



2020 HIGH RISK CORRECTIVE ACTION PLAN

In Response to Recent Programmatic Performance and
NASA's Designation on GAO's High Risk List

August 2020

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Purpose

This Corrective Action Plan (hereinafter referred to as the “Plan,” or the “CAP”) encompasses a collection of specific initiatives and areas of emphasis that the National Aeronautics and Space Administration (the “Agency,” or “NASA”) commits to pursuing as it matures Agency program and project management policies and processes, as well as related surveillance of contractors through appropriate insight and oversight. NASA developed this Plan in response to recent challenges in cost and schedule growth experienced by several of the Agency’s highest profile missions, as well as the continued inclusion of NASA’s acquisition practices in the Government Accountability Office’s (GAO) biennial High Risk Report. The Plan is also developed in support of the Agency’s steadfast commitment to good governance and effective stewardship of the resources entrusted to it. The overall goal of the Plan is to strengthen the Agency’s cutting-edge program and project management efforts across the board and to improve transparency for NASA’s stakeholders.

NASA Legacy of Programmatic Improvements

2007 Corrective Action Plan

NASA sees excellence in program and project management as a core capability and critical if the Agency is to successfully develop and operate technologies and systems for the human exploration of deep space; execute robust programs of robotic missions to monitor the Sun and Earth, explore the planets of our solar system, and observe the universe beyond; and continue to make aviation safer, more efficient, and more environmentally friendly. To that end, the Agency continually assesses how to manage projects and prepare people to lead. As a result, NASA’s project management and oversight practices have seen significant improvement since the Agency was first added to GAO’s High Risk List in 1990.

GAO originally designated NASA’s acquisition management as a “high risk” area in its inaugural High-Risk List released in 1990, citing what was at the time considered a history of persistent cost growth and schedule delays in the majority of the Agency’s major products. In 2007, NASA established a Corrective Action Plan consisting of five broad focus areas and seven tactical initiatives that provided an Agency-wide coordinated approach to improve NASA’s program and project management activities. The initiatives included in the 2007 Plan were all successfully closed by the end of 2012, and GAO has acknowledged that considerable progress toward strengthening and integrating NASA’s acquisition management functions resulted from those efforts. Both the 2015 and 2017 High Risk Reports credited NASA with fully meeting three of the five criteria for removal from the High Risk List (leadership commitment, action plan, and monitoring), as well as partially meeting the remaining two criteria (capacity and demonstrated progress).

A key milestone in the maturity of NASA’s programmatic discipline was the Corrective Action Plan developed in 2007. The 2007 plan contained seven initiatives to address potential shortcomings in NASA’s acquisition management practices. Those initiatives were: (1) Program/Project Requirements and Implementation Practices; (2) Agency Strategic Acquisition Approach; (3) Contractor Cost Performance Monitoring; (4) Project Management Training and Development; (5) Improve Life-Cycle Cost/Schedule Management Processes; (6) Integrated Enterprise Management Program (IEMP) Process Improvement; and, (7) Procurement Processes and Policies. Six of these seven initiatives were operationalized by 2012 through the introduction of new requirements, policies, procedures, training, and other tools to improve how we manage our major acquisitions and ensure our workforce has the

necessary associated tools. In 2014, NASA declared that the one outstanding initiative, Contractor Cost Performance Monitoring, was closed. This initiative was originally designed to improve the availability of contractor data to support performance monitoring of programs and projects. The initiative would have been accomplished through enhanced business systems and changes to the contractor cost reporting process. NASA performed analyses at that time to identify gaps in the existing key business systems and concepts and courses of action that could be implemented to address those gaps. As a result of this analysis, NASA and GAO agreed to replace the original objective, and instead instituted several process improvements designed to achieve greater insight into project performance, including contractor cost performance.

These operationalized initiatives have yielded the desired results for NASA's small and medium-class missions, though the Agency recognized that there was still work to be done. Specifically, that NASA needed to do better managing larger, more complex projects, which typically involve the development of a significant number of new technologies, greater risk, and early estimation challenges. The 2018 Corrective Action Plan described below was designed to build upon the successful legacy of its 2007 predecessor, ensuring that NASA continues to enhance its programmatic rigor while pushing forward with the activities that will be necessary to initiate a bold new era of discovery.

[2018 Corrective Action Plan](#)

In September 2018, Agency senior leadership determined that a new CAP was necessary to continue driving improvements in NASA's program and project management policies and processes. NASA's Associate Administrator (AA) and the Chief Financial Officer (CFO) jointly issued a memorandum to this effect on September 6, 2018, which can be found as an Appendix to the [2018 CAP](#). The memo required that a new Plan be in place by the end of the 2018 calendar year, and established a working group comprised of relevant experts from across the Agency to develop the initiatives. It also called for the creation of a Steering Committee to provide guidance to the working group at key milestones in the development process. Finally, top-level direction for the new Plan would reside with the NASA AA (in coordination with the CFO), with official approvals routed through the Agency Program Management Council (APMC).

The working group held a kick-off on September 19, 2018 and met or communicated daily throughout the development of the Plan. The working group considered a variety of inputs during the formulation of each of the individual initiatives that comprise the Plan. These inputs include, but are not limited to, previous GAO High Risk Reports, GAO's 2018 Priority Recommendations Letter, reports issued by GAO during its annual programmatic reviews of NASA's major projects, as well as internal analyses conducted by the Agency. Direction from NASA senior leadership, the advice of subject matter experts drawn from across NASA, and feedback from GAO were also considered. Agency-wide stakeholder review was conducted via the APMC community during November 2018, and the final document was approved at the December 6, 2018 APMC meeting.

The 2018 CAP represented an entirely new Plan identifying NASA leadership priorities aimed at improving the programmatic performance of NASA's acquisition management, recognizing that NASA was facing continued struggles in its management of large acquisition programs and opportunity existed to make improvements. The Plan was comprised of seven (7) initiatives to implement, one (1) initiative to pilot, and one (1) initiative to research:

- Initiatives to Implement
 - Enhance Earned Value Management (EVM) Implementation
 - Program Planning and Control (PP&C) Training Curriculum
 - Create Technology Readiness Assessment (TRA) Best Practices Document
 - Include Original Agency Baseline Commitment (ABC) for Performance-Driven Rebaselined Projects
 - Update Probabilistic Programmatic Policy
 - Enhance Annual Strategic Review Process
 - Improve Human Exploration and Operations Mission Directorate (HEOMD) Portfolio Insight and Status
- Initiative to Pilot
 - Create a Schedule Repository
- Initiative to Research
 - Enhance Implementation Indicators for Trends and Projections

The 2018 CAP also included three Areas of Emphasis around the subjects of improving governance of strategic acquisitions, improving risk assessment and concept definition in the early formulation phase, and contractually incentivizing high performance. Leadership wanted to emphasize adherence to current policies and practices in these areas to encourage improvements that better position the Agency to manage cost and schedule performance.

