objectives	65%	X 65% = **Justification**
Support will be provided to the Materials and Processes (M&P) Laboratory Materials Selection Control & Evaluation and Small Projects Branch. Activities will include the following: the generation, evaluation and/or assessment of materials and processes specification/ standards, control plans, engineering change proposals, and metallic and non-metallic specification/standards; support hardware manufacture, post-flight evaluations, Technical Interchange Meetings (TIM), design reviews, and MAPTIS-II Development Support; Materials Usage Agreement (MUA) and Materials Analysis and Evaluation Board (MAEB) review, and Data Requirement (DR) deliverables. These deliverables include, but are not limited to, Materials Identification and Usage Lists (MIUL) and MUAs which will require access to the Materials and Processes Technical Information System (MAPTIS-II) database. Technical support and working group meeting support will be provided for the development of a new NASA standard for corrosion control.		
Schedule Objectives (Milestones)	**Weighting Schedule %** 10% *(min 10%)*	**Schedule Score** X 10% = **Justification**

ESTS Contract Task Order Request Performance Plan

Task Order Title: Space Materials Selection and Control Evaluation

Task Order Number: 34-000301 Revision: 16

Evaluation of Engineering Change Packages, Materials and Processes Specifications/Standards, and MIULs and MUAs. Generation of MIUL and MUA for MSFC in-house projects. Submission of Monthly Activity Reports. Submission of Bi-weekly Notes for significant activities.		

Cost (actual vs. negotiated)

Weighting Cost%
25%
(min.25%)

Cost Score
X 25% =

Justification

Weighting Total %
100.00%

Total Score

Technical, Schedule, and Cost Grading Scale

Score	Description
9.0-10.0	Exceeded TO Performance Plan objectives resulting in major benefit(s)
8.0-8.9	Exceeded TO Performance Plan objectives resulting in modest benefit(s)
7.0-7.9	Met TO Performance Plan objectives
3.0-6.9	Did not meet all TO Performance Plan objectives resulting in minimal impact or requiring additional agency funds
0.0-2.9	Did not meet TO Performance Plan objectives resulting in substantial impact and/or requiring additional agency funds

ESTS Contract Task Order Request Performance Plan

Task Order Number: Space Materials Selection and Control Evaluation

Task Order Number: 34-000301 Revision: 16

Comments:

Marshall Space Flight Center
Engineering, Science & Technical Services

JACOBS ESTS Group

Risk Assessment

Contract Number: *NNM05AB50C*
TO Title: *Space Materials Selection and Control Evaluation*
TO Number: *34-000301* **Revision:** *16*

Period of Performance: *10/02/2010* to *09/30/2011*

MSFC Initiator: *Dennis Griffin*

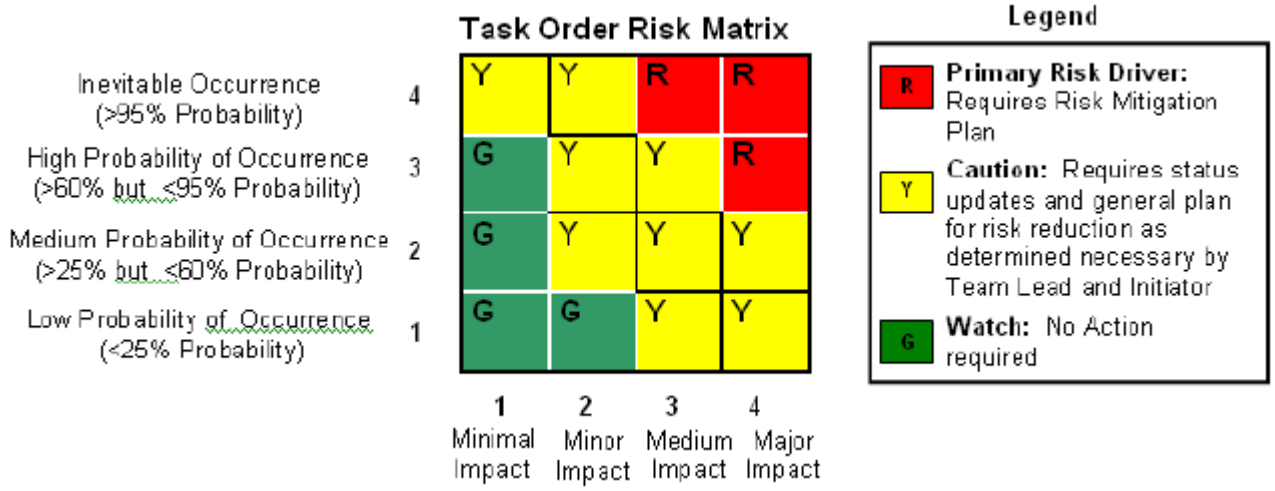
(b)(4)

Task Order Risk Assessment to Cost, Technical, and Schedule

List identified risk associated with Task Order performance as related to task cost, technical, and schedule. Classify the risk(s) according to probability of occurrence and impact as defined below and enter the risk into risk matrix.

Risk	Risk Type	Probability (1-4)	Impact (1-4)	Risk Description
Risk C1	Cost	1	2	Unable to complete task work with designated resources.
Risk C2	Cost			
Risk T1	Technical	1	2	Unable to resolve material application issue.
Risk T2	Technical			
Risk S1	Schedule	1	2	Unable to complete task work within required time.
Risk S2	Schedule			

*Note: See page 2 for risk mitigation plan for those risks which are Primary Risk Drivers.



Impact Level	Cost Impact Definition	Technical Impact Definition	Schedule Impact Definition
(1) Minimal Impact	No significant cost impact	No significant technical impact	No significant schedule impact
(2) Minor Impact	Potential to recover cost	Potential to gain required technology without impact	Minor delay in deliverables but no impact to customer
(3) Medium Impact	>0 but <10% subtask cost overrun	Some technical impact but potential to recover	Delay in subtask deliverables but work arounds available and acceptable to customer
(4) Major Impact	>10% subtask cost overrun	Unable to meet technical requirements to perform subtask	Delay in subtask deliverables with impact to customer

Risk Mitigation Plan

Complete the following chart for those risks identified on page 1 as “Primary Risk Drivers”. The following chart will serve as the Risk Mitigation Plan.

Risk No.: Risk Description:		
Mitigation Step No.	Planned Completion Date	Mitigation Step Description