Implementing the Integrated Project/Program Management (IP2M) Maturity and Environment Total Risk Rating (METRR) Using EVMS in a Team Environment

Report No. 6

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Executive Summary

This implementation guidebook is part of a series of deliverables for a national research project sponsored by the DOE and has been approved by the research steering committee and Arizona State University (ASU) joint team. It was developed as part of the process for developing the Integrated Project/Program Management (IP2M) Maturity and Environment Total Risk Rating (METRR), pronounced "IP2M meter". This document introduces the EVMS (or related project management system) attributes and factors, the purpose of the IP2M METRR, and its benefits. The contents of this document can be applied for those situations where the implementation of an EVMS is not required but the use of an integrated project management tool is warranted. This guidebook walks the user through instructions on how to successfully implement the IP2M METRR to assess the effectiveness of a project's/program's implementation of the EVMS, with an emphasis of "showing versus telling". It provides a detailed assessment example and explains the meaning of maturity and environment scores. It also provides strategies on how to implement the IP2M METRR in the user's organization. In addition, it also includes instructions on how to use the software version of the tool as well as facilitation recommendations. The IP2M METRR tool is provided in the appendices of this guidebook.

The IP2M METRR is a novel assessment mechanism developed as part of a DOE-sponsored Joint Research Study led by ASU and representing 19 government, industry, and academic organizations. The research team members are 41 individuals who have a diverse background including customers, contractors, consultants, academia, and so forth. The list of the research team members is provided at the end of this document. The tool assesses a spectrum of EVMS maturity and environment issues centered on the EVMS Guidelines in EIA748-D, while also referencing the Project Management Institute's American National Standards Institute (ANSI) standard for EVM (2019) and International Organization for Standardization (ISO) 21508:2018 guidance. By using the IP2M METRR to assess both the maturity and environment of an EVMS, project leaders and personnel can understand the efficacy of that EVMS to support integrated project/program management. It also helps identify opportunities for improvement. The ultimate goal of performing this assessment is to assure project/program participants are working with accurate, timely, and reliable information to manage their work, leading to successful project/program performance. Ideally, contracting officers could leverage the IP2M maturity and environment factor platform (future state) to strategically identify what level of earned value compliance is appropriate for their program or project.

The IP2M maturity assessment component consists of 10 sub-processes, each of which is further divided into attributes. Both the unweighted score sheet and the weighted score sheet for the maturity component of the tool are presented in Appendices A and B, respectively. The 10 sub-processes are further divided into a total of 56 maturity attributes, each with its own detailed description, as provided in Appendix C. Each attribute is evaluated on a 1 to 5 graduated maturity scale: "1" means that work on this attribute has not yet started; while "5" means this attribute has been optimized and is best in class. Attributes that are mature enough for a compliant system should receive a maturity level of "4". Attributes that are not yet mature should receive scores of "2" or "3", depending on their levels of maturity as determined by the team. For each of the 56 attributes, each of the five maturity levels is described in detail to allow for an informed assessment. The descriptions of the maturity levels are additive, meaning that level 5 already includes everything that is in level 4; level 4 already includes everything that is in level 3, and so on. Those attributes deemed not applicable (*N/A*) for the project/program under consideration should be marked as *N/A*, thus not affecting the final maturity score. A clear justification should be added to explain why a certain attribute is considered not applicable. Each attribute has a relative weight associated with it, and all maturity attributes scores roll up to a 1000-point scale, with higher scores being better. The score helps quantify the overall EVMS maturity level for the project/program.

The IP2M environment assessment component consists of four categories, each of which is further broken down into a number of environment factors. Both the unweighted score sheet and the weighted score sheet for the environment component are presented in Appendices D and E, respectively. The 27 total environment factors and their detailed descriptions are provided in Appendix F. Each factor is evaluated on a scale ranging from *Not Acceptable* to *Needs Improvement*, *Meets Some*, *Meets Most* and finally *High Performing*. The environment factors that fully meet the criteria discussed in the factor descriptions should receive a *High Performing* rating, while factors that meet some of the criteria should receive a *Meets Some* rating, and so on. Each factor has a relative weight associated with it, and all environment factors scores roll up to a 1000-point scale that helps gauge the environment of the EVMS of the project/program. Higher scores are better.