Significant progress was accomplished between the start of the 2018 CAP in December 2018, and the approved 2020 CAP in July 2020. Six initiatives were completed, one was closed and rewritten, and two remained in process at the end of the period. Enhancing EVM implementation and implementing the PP&C training curriculum were intended to be longer-term initiatives. The HEOMD initiative was rewritten, as described below, to better align the changes to GAO's associated priority recommendations, and to clarify tracking and closure requirements. The remaining initiatives all successfully completed their plans of action as outlined.

Approach

A CAP informational status briefing was presented to the APMC by the OCFO Strategic Investments Division (SID), where the progress of the 2018 CAP initiatives was reviewed in detail by Agency senior leadership. Out of that meeting, the NASA AA directed that the CAP working group be reconvened to explore and evaluate a list of new candidate initiatives for potential inclusion in a 2020 CAP update. The Program Management Improvement Accountability Act (PMIAA) NASA working group was identified to serve the function that the Steering Committee served in 2018. A tentative date of May 6, 2020 was set as the date for the CAP Update decisional APMC. In order to relieve pressure on the CAP working group team during the onset of full-time telework in spring 2020, the APMC decisional briefing was subsequently rescheduled to July 16, 2020.

Appendix A includes the 2020 CAP working group and PMIAA working group membership. Appendix B includes a table of acronyms used in this document.

Corrective Action Plan Overview

Ownership and Responsibilities

The NASA AA assumes ownership of the CAP. OCFO SID is responsible for maintaining CAP documentation, tracking and reporting progress against the CAP on an annual basis, and conducting any process updates for subsequent iterations on the CAP. Lead Executives or Lead Organizations as described in the various initiatives in the CAP are responsible for executing upon the initiatives as written, and reporting progress to either OCFO SID or other specific forums as described. The Supporting Organizations, where listed, will support the identified Lead Executives or Organizations in execution of the initiatives, as necessary.

Initiatives

The Corrective Action Plan is comprised of a set of initiatives evaluated by the working group and cross-Agency stakeholders to provide value for Agency acquisition management improvements. The initiatives are categorized by the following actionable characteristics:

- **Implement:** Initiatives that NASA has determined should proceed and become part of regular Agency business cadence. Any actions taken to support execution of the described initiatives will follow all established Agency control and oversight boards, as applicable, to ensure no unintended consequences are experienced.
- **Pilot:** Initiatives that NASA has determined show promise to provide value related to Agency acquisition management but will initially be executed to a limited degree in scope and time until the Agency assesses and reaffirms continued execution.
- **Research:** Initiatives that are less conceptually mature but warrant dedicated effort to explore and develop with respect to generating value for Agency acquisition management.

Each initiative in the CAP includes the following sections:

- **Lead Executive/Organization:** The individual or office responsible for leading the initiative as described, and periodically reporting progress to OCFO SID for internal and external communications and for coordination purposes.
- **Supporting Organization(s):** The organization(s) required to support the Lead Executive/Organization execute the initiative as described. While the organizations listed are necessary and required to support the initiative, the lists are not necessarily exhaustive, as the Lead Executive/Organization may call on other Organizations to support.
- **Initiative Description:** A brief high-level summary of the initiative.
- **Background/Current State:** A description of the status quo and, as necessary, an overview of relevant background information and any policies, procedures, constraints, or other areas influencing the status quo.
- **Expected Benefits:** A review of the expected payoff from conducting and completing the described initiative.
- **Recent Accomplishments:** Where applicable, a review of recent progress and accomplishments regarding the described initiative. Some initiatives already have momentum, which will be reflected here. Others, such as research initiatives for new ideas, will not have content for this section.
- **Planned Next Steps:** A high-level description of the planned progress for the initiative to occur over a period ranging up to two years.

- **Output and Outcome Metrics:** Where applicable, a list of appropriate methods of measurement to track progress and effectiveness of the described initiative.
- **Interdependencies:** Where applicable, a description of key dependencies that necessitate coordination or cognizance in support of initiative success.
- **Impediments and Challenges:** A brief description of possible pitfalls, risks, impediments, and challenges that can be reasonably expected to occur during execution of the described initiative.
- **Required Resources:** A preliminary assessment of possible resource requirements for successful execution of the described initiative. This does not represent committed resources and does not reflect a refined estimate of resources. Any funds required to execute any initiatives will proceed through the regular budget formulation processes for Agency approval.

Areas of Emphasis

NASA will emphasize adherence to current policies and practices in certain areas listed in this section and encourage improvements that better position the Agency to manage cost and schedule performance. In contrast to the initiatives in the CAP, Areas of Emphasis do not currently have direct, measurable plans of action for the purposes of the Corrective Action Plan, but nevertheless are deemed critical to improving Agency performance.

Severability

The initiatives contained herein are interrelated with respect to their connection to improving Agency acquisition management but are not mutually dependent on one another for execution purposes unless otherwise identified. As such, if the Agency should determine that any individual initiative be removed from the Corrective Action Plan for any reason, the Plan and remaining initiatives will remain in effect.

Progress Tracking and Reporting

Each initiative in the CAP includes planned next steps and metrics, where applicable. The Lead Organization(s) cited in the CAP will pursue actions as described. A subset of initiatives includes specific forums for reporting progress or deliverables (e.g., APMC or Business Performance Review (BPR)). For all efforts in the CAP, OCFO SID will conduct an annual checkpoint to measure progress against the CAP. For odd-numbered years, the progress checkpoint will occur in the summer months. For even-numbered years, the progress checkpoint will be folded into the CAP update (see below). OCFO SID will provide the overall progress and status update to the AA. OCFO SID will also share and discuss progress with GAO annually at a minimum, and more often when applicable.

Corrective Action Plan Update Schedule

NASA will keep this Corrective Action Plan current and up to date until GAO removes the High Risk designation for the Agency. The update process in which initiatives and/or Areas of Emphasis are added, revised, or resolved will occur in the approximate period of May to September of even-numbered years. This timeframe allows an informed GAO consideration of any changes made to the CAP and supports the GAO's timeline for preparation of the biennial publication of the High Risk Report (~January/February of odd-numbered years). The AA will retain the authority to make changes and revisions to the CAP at any time.

Initiatives to Implement

Enhance Earned Value Management Implementation

Lead Executive/Organization

Office of the Chief Financial Officer (OCFO)

Supporting Organization(s)

Mission Directorates; Centers; Programs and Projects

Initiative Description

NASA will improve and strengthen the Earned Value Management (EVM) discipline, and work to foster a culture at NASA where EVM is accepted by Programs and Projects and embraced by managers and employees.

Background/Current State

EVM is an integrated management control system for assessing, understanding, and quantifying what a contractor or field activity is achieving with program dollars. EVM is a discipline with established industry-adopted standards outlined in EIA-748 that integrates technical, cost, schedule, and risk management. It requires an established performance measurement baseline (PMB) which allows for objective assessment and quantification of current project performance as well as helps to predict future performance based on trends. EVM provides project management with objective, accurate, and timely data for effective decision-making.

EVM system compliance and use is required on all acquisitions for development designated as major in accordance with the Office of Management and Budget (OMB) Circular A-11 and the Capital Programming Guide. At NASA, EVM is required for development or production contracts and subcontracts (including those for flight systems, ground systems, and institutional requirements (facility, information technology, investment, etc.)) valued at or greater than \$20 million. EVM is required on NASA spaceflight projects with a lifecycle cost (LCC) of \$250 million or greater. Science Mission Directorate (SMD) Mission Risk Class-D space flight projects and contracts with a LCC of up to \$150 million (not including launch costs) have an approved deviation from the EVM requirements of NASA FAR Supplement (NFS) 1834.201. Class-D missions with a LCC of up to \$150 million (not including launch costs) should use the processes per the SMD Class-D Tailoring/Streamlining Policy. The Aeronautics Research Mission Directorate (ARMD) has also recently tailored governance to require EVM on large crewed flight projects.

EVM reporting begins no later than 60 days post Key Decision Point-C (KDP-C). The primary consideration for EVM applicability is the nature of the work, associated risks, and the value of the effort. EVM is not recommended on Firm Fixed Price contracts or contracts that are exclusively Level of Effort (LOE).

Expected Benefits of Implementation

Improved EVM will:

- Encourage rigorous upfront planning to establish a performance measurement baseline to assess NASA projects performance for cost, schedule and Estimate at Completions (EACs).
- Provide project managers with objective, accurate, and timely data for effective decision-making.
- Help the Agency progress toward removal from the GAO's High Risk List by enabling NASA programs and projects to identify and address issues and take corrective actions.

- Enable a central repository that provides relevant historical data for NASA to develop better cost and schedule estimates for NASA's future programs and projects.

Recent Accomplishments

While areas for improvement still exist, the Agency has taken concrete steps to advance the EVM capability, including:

- All applicable projects submitting EVM data to the EVM central repository. Developed and distributed an Earned Value Management System (EVMS) surveillance guide and project selection matrix for Centers for implementation beginning third quarter FY20.
- EVM metrics continue to be reported at the BPR. Data from the EVM Central Repository supplies metrics for the OCFO Strategic Investments Division (SID) dashboard chart in support of the BPRs.
- Implemented routine EVM surveillance at the Applied Physics Laboratory (APL), Jet Propulsion Laboratory (JPL), and the Southwest Research Institute (SwRI).
- Surveillance Sub-team developed including APL, JPL, SwRI, Defense Contract Management Agency (DCMA), and in-house programs to discuss the DCMA EVMS Compliance Metric (DECM) test metrics and use to foster better communication and understanding of the surveillance initiative.

Planned Next Steps

Mission Directorates (MD) and Centers will provide points of contact to work with the Agency EVM Steering Committee to jointly review and assign the following next steps and considerations:

- Schedule a meeting with the EVM Steering Committee to get agreement on funding and identify potential projects for rollout of the EVM Capability.
- Continue to work with OCFO/SID, MDs, and projects to refine the EVM reporting metrics at the Baseline Performance Review (BPR).
- Begin joint Agency-level EVMS surveillance on Centers.
- Continue to work with suppliers to implement and refine EVMS surveillance.
- Continue to work with projects to get their EVM reports into the Central Repository. Work with JPL to get EVM data in a format readable by the Agency's EVM analysis tool, Empower, and to revise contract language and ensure Empower data is submitted for future applicable task orders.

Output and Outcome Metrics

- All applicable contracts use DCMA for contract EVMS surveillance or an equally effective method as outlined in the project plan that is consistent with the agency overall surveillance approach.
- All issues identified in the EVM Assessment have been satisfactorily dispositioned with corrective action plans within a reasonable time of identification.
- A reduction of EVMS data integrity issues identified by GAO.
- EVM capability is rolled out to all NASA Centers with EVM requirements.
- Status meetings (e.g., BPR) include EVM data where applicable.

Interdependencies

The success of EVM implementation is predicated upon successful adoption and execution by all affected projects, programs, and mission directorates. It is also critical that NASA senior leadership emphasize the need for EVM performance data and act upon the data when anomalies are identified.

Impediments & Challenges

- Resistance and pushback from MDs, Centers, and projects is ongoing.
- Funding and resources for additional work scope. Sufficient funding approved by the EVM Steering Committee has not been received to fully implement the initiative.
- OCFO share of the additional funding submitted as an over guide. No decision yet on the additional funding for FY19 and beyond.
- In-house EVM was waived on Low Boom Flight Demonstrator (LBFD) and therefore EVM Capability rollout still has not occurred.

Required Resources

Demands on the EVM staff within OCFO and at the Centers indicate that the Agency has been under-resourced and under-staffed in recent years for EVM implementation and surveillance. To implement the steps in this plan, additional resources will be required depending on the Agency's final strategy. If the full EVM surveillance is assumed by the Agency for both total project (in-house) and contracts, it is estimated that an additional 10 full-time equivalents (FTE)/work-year equivalents (WYE) would be required. If the Agency continues to utilize DCMA for contracts and focuses more on project (in-house) surveillance and increasing EVM analysis at the project level, then approximately three additional FTE/WYEs would be required. Finally, to conduct EVM surveillance at contractor specific institutions (such as the JPL, the APL, and the SwRI), to continue to conduct EVM assessment in their current state, and to use DCMA for contracts, then approximately five additional FTE/WYEs would be required. The CAP Working Group (CAPWG) recommends that the level of adequacy for EVM resources be assessed during the next logical Planning, Programming, Budgeting, and Execution (PPBE) budget formulation process and that the results of that assessment be reflected in the budget.

NOTE: If the agency were to choose not to use DCMA for EVM surveillance on contracts, the risk would be that the current memorandum of understanding (MOU) for surveillance could be rescinded by DCMA. This could reduce the likelihood of DCMA conducting these types of reviews in the future because they could adjust their workforce based on the reduced scope of work with NASA. Finally, DCMA has a stronger presence in the industrial base because the Department of Defense's budget is much larger than NASA's and DCMA EVMS surveillance findings carry more influence with the industrial base than findings by civil agencies carry.

Notional resource levels (to be reviewed in established NASA budget formulation process):

NASA does all of EVMS surveillance including all contracts	NASA does EVMS surveillance on total project (in-house) and JPL, APL, SwRI, etc.	Current State, plus additional support to implement CAP plan
+~10 FTE/WYEs	+~5 FTE/WYEs	+~3 FTE/WYEs

Implement Programmatic (PP&C) Training Curriculum

Lead Executive/Organization

Office of the Chief Financial Officer, Strategic Investments Division (OCFO SID)

Supporting Organization(s)

The training lead coordinates with subject matter experts (SMEs) from Agency Centers and from each programmatic function to ensure that all NASA best practices and processes are reflected in the skillsets captured in the competency model matrices.

Initiative Description

The purpose of the Programmatic Training Curriculum is to help bridge the gap between the current-state workforce and future-state workforce of highly trained analysts. Establishing a training curriculum where courses are reflective of the Agency's best practices and methods is necessary to grow and strengthen the Agency's programmatic capabilities.