The IP2M METRR tool and supporting examples are provided in the attached appendices, as follows:

- Appendix A: Unweighted IP2M Maturity Score Sheet
- Appendix B: Weighted IP2M Maturity Score Sheet
- Appendix C: IP2M Maturity Attribute Descriptions
- Appendix D: Unweighted IP2M Environment Scoresheet
- Appendix E: Weighted IP2M Environment Score Sheet
- Appendix F: IP2M Environment Factor Descriptions
- Appendix G: Facilitation Instructions
- Appendix H: Instructions for Using the IP2M METRR Software
- Appendix I: Example Action List
- Appendix J: Sample of a Completed IP2M METRR Assessment

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1. What Is IP2M METRR?

The Integrated Project/Program Management (IP2M) Maturity and Environment Total Risk Rating (METRR) tool provides a simple and easy-to-use mechanism for assessing the maturity and environment of a project/program's EVMS and/or related project management systems.

Integrated Project/Program Management (IP2M) Maturity and Environment Total Risk Rating (METRR) using EVMS (called the "IP2M meter"), is a novel method developed to assess the maturity of processes, and the environment within which an EVMS functions in a project/program. By assessing both the maturity and environment, project/program managers can understand the efficacy of the system, leading to opportunities for improvement. The ultimate goal of performing this assessment is to assure participants are working in an integrated manner, while understanding issues that may cause problems in the execution of the project/program and provide a platform and process for self-governance.

The IP2M METRR tool is intended to be used at any point between project/program initiation through the end of execution. Thus, the stakeholders can assess the maturity and environment of the integrated project/program management. Integrated Project/Program Management (IP2M) is defined as the collection of processes to ensure various project elements are well coordinated. It establishes and manages the involvement of stakeholders and resources to make sure everything is working properly.

The customer's expectation of a mature and effective EVMS is to provide current, accurate, complete, repeatable, auditable, and compliant (CACRAC) data to control the project/program and inform proactive decision-making, including cost and schedule estimations. The assessment tools contained in this guidebook were developed to assess both maturity and environment of the project/program implementing the EVMS and correlate their effects to project/program performance predictability.

There have been many endeavors in the past to properly implement EVMS for project/program performance management on major capital acquisitions by federal departments and agencies. A widely used method has been to comply with EIA748-D guidelines (SAE 2019); however, this process lacks consistency across differing federal departments and agencies because of interpretation of requirements and evaluation methods to provide necessary checks for contractor performance data. This problem has led to the need for a common approach that allows the government to evaluate project/programs' progress and assess the likelihood of meeting scope, cost, and technical objectives.

The developed IP2M METRR builds on EIA748-D EVMS Guidelines, while also referencing PMI's ANSI Standard for EVM (2019) and ISO 21508:2018 guidance providing a more consistent mechanism to evaluate the level of IP2M maturity of the used EVMS as well as the level of performance affected by the environment and its factors (ISO 2018; PMI 2019; SAE 2019). This tool allows large and complex projects/programs to apply better governance of their IP2M by assessing its management processes and practices based on consistent, common, and well-defined attributes and factors; hence, leading to more efficient and effective IP2M and better decision making, project controls, and project success.

The intent of this document is to summarize the state of knowledge concerning management sub-processes, attributes, and factors that impact the EVMS within an IP2M environment. The foundation for this tool includes about 400+ published sources on EVMS, a national survey with close to 300 responses from EVMS and IP2M experts, a dedicated research team comprised of close to 30 experts that met regularly to develop this assessment over a period of three years, as well as 136 workshop participants from all around the U.S. who tested the tool with their own data and organizational practices. Details of this development effort, including how attributes and factors were weighted, is provided elsewhere in cited works (Report 1; Report 1 Annex A; Report 2; Report 2 Annex A; Report 3; Report 3 Annex A; Report 4; Report 4 Annex A; Report 5; Report 5 Annex A; Report 6 Annex A; Report 6 Annex b; Report 7).