Background/Current State

The Budget and Management Business Services Assessment (BSA) core team conducted a study to evaluate the health of the Agency's PP&C functions, specifically Integration, Resource Management, Schedule Management, and Cost Estimation and Assessment (CE&A). The outcome of this study revealed that, within the PP&C (herein referred to as *Programmatic*) workforce, there is an inadequate number of advanced, proficient analysts. In addition, there are limited resources describing how a programmatic analyst develops into a programmatic SME.

Expected Benefits of Implementation

The approach to address the concern for the low number of advanced-level programmatic analysts is two-fold: to refine the Agency hiring process to recruit ideal candidates, and to establish a Programmatic Career Development and Progression Framework to provide training and guidance to those candidates and other programmatic employees. The hiring and interview processes should be strategic to attract candidates who possess an inherent analytical and technical aptitude to support programmatic work. The Programmatic Career Development and Progression Framework will offer a roadmap of how to enhance or develop programmatic skills. It will include tiered competency matrices of entry-level to advanced-level programmatic analysts that is reinforced with a common, centralized Programmatic Training Curriculum. The establishment of the Programmatic Training Curriculum will increase the Agency's programmatic proficiency level and encourage adherence to Agency best practices and processes. This will also promote the consistent application of analytical methods and techniques, which will produce more coherent, reliable work products. Although a robust training program lays a foundation for acquiring certain programmatic skills, it is important to note that on-the-job experiences and mentoring is also needed to develop programmatic SMEs. Taking concepts learned in formalized classroom settings and applying them in day-to-day job functions will enable an analyst to grow in their discipline, strengthen any weak programmatic areas, and continue their progression to an advanced-level programmatic analyst.

Recent Accomplishments

- Drafted course materials for several schedule and cost-related courses. The majority of courses are modules in development and are undergoing iterative, internal peer reviews.

- Met with the Agency’s Chief Financial Officer University (CFOU) lead, routinely, to ensure that the programmatic training material is embedded within their website and curriculum.
- Ensured PP&C competency models are reflected in training objectives and supported in Agency-related guidance documents.

Planned Next Steps

The planned next steps are to:

- Meet routinely with several course development teams to track execution of plans and progress.
- Target to have one new course completed and ready for deployment by end of 2020.

Output and Outcome Metrics

- A percent increase on the number of proficient analysts within the Agency. Similar to the BSA study, assess the proficiency levels of the Programmatic community within a year of course deployment.
- Common Competency Models exist for each PP&C discipline and are used toward Career Planning and 100% of programmatic job announcements reflect competencies listed within models.
 - Supervisors and hiring officials refer to competency models to assess the proficiency levels of programmatic analysts and to gauge their ability to support advanced programmatic analysis.
- Development and deployment of training courses.
 - Courses are being developed according to the planned timeline. 100% of plan deviations are documented and communicated to the Programmatic Portfolio lead.
 - Each PP&C professional has taken at least one programmatic course from the curriculum and/or have identified courses within the Individual Development Plan (IDP). Supervisors reinforce the training needs at mid-year and annual performance discussions.
 - New hires and early career programmatic professionals have taken at least two courses within one year of activity within the PP&C community.

Interdependencies

An interdependency exists with the GAO Corrective Action Plan initiative for Agency efforts that involve updating programmatic guidance documents and handbooks (e.g., Schedule Management Handbook, Earned Value Management (EVM) handbook, Cost Estimating Handbook, Risk Management Handbook). The guidance and requirements outlined in related programmatic material will be reinforced within the training courses.

There are similar training initiatives that exist within the Agency that are interdependent with the Programmatic Training Curriculum efforts. NASA’s CFOU has an established curriculum that caters to the job functions related to the finance and resource management domains as well as the management of risk used for programmatic and institutional decision-making. Some of these courses can be expanded or amended to include the proper programmatic context to ensure that concepts are properly reflected in related training material. Additionally, OCFO’s Professional Development Framework (PDF) has created a career path website that enables employees to view the competency matrices of OCFO job functions. The competency levels of the Programmatic functions can also be added to this website so

that information is provided uniformly and consistent to other related technical and programmatic fields.

Impediments & Challenges

The challenges associated with this effort are:

- Operating without a budget to develop and deploy courses. Without dedicated resources, it is difficult to ensure that conducting training related activities are a priority for team members.
- Finding optimal times to meet with development teams, due to team member's conflicting schedules. If a team meeting is re-scheduled, action items are still tracked so progress is not hindered.

Required Resources

The resources required to execute the establishment of the Programmatic Training Curriculum include a group of dedicated SMEs that are given the time to develop courses and teach the material. The intent is not to solicit assistance from outside the Agency, but to use programmatic SMEs who are familiar with NASA's best practices and processes. However, full-time dedication is not the requirement; depending how often a course is taught, an instructor will need a budget to develop course material, prepare for a class, travel to the class site (if applicable), and teach the course. Portions of the budget will also help ensure that there is a central repository where all related materials of the Programmatic Training Curriculum can reside.

Increase Deep Space Exploration Systems' Transparency of Cost and Schedule

Lead Executive/Organization

Human Exploration and Operations Mission Directorate (HEOMD)

Supporting Organization(s)

ESD/AES (including EGS/Orion/SLS/HLS/Gateway programs); OCFO SID; OCE; HEOMD RMO

Initiative Description

NASA will improve the Human Exploration and Operations Mission Directorate's (HEOMD) Deep Space Exploration Systems' transparency of cost and schedule for long term plans for human exploration. By making Agency Baseline Commitments for future capability upgrades, reporting through the annual budget process, and reporting performance against year-to-year operating plans, the data will exist to monitor risk and schedule, assess long-term affordability, and enable Congress to make informed budgetary decisions. This initiative will address multiple long-standing open GAO recommendations.

Background/Current State

In the 2018 Corrective Action Plan, NASA established an initiative to improve the overall internal portfolio analysis and planning of the Human Exploration and Operations Mission Directorate (HEOMD). The 2018 HEOMD initiative (now retired) was instrumental in comprehensively synthesizing exploration planning to allow for cross-portfolio strategic assessments within the HEOMD. This 2020 initiative builds upon the previous initiative and specifically addresses the need for increased transparency of cost and schedule for Deep Space Exploration Systems.

HEOMD's Deep Space Exploration Systems feature multi-decadal programs with the goal of returning humans to the Moon and beyond to deep space, comprised of the Exploration Systems Development (ESD) and Advanced Exploration Systems (AES) enterprise-level organizational structures. ESD is responsible for programmatic and technical integration of the Space Launch System (SLS), Orion, and Exploration Ground Systems (EGS) programs. AES is responsible for similar integration of the Human Landing System (HLS) and Gateway programs. The Deep Space Exploration Systems programs are in different life cycle phases for the Artemis missions, with many programs executing multiple life cycles concurrently. In terms of the HLS and Gateway programs, these are currently in the Formulation phase and will make future commitments, as discussed in following sections. The ESD Programs are focusing on the Artemis I launch in 2021 and planning for subsequent missions, including the 2024 crewed lunar landing mission. The ESD Programs are also in the design cycle for SLS Block 1B capability upgrades, including Exploration Upper Stage (EUS) and Mobile Launcher 2 (ML-2).

Since the last Corrective Action Plan, multiple contracts have been awarded within ESD and AES that incorporate better insight into and tracking of contractor performance. NASA has also since implemented the 2018 'Enhance Earned Value Management Implementation' CAP initiative to monitor the progress of contracts and report Earned Value (EV) metrics to the Agency on a quarterly basis.

Additionally, the Agency has recently completed several assessments related to the Artemis I and II launch dates. NASA has conducted an internal HEOMD assessment of the overall Artemis effort, of which SLS and EGS are key components. This assessment included a review of the schedule and technical approaches as well as systems engineering integration and program management. In parallel, NASA has performed an independent technical and programmatic assessment, including a joint cost and

schedule confidence level analysis of the SLS and EGS programs to rebaseline per Agency policy. The results of these assessments have informed updates to the Artemis I and II launch planning dates.

Note that this initiative was written during the COVID-19 pandemic and does not include impacts to overall program planning and execution that may result from the pandemic.

Expected Benefits of Implementation

The initiative is expected to increase the overall transparency of cost and schedule for Deep Space Exploration Systems, resulting in:

- Improved cost and schedule performance across ESD/AES programs within Artemis.
- Increased trust and transparency by demonstrating ability to execute to plans and report to external stakeholders.
- Improved clarity of HEOMD major program expenditures for NASA's planning and execution.

Recent Accomplishments

- The Deep Space Exploration Systems enterprises have recently enhanced reporting in areas such as:
 - Improved ESD Quarterly Program Status and Agency Baseline Performance Reviews (BPRs) with a focus on performance-to-plan schedule metrics and schedule risk identification.
 - Enhanced Earned Value Management implementation and reporting (completed 2018 CAP Initiative); ESD now reports EV metrics to the Agency on a quarterly basis.
- ESD and AES have recently compiled their Procurement Planning Landscapes across the enterprises that couple upcoming and projected contract and procurement milestones with contract status.
 - Recent major ESD contract accomplishments include improved contract structures to aid in tracking performance by mission for Orion and SLS and enable separate tracking of total development cost for Mobile Launcher-2:
 - Mobile Launcher-2 Design-Build Award (June 2019)
 - Orion Production and Operations Contract Award (September 2019)
 - Stages Production and Engineering (CS 3 – 12 and EUS 2 – 9) Letter Contract (October 2019)
 - Recent major HLS/Gateway contract accomplishments include:
 - Gateway Power Propulsion Element Contract Award (May 2019)
 - Gateway Logistics Module Award (March 2020)
 - Human Landing System Award of three contracts (April 2020)
 - Gateway Habitation and Logistics Outpost (HALO) Formulation Phase Contract Definitized (June 2020)
- ESD is implementing NASA/GAO contract management best practices, including monthly and quarterly reporting of EVM data to the Agency, structured approach to reduced cost, incentives in contracts, and evolving to firm fixed price contracts when production has matured. ESD has:
 - Separated out contract line item numbers (CLINs) to allow for better tracking of cost on all new contracts and during contract actions
 - Shortened period of Fee Determination to 6 months
 - Included technical monitor information in fee evaluation
 - Coordinated fee determination at the Agency level
 - Updated contract areas of emphasis based in part on previous period of evaluation

- Incorporated incentive fee into contracts
- NASA leadership rebaselined the EGS and SLS Programs, establishing new Agency Baseline Commitments for the EGS and SLS programs and an updated Artemis I launch readiness date to appropriately account for Artemis I costs (Orion’s Agency Baseline Commitment is to Artemis II, so they were not rebaselined as part of this activity).
 - A joint cost and schedule confidence level analysis was performed for EGS and SLS as part of the rebaselining activity

Planned Next Steps

- Continue to refine reporting processes.
 - ESD will utilize production contract cost data and annual planning process to establish plans and monitor cost performance relative to the baseline manifest plans
- Further refine Procurement Planning Landscape products. Major upcoming procurement activities include:
 - Stages Production and Engineering Contract (SPEC) Award (CS 3 – 12 and EUS 2 – 9) (Targeted Award Date Q1 FY21)
 - Core Stage Engine – RS-25 Production Restart CLIN 4 - (Labor & Materials) (Targeted Award Date Q3 FY20)
 - Boosters Production and Operations Contract Award (Flights 4 – 9) (Targeted Award Date Q1 FY2021)
 - Orion Main Engine Award (Required for Flight 6 of Orion and beyond) (Targeted Award Date Q1 FY21)
 - Human Landing System Down-select planned for CY21
 - Gateway xEVA Project (including Suits, Vehicle Interface Equipment and Geology Tools) Contract Award (Targeted Award Date CY21)
- Establish future commitments.
 - Agency Baseline Commitments (including Joint Confidence Level analysis) for SLS, EGS and Orion programs’ major capability upgrades over \$250M (SLS Block 1B, EGS ML-2, and Orion docking). Timing of commitments is dependent upon Block 1B configuration and manifest.
 - ML-2 Agency Baseline Commitment will follow SLS Block 1B requirements definition
- Evaluate changes to NASA’s programmatic policies and existing performance reporting to improve transparency of program schedules, costs, and performance for multi-year, multi-cadence type programs.
 - Develop methods to track and report annual costs and cost variances to operating plans due to content or scope changes, which can be traced year-to-year.
- Prepare for upcoming Key Decision Points (KDPs).
 - KDP D for Orion to update Artemis II cost and schedule estimates
 - Orion KDP D will follow NASA’s updated Joint Confidence Level (JCL) Policy outlined in 7120.5E as a result of 2018 CAP Initiative implementation.
- The Gateway program will complete a Program Commitment Agreement (PCA), with cost and schedule estimates, to be formalized at KDP-1. Each Gateway project will develop a Joint Confidence Level analysis to inform an Agency Baseline Commitment at the Project level.
- HLS will develop a Joint Confidence Level analysis and Agency Baseline Commitment. HLS will further conduct Annual Program Status Life Cycle Reviews assessing adequacy of cost, schedule, technical maturity, and integration.

Output and Outcome Metrics

- Schedule performance-to-plan metrics for ESD programs reported through Quarterly Program Status Reviews and provided to GAO.
- Future reporting against ESD's original Agency Baseline Commitment for Artemis I through Agency reviews and quarterly Office of Management and Budget (OMB) reports.
- Measure against future commitments for ESD capability upgrades above \$250M.
- The HLS/Gateway programs and projects will measure against future commitments once established.

Interdependencies

- HEOMD internal interdependencies between Program Planning & Control managers, HEOMD Resource Management Office, and HEOMD leadership team.
- Continued insight to NASA leadership through Baseline Performance Reviews, Agency Program Management Councils, and recurring communications with the GAO.
- Coordination with Office of the Chief Financial Officer Strategic Investments Division and Office of the Chief Engineer for oversight and analysis.