IP2M METRR offers a method to comprehensively evaluate 56 maturity attributes, and 27 environment factors, in an easy-to-use score sheet format for assessing the maturity of the EVMS and the environment of the project/program implementing the EVMS. Each attribute and factor are weighted based on their relative importance. Since the IP2M METRR suite of scores relate to risk, those areas that need further work can easily be isolated. An IP2M METRR maturity score of 550 or more has been shown to greatly increase the probability of a successful project/program as described in Chapter 5. Similarly, an environment score of 800 or more is an indicator of effective project/program's team environment.

IP2M METRR is ideally meant for use on large and complex projects/programs. Table 1.1 provides a list of typical large and complex project/program types that are suitable for evaluation using IP2M METRR.

Table 1.1. Applicable Large and Complex Project/Program Types for Maturity and Environment Assessments

Typical Large and Complex Projects/Programs		
Industrial Energy Defense Aerospace	Manufacturing Infrastructure Environmental Software	Construction Science Other

EVMS

It is important to frame definitions of earned value management (EVM) and earned value management system (EVMS), along with the terms maturity and environment, in order to understand the implications of this tool. For the purposes of this document, the definition of EVM and EVMS are presented below.

Earned value management (EVM) is defined as:

> **The use of performance management information, produced from the EVMS, to plan, direct, control, and forecast the execution and accomplishment of contract/project cost, schedule, and technical performance objectives versus the plan.**

Earned value management system (EVMS) is defined as:

> **An organization's management system for project/program management that integrates a defined set of associated work scopes, schedules, and budgets for effective planning, performance, and management control. It integrates these functions with other business systems such as accounting and human resources, among others.**

EVMS is comprised of ten sub-processes as shown in Figure 1.1. These ten sub-processes are used to manage project/program integration, scope, time, cost, quality, human resources, communications, risk, and procurement (NDIA 2018). The 32 Guidelines that make up the NDIA EVMS EIA-748-D Intent Guide aligns with these 10 sub-processes, outlining the critical functionality of an EVMS to meet the proper functionality required by a project/program (NDIA 2018). In developing IP2M METRR, the EVMS guidelines established by ISO 21508:2018 and PMI ANSI Standard for EVM were cross-checked, confirming that the 10 sub-processes were also aligned with these documents (ISO 2018; PMI 2019).

IP2M Maturity and Environment

IP2M *maturity* is defined as:

> **The degree to which an implemented system, associated processes, and deliverables serve as the basis for an effective and compliant EVMS.**

IP2M *environment* is defined as:

> **The conditions (i.e., people, culture, practices, and resources) that enable or limit the ability to manage the project/program using the EVMS, serving as a basis for timely and effective decision-making.**