Impediments & Challenges

- The Agency is challenged in its ability to establish and track baseline costs and schedules given the uncertainty that arises from differing priorities of the Administration and Congress. Differing priorities may result in content changes, which will affect the program baselines.
- The current contract structures in place for ESD have proven difficult to track overall performance by individual missions. However, ESD is addressing these challenges by restructuring existing and future contracts.
- The structuring of firm-fixed-price contracts for Gateway and HLS may lend itself to limited contractor performance insight due to less defined reporting requirements. To address this challenge, the Gateway and HLS programs are partnering with the contractors to ensure the proper deliverables to adequately track performance. In addition, the use of Public Private Partnerships will limit the level of insight into cost and schedule.

Required Resources

- Resource impacts may be realized if NASA Procedural Requirement (NPR) 7120.5E updates or other Agency reporting add additional requirements that programs have not previously planned for (e.g., increased leading indicators, external commitments or performance metrics).

Implement CADRe Enhancements for Category III/Class D Missions

Lead Executive/Organization

Office of the Chief Financial Officer (OCFO)

Supporting Organization(s)

Science Mission Directorate (SMD); OCFO Strategic Investment Division (SID); Office of Chief Engineer (OCE)

Initiative Description

NASA will enhance its Cost Analysis Data Requirement (CADRe) capability by implementing enhancements that will continue NASA's commitment to collect robust technical and programmatic data for smaller Category 3 (Cat III)/Class D missions by expanding its data collection efforts to all NASA space flight projects¹ above a \$50M dollar LCC threshold. CADRe product expectations and cadence would be consistent to current language documented in NASA Procedural Requirement (NPR) 7120.5E and the NASA Cost Estimating Handbook. This initiative addresses GAO's desire to continue CADRe as a meaningful document to underpin cost and schedule capabilities at NASA.

Background

The CADRe initiative began in 2005 as part of a NASA's effort to increase its ability to estimate cost and schedule of its missions and archive programmatic, technical, cost information. Shortly after GAO issued a report in May 2004 (GAO Report #GAO-04-642) stating that NASA "Lacked Discipline in its Cost Estimating Process," NASA implemented sweeping changes. These included establishing a standard Life Cycle Cost Estimate (LCCE) framework to include full life cycle cost analysis using a standard Work Breakdown Structure (WBS). A key part of the NASA changes was the creation and implementation of the CADRe, which was codified in 7120 shortly afterwards. Since then, NASA has made significant strides to continually improve CADRe as a key enabler of data driven cost and schedule capabilities.

The unique capability of CADRe is to provide a significant amount of project information in a quick "easy to retrieve" format. The CADRe also tracks and explains changes that occurred from one milestone to the next, helping the Agency record in a single document events that occurred during the project. All NASA Centers use CADRe in some capacity to enable a wide array of analysis capabilities. Some of the uses include but not limited to the following:

- Enable analogy estimating using similar projects already completed.
- Announcement of Opportunity (AO) Evaluations by the Science Office for Mission Assessments (SOMA).
- Cost studies (Insight articles) and analysis of projects, including trend analysis, milestone to milestone cost growth over time, etc.
- Portfolio analysis, modeling and assessment.
- Risk input data to help inform Joint Cost and Schedule Confidence Level (JCL) analysis.
- Support proposal development.
- Cost model development including the Project Cost Estimating Capability (PCEC) model.
- Historical cost research and special studies.
- Cost engineering trades.

¹ Flight projects are defined as projects governed by NASA Procedural Requirements 7120.5E: NASA Space Flight Program and Project Management Requirements w/Changes

- Cost/Schedule improvement, policy Improvement, JCL Improvement.

The CADRe is NASA's unique response to the need to improve cost estimates during formulation process and provide the necessary data to enable NASA to be a "smart buyer." CADRe is a vital component for NASA to develop its early cost and schedule estimates for new NASA projects. It is needed to provide a common description of a project at a point in time when information is needed to support various cost and schedule analysis activities. Additionally, it provides valuable information for procurement of hardware and services with partners.

CADRe's combination of programmatic and technical data allows NASA to build NASA specific cost models calibrated to NASA projects. In addition, the temporal aspect of data collection at each major milestone, allows for conducting studies of how technical and programmatic changes occur during the development of a project. As NASA produces more realistic cost estimates, more realism is inserted into the budgetary process and enables Congress to make informed budgetary decisions based on historical data, trends, and patterns.

Current State

CADRe is a requirement to the projects as described in NPR 7120.5E. However, in 2014 a policy change was implemented for Category 3 Class D missions with a life cycle cost under \$150 million, changing the CADRe requirement from a "shall" to a "should." This has caused unnecessary confusion and, in some cases, has halted the preparation of CADRes for these missions, limiting the ability to use historical data for cost and schedule purposes. All CADRes are funded by the NASA OCFO and provide minimal burden to projects.

Expected Benefits of Implementation

The initiative is expected to increase clarity and reduce confusion regarding the development of CADRe for Category 3 Class D missions by aiming to:

- Significantly increase the available information on smaller missions with a development cost greater than a recommended threshold of \$50M. This will enable NASA to better estimate projects within the Cat III/Class D missions. Enhancing the CADRe requirement for Cat III/Class D projects will contribute to NASA's on-going efforts to improve programmatic performance, and continue to enable NASA to be a "smart buyer" of hardware and services.

Recent Accomplishments

The OCFO/SID has worked on an individual basis with several Project Managers (PMs) of these smaller missions by:

- Helping to prevent the unnecessary waiving of the CADRe requirement for these important missions.
- Regularly engaging with concerned project managers and showing them the analytical value that CADRe provides for future projects.
- Demonstrating the CADRe requirement is not overly burdensome on a project since OCFO/SID provides the necessary resources to enable this capability.

Planned Next Steps

- Clarify policy as part of the NPR 7120.5F revision efforts.
- Begin working with upcoming Cat III/Class D projects that are between \$50 and \$150 million nearing milestone review and explain all the realized benefits of CADRe over the last decade.

- Expand existing training on the access and use of CADRe data to build consensus among current and future Cat III/Class D missions PMs.
- Develop methods to track and report compliance to CADRe initiative especially with regards to Cat III/ Class D missions affected. This effort will be an extension to existing tracking and reporting processes.

Output and Outcome Metrics

- Additional CADRes for projects between \$50 and \$150 million dollars. CADRe's information will help inform NASA future endeavors and assist in controlling costs.

Interdependencies

- SMD internal interdependencies between project and OCFO/SID.
- Coordination among OCFO SID and PMs for milestone reviews which include System Requirements Review (SRR), Preliminary Design Review (PDR), Critical Design Review (CDR), and System Integration Review (SIR).

Impediments & Challenges

- Communicating Agency expectations: after the 2014 policy change, some Centers and Federally Funded Research Development Centers (FFRDC) began aggressively waiving the CADRe requirement for Cat III/Class D missions. This initiative will mitigate that issue, however, communicating direction will be primary challenge.

Required Resources

- Estimated yearly resources to support this CAP: \$80K funded within OCFO/SID.

Create a Schedule Repository

Lead Executive/Organization

Office of the Chief Financial Officer, Strategic Investments Division (OCFO SID) and Agency Programmatic Analysis and Research Capability (APARC) will lead the Schedule Repository effort with direct support of the Agency's Program Planning and Control (PP&C) Portfolio Lead and the PP&C Steering Group.