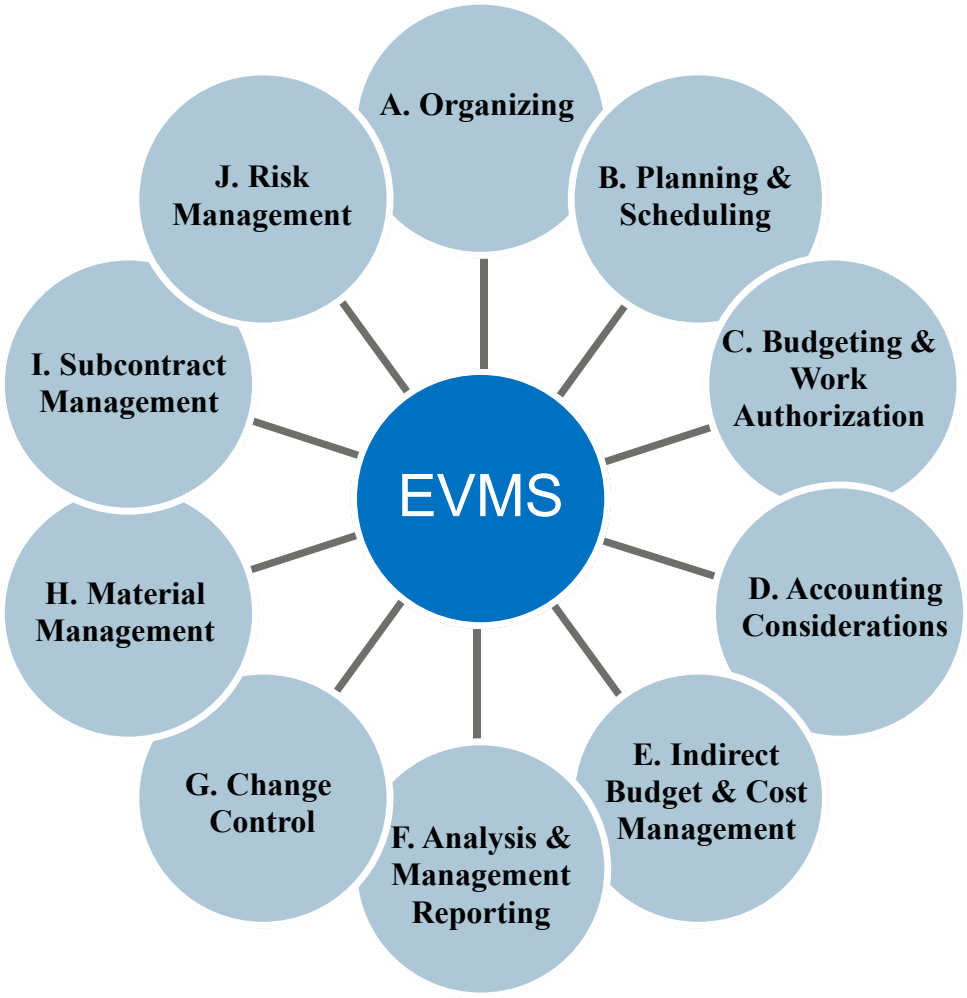

Figure 1.1. EVMS and Project Management

Maturity and environment are both critical for a reliable IP2M and EVMS implementation. The maturity assessment component measures how well the EVMS attributes have been completed along with their integration. The environment assessment component of this tool looks at the factors surrounding the EVM of the project/program where a mature EVMS can be developed. Hence, environment is impacted by factors related to people, culture, practices, and resources. The research analysis showed that both metrics help inform how well the project/program is performing in implementing EVMS as well as assist the project/program team identify gaps and plan corrective actions to achieve a reliable compliant EVMS within the IP2M. Research also showed that higher maturity and environment scores are correlated with better project/program performance, including minimized cost and schedule growth, meeting business objectives, customer satisfaction, and EVMS compliance which is based on adherence to the guidelines contained within the EIA748-D which is the Systems Management Standard (SAE 2019).

Structure of the IP2M METRR using EVMS

The IP2M METRR tool includes two assessment components as shown in Figure 1.2:

(1) the maturity assessment; and

(2) the environment assessment.