Supporting Organization(s)

OCFO SID/APARC will coordinate with Center points of contact (primarily the Schedule Community of Practice (SCoPe) POCs), and individual programs and projects on the collection of schedule data to support the Schedule Repository effort.

Initiative Description

Move NASA's current Schedule Repository Pilot to implementation.

A Schedule Repository is a collection of program and project (P/p) schedules for completed and current missions and technology developments. Schedule information is organized and archived in a searchable library. The purpose of the Schedule Repository is to:

- Provide the schedule management community with access to historical and analogous schedules to aid in the planning and development of schedules for future missions.
- Allow for the continuous improvement of schedule management guidance and best practices.

The schedule data collection cadence for the Schedule Repository will be determined by the PP&C Steering Group, which is represented by the Centers and Mission Directorates (MD).

Background/Current State

At the December 2018 Agency Program Management Council (APMC), NASA senior leadership approved a collection of specific initiatives and areas of emphasis to strength the Agency's cutting-edge program and project management efforts across the board and improve transparency for NASA's stakeholders. These initiatives and areas of emphasis were documented in [the Agency's 2018 Corrective Action Plan](#). One aspect of the CAP focused on the implementation of a pilot initiative to develop a repository of schedules and schedule data from NASA projects.

In June 2019, the NASA Chief Financial Officer (CFO) released a memo codifying the Agency's approach to creating a Schedule Repository as a pilot initiative. This initiative required the following:

- Submission of Program/project Integrated Master Schedules (IMS) in native scheduling tool formats, including a fully integrated IMS or summary IMS with lower-level detailed schedules beginning July 1, 2019.
 - All NASA Procedural Requirement (NPR) 7120.5E projects and single-project programs over Life Cycle Cost (LCC) of \$50 Million shall submit quarterly.
 - All NPR 7120.8 projects over LCC of \$50 Million shall submit quarterly.
 - All projects below the \$50 Million threshold are not required to submit.
- IMS submissions are required starting after completion of System Requirements Review (SRR) through completion of Launch Readiness Review (LRD).
 - For two-step Announcement of Opportunity (AO) process, where down-selection serves as KDP-B, schedules are required after down-selection. For NPR 7120.8 projects with no

SRR or LRD, schedule submissions are required starting after Project Approval for Implementation.

- NASA HQ CFO will provide resources for data archiving. Data access control will be conducted by NASA HQ CFO. Data will not be broadly accessible without project permission before LRD. After LRD, schedule data will be made available to larger NASA scheduling community.
- All schedule submissions will be collected by emailing schedule native files. The SCoPe Lead will transfer data to the Schedule Repository location as collected.

NASA has been actively collecting data since July 2019, per memo guidance, with minimal impact to programs and projects.

Expected Benefits of Implementation

A Schedule Repository will provide a centralized source for quick and convenient access to schedule data (integrated master schedules, as well as supporting schedules and data) from which schedulers and analysts will be able to research analogous missions and use them as a basis for developing program or project schedules. A Schedule Repository will also allow the Agency to fine-tune best practice guidance for schedule planning, development, assessment, analysis, maintenance, and control. Looking across P/p schedules can inform the Agency regarding how well schedule management best practices are implemented, which in turn can lead to improvements in schedule guidance and training. In addition, having a routine collection of schedules will aid the Agency in understanding how and at what point in project lifecycle schedules typically experience issues. The trending of performance-based indices across a repository of programs and projects can help uncover the critical points in P/p lifecycles when schedule performance issues are more likely to arise. This can also facilitate continuous improvement in guidance and training.

Recent Accomplishments

- In June 2019, the NASA Chief Financial Officer released a memo codifying the Agency's approach to creating a Schedule Repository as a pilot initiative.
- The SCoPe Lead has coordinated with NASA Centers and the Jet Propulsion Laboratory (JPL) to determine the programs and projects that meet requirements for quarterly schedule submissions.
- Three quarterly schedule submissions have been completed by the identified programs and projects.

Planned Next Steps

- Codify Schedule Repository requirements into a NASA Procedural Requirements document.
- Streamline schedule submission/file collection process.
 - Utilize one interface for schedule submissions.
 - Perform data quality check to provide feedback to submitters on schedule adherence to best practices.
 - Document reporting compliance.

Output and Outcome Metrics

The Schedule Repository will consist of past and current schedules (as of the most recent key decision milestone) from each Center collected in a centralized repository. Repository will enable Agency to have the capability to analyze data collected, tag data appropriately, (e.g., by work breakdown structure,

subsystem type, and/or responsible organization) to enable various categorizations as appropriate for Agency analysis and use.

Impediments & Challenges

There are several challenges to implementing a data collection activity to produce a consolidated Schedule Repository:

- Establishing an Agency Framework: to be supportive of all stakeholders from practitioners to decision makers.
 - Different schedule file formats (e.g., Primavera versus Microsoft Project files)
 - Schedules may be at different levels of detail for different programs and projects
 - Schedules may be at different levels of integration for different programs and projects (e.g., giver/receiver relationships versus all work captured in one IMS)
- Governance: Forcing mechanism (requirements/guidance).
 - Not “adding” product requirements
 - Not “dictating” schedule processes beyond what is already in policy and guidance
 - Guidance on the way the IMS should be set up to facilitate these uploads (e.g., necessary fields, preventing the deletion of tasks once they are complete, putting in the actual achieved duration at completion, use of Microsoft Project or compatible format, etc.)

Required Resources

Pilot of Schedule Repository was conducted with no additional resources. Now that: 1) Schedule Repository requirements have been communicated to all Centers and Mission Directorates (MDs) and a list of Programs/projects meeting the requirement have been identified, 2) nuances to the schedule collection effort across Centers (including JPL) have been identified and workarounds explored, and 3) the Schedule Repository has moved from a “pilot initiative” to “implementation”, it has been determined that to implement the “next steps” in this plan, additional resources will be required depending on the Agency’s final strategy. The Schedule Repository requires:

- Additional 2.0 full-time equivalents/work-year equivalents (FTE/WYE) and \$75k annually in Other Direct Costs (ODCs) support to:
 - Communicate/coordinate with Centers (including JPL) and MDs on identifying Programs/projects that meet the requirement to ensure schedule file submission start dates for new Programs/projects and end dates for current Programs/projects
 - Facilitate an automated process for the collection and metadata analysis capability of both NASA- and JPL-provided schedule data

The CAP Working Group (CAPWG) recommends that the level of adequacy for Schedule Repository resources be assessed during the next logical Planning, Programming, Budgeting, and Execution (PPBE) budget formulation process and that the results of that assessment be reflected in the budget.

Risk Assessment and Financial Evaluation of Contractors

Lead Executive/Organization

Office of the Chief Financial Officer (OCFO)

Supporting Organization(s)

Office of Procurement and Office of Strategic Engagements and Assessments

Initiative Description

Enhance competitive and sole-selection procurement processes by requiring an evaluation of the financial health, stability, and outlook of organizations under consideration prior to selection and contract award. As part of this financial evaluation, include an assessment of risks to continued financial stability. Conduct assessment as part of the contractor responsibility determination.