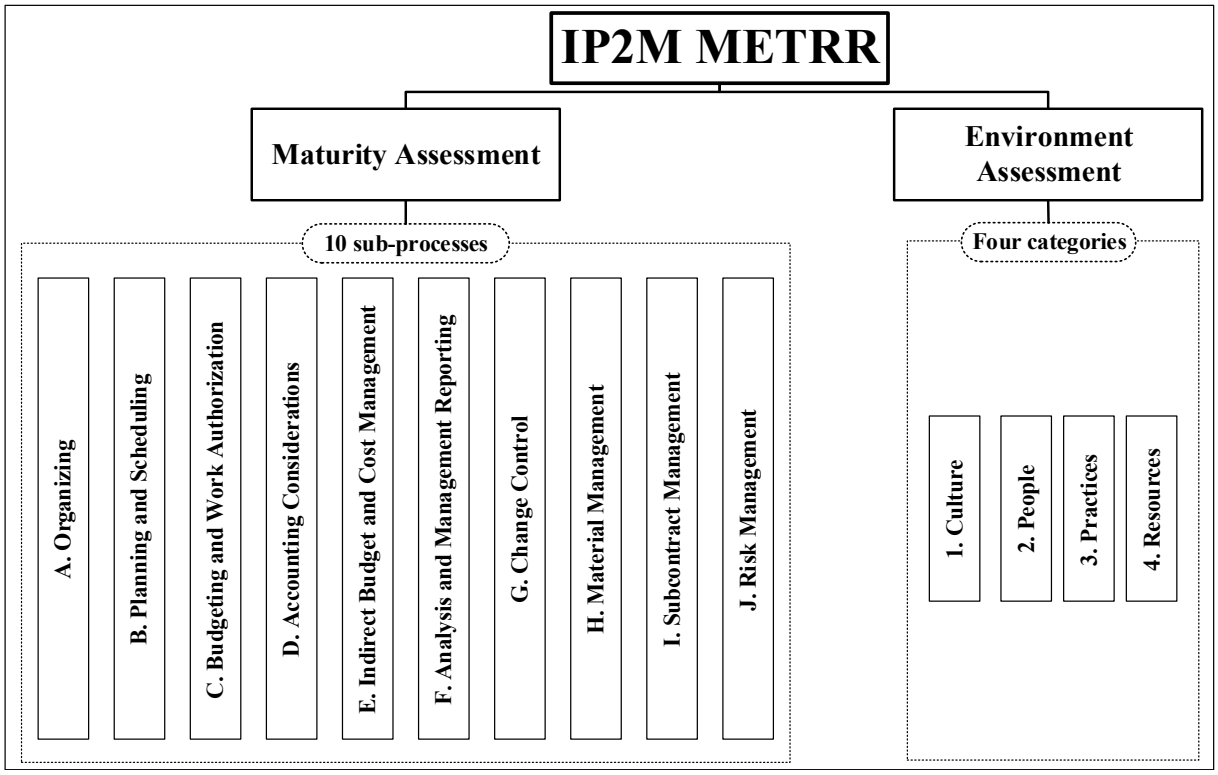

Figure 1.2. IP2M METRR High Level

IP2M Maturity Assessment

The IP2M maturity assessment component consists of 10 sub-processes, each of which is further divided into a series of attributes. A complete list of the maturity assessment 10 sub-processes and 56 attributes is given in Table 1.2. For the purposes of this document, the definitions of EVMS sub-process and maturity attribute are presented below.

An EVMS *sub-process* is defined as:

> **A series of interrelated tasks that, together, transform inputs into a system to achieve Earned Value Management (EVM).**

An EVMS maturity *attribute* is defined as:

> **A core characteristic or quality that is essential to fielding an effective EVMS.**

The 10 EVMS sub-processes are:

A. Organizing (includes attributes A.1 to A.5)
B. Planning and Scheduling (includes attributes B.1 to B.10)
C. Budgeting and Work Authorization (includes attributes C.1 to C.12)
D. Accounting Considerations (includes attributes D.1 to D.4)
E. Indirect Budget and Cost Management (includes attributes E.1 to E.4)
F. Analysis and Management Reporting (includes attributes F.1 to F.5)
G. Change Control (includes attributes G.1 to G.6)
H. Material Management (includes attributes H.1 to H.5)
I. Subcontract Management (includes attributes I.1 to I.3)
J. Risk Management (includes attributes J.1 and J.2)

Each of the maturity attributes is assessed on a scale from 1 to 5 to determine the maturity level. This is thoroughly explained in chapter 3. In addition to these maturity levels, there might be cases where the attribute is Not Applicable (N/A) to the project/program. In this case, the attribute under consideration should be marked N/A and should be accompanied with a justification for the N/A choice. Several attributes were identified in the research as being not applicable (many times they are not being required by the contract), such as B.5, B.8, C.2, C.11, H.3, H.5, I.1, I.2, and I.3. For example, if B.8 Schedule Margin (SM) is not required in a certain project/program, it would be assessed as N/A with an appropriate comment. Another example is if H.5 Unit Costs were not applicable, then it would be assessed as N/A with an appropriate comment explaining why unit costs are not needed for this type of procurement.