Background/Current State

This initiative was proposed by the Chief Financial Officer (CFO) in the summer of 2019. Department of Defense (DOD) has regulation and guidance in place that executes this requirement, of which NASA can leverage as a model. This effort and its implementation approach was approved at the Acquisition Strategy Council.

OCFO is working towards a gradual implementation approach, which is dependent on securing additional funding.

- **Pre-award Assessments:** Apply to contracts over \$500M Current Value and any other high risk acquisitions deemed necessary.
- **Staffing model:** Resident in OCFO. A term full-time equivalent (FTE) will be hired in FY21, and pending funding approval the full capability will be established in FY22 leveraging a fixed price procurement acquisition.
- **Policy:** Will be codified in policy NASA Policy Directive (NPD) 1000.5B, Policy for NASA Acquisition. Contracting Officer to include required NASA Federal Acquisition Regulation (FAR) Supplement language in applicable procurements.
- **Governance:** This initiative and implementation approach was approved by the Acquisition Strategy Council (ASC) on 6/12/2020.

Expected Benefits of Implementation

- Lower risk to NASA programs and projects due to vendor financial instability by enhanced financial capability assessment in pre-award responsibility determination process.
- Senior Leadership and ASC improved awareness of contractor stability.
- Insight at the enterprise level rather than just the Program/project level, as NASA may have the same contractor working multiple projects.

Recent Accomplishments

- Finalized implementation approach with stakeholders and achieved concurrence at the Acquisition Strategy Council.
- Submitted request for funding to enable full capability for FY22-FY26 as a part of the Agency's annual PPBE process.

Planned Next Steps

Onboard a Term FTE before 1 October 2020 to implement initial capability. Term hire to work with existing Subject Matter Expert (SME) to establish processes and systems to conduct assessments and begin conducting assessments on an ad-hoc basis for FY21.

Secure funding for FY22 and beyond to establish full capability.

Output and Outcome Metrics

TBD

Interdependencies

N/A

Impediments & Challenges

- There is a slight barrier to contractor participation since NASA will be adding an extra layer of financial evaluation of contractors.
- A company may be determined to be financially viable and still not perform.
- Ability to secure funding in budget constrained environment.
- Ability to secure highly skilled in-house personnel to perform activities given limited salary and benefits of government positions.

Required Resources

- Term FTE to begin implementation in FY21.
- Funding post FY21 to support full-implementation of this capability within OCFO.

Appendices

Appendix A: 2020 CAP Working Group Membership and PMIAA Working Group Membership

CAPWG Membership

Team Lead: Kevin Gilligan

OCFO/Champion: Craig McArthur

OCFO/Co-Champion: David Walters

HEOMD: Melodie Jackson; Ashley Peter

SMD: Viet Nguyen

ARMD: Tony Springer

STMD: Patrick Murphy

OP: Jeff Cullen

OCE: Ellen Stigberg; Tracy Osborne

OCFO SID: Charley Hunt

Deputy PMIO: Mike Blythe

ARC: Vonnie Simonsen

GSFC: Richard Ryan

PMIAA Working Group Membership

OCE: Ellen Stigberg; Tracy Osborne; Roger Forsgren; Steve Angelillo

OCFO: David Walters; Charley Hunt; Craig McArthur

OHCMO: Fernan Rodriguez

OP: Julia Wise; Veronica Lansey

OCIO: Dana Mellerio; Stephanie Stilson

SMD: Mayra Montrose; Steve Hirshorn

STMD: Prasun Desai

ARMD: Tony Springer

HEOMD: Scott Martinelli

Project Manager Practitioner: Doug McLennan; Mike Blythe

Program Manager Practitioner: Cheryl Harrell

Office of the Administrator: Lisa Guerra; Mike Blythe; James Ortiz

Appendix B: Acronyms List

AA – Associate Administrator	FY – Fiscal Year
ABC – Agency Baseline Commitment	GAO – Government Accountability Office
AES – Advanced Exploration Systems	GSFC – Goddard Space Flight Center
AO – Announcement of Opportunity	HEOMD – Human Exploration and Operations Mission Directorate
APARC – Agency Programmatic Analysis & Research Capability	HLS – Human Landing System
APL – Applied Physics Laboratory	IEMP – Integrated Enterprise Management Program
APMC – Agency Program Management Council	IMS – Integrated Master Schedule
ARMD – Aeronautics Research Mission Directorate	JCL – Joint Cost and Schedule Confidence Level
ASC – Acquisition Strategy Council	JPL – Jet Propulsion Laboratory
BPR – Baseline Performance Review	KDP – Key Decision Point
BSA – Business Services Assessment	LBFD – Low Boom Flight Demonstrator
CADRe – Cost Analysis Data Requirement	LCC – Life-Cycle cost
CAP – Corrective Action Plan	LOE – Level of Effort
CAPWG – Corrective Action Plan Working Group	LRD – Launch Readiness Review
CE&A – Cost Estimation and Assessment	MD – Mission Directorate
CFO – Chief Financial Officer	ML-2 – Mobile Launcher 2
CFOU – Chief Financial Officer University	MOU – Memorandum of Understanding
CLINs – Contract Line Item Numbers	NASA – National Aeronautics and Space Administration
COVID-19 – Coronavirus Disease 2019	NFS – NASA FAR Supplement
CS – Core Stage	NPD – NASA Policy Directive
CY – Calendar Year	NPR – NASA Procedural Requirements
DCMA – Defense Contract Management Agency	OCE – Office of the Chief Engineer
DECM – DCMA EVMS Compliance Metric	ODC – Other Direct Costs
EAC – Estimate at Completion	OMB – Office of Management and Budget
EGS – Exploration Ground Systems	P/p – Program/project
EIA – Electronic Industries Alliance	PCA – Program Commitment Agreement
ESD – Exploration Systems Development	PCEC – Project Cost Estimating Capability Framework
EUS – Exploration Upper Stage	PDF – Professional Developmental Framework
EV – Earned Value	PM – Project Manager
EVM – Earned Value Management	PMB – Performance Measurement Baseline
EVMS – Earned Value Management System	PMIAA – Program Management Improvement and Accountability Act
FAR – Federal Acquisition Regulations	POC – Point of Contact
FFRDC – Federally Funded Research and Development Center	PP&C – Program Planning and Control
FTE – Full Time Equivalent	PPBE – Planning, Programming, Budgeting, and Execution
	RMO – Resource Management Officer
	SCoPe – Schedule Community of Practice
	SID – Strategic Investments Division
	SLS – Space Launch System

SMD – Science Mission Directorate
SME – Subject Matter Expert
SOMA – Science Office for Mission Assessments
SPEC – Stages Production and Engineering Contract
SRR – System Requirements Review

STMD – Space Technology Mission Directorate
SwRI – Southwest Research Institute
TRA – Technology Readiness Assessment
WBS – Work Breakdown Structure
WYE – Work Year Equivalent
xEVA – Exploration Extravehicular Activity