Table 1.2. EVMS Sub-processes and IP2M Maturity Attributes

A. ORGANIZING

A.1. Product-Oriented Work Breakdown Structure (WBS)

A.2. Work Breakdown Structure (WBS) Hierarchy

A.3. Organizational Breakdown Structure (OBS)

A.4. Integrated System with Common Structures

A.5. Control Account (CA) to Organizational Element

B. PLANNING AND SCHEDULING

B.1. Authorized, Time-Phased Work Scope

B.2. Schedule Provides Current Status

B.3. Horizontal Integration

B.4. Vertical Integration

B.5. Integrated Master Schedule (IMS) Resources

B.6. Schedule Detail

B.7. Critical Path and Float

B.8. Schedule Margin (SM)

B.9. Progress Measures and Indicators

B.10. Time-Phased Project Management Baseline (PMB)

C. BUDGETING AND WORK AUTHORIZATION

C.1. Scope, Schedule and Budget Alignment

C.2. Summary Level Planning Packages (SLPPs)

C.3. Work Authorization Documents (WADs)

C.4. Work Authorization Prior to Performance

C.5. Budgeting by Elements of Cost (EOC)

C.6. Work Package Planning, Distinguishability, and Duration

C.7. Measurable Units and Budget Substantiation

C.8. Appropriate Assignment of Earned Value Techniques (EVTs)

C.9. Identify and Control Level of Effort (LOE) Work Scope

C.10. Identify Management Reserve (MR) Budget

C.11. Undistributed Budget (UB)

C.12. Reconcile to Target Cost Goal

D. ACCOUNTING CONSIDERATIONS

D.1. Direct Costs

D.2. Actual Cost Reconciliation

D.3. Recording Direct Costs to Control Accounts (CAs) and/or Work Packages (WPs)

D.4. Direct Cost Breakdown Summary

E. INDIRECT BUDGET AND COST MANAGEMENT

E.1. Indirect Account Organization Structure

E.2. Indirect Budget Management

E.3. Record/Allocate Indirect Costs

E.4. Indirect Variance Analysis

F. ANALYSIS AND MANAGEMENT REPORTING

F.1. Calculating Variances

F.2. Variances to Control Accounts (CAs)

F.3. Performance Measurement Information

F.4. Management Analysis and Corrective Actions

F.5. Estimates at Completion (EAC)

G. CHANGE CONTROL

G.1. Controlling Management Reserve (MR) and Undistributed Budget (UB)

G.2. Incorporate Changes in a Timely Manner

G.3. Baseline Changes Reconciliation

G.4. Control of Retroactive Changes

G.5. Preventing Unauthorized Revisions to the Contract Budget Base (CBB)/Project Budget Base (PBB)

G.6. Over Target Baseline (OTB)/Over Target Schedule (OTS) Authorization

H. MATERIAL MANAGEMENT

H.1. Recording Actual Material Costs

H.2. Material Performance

H.3. Residual Material

H.4. Material Price/Usage Variance

H.5. Identification of Unit Costs and Lot Costs

I. SUBCONTRACT MANAGEMENT

I.1. Subcontract Identification and Requirements Flow Down

I.2. Subcontractor Integration and Analysis

I.3. Subcontract Oversight

J. RISK MANAGEMENT

J.1. Identify and Analyze Risk

J.2. Risk Integration

IP2M Environment Assessment

The IP2M environment assessment component consists of four categories, each of which is further divided into a series of factors. A complete list of the environment assessment four categories and 27 factors is given in Table 1.3. For the purposes of this document, the definitions of EVMS environment category and EVMS environment factor are presented below.

An EVMS *environment category* is defined as:

> **A class or division of factors regarded as having particular shared characteristics, arranged in a topological fashion.**

An EVMS *environment factor* is defined as:

> **Is one of the circumstances, facts, or elements that contributes to the result or outcome of an EVMS.**

The four environment categories are:

Culture

Culture is, by definition, the display of behaviors. Organizational culture is a system of common assumptions, values, and beliefs (or the lack thereof) that governs how people behave in organizations. Organizational values and beliefs should align with the development and outcomes of a successful EVMS. The project/program culture can enable or hinder the effectiveness of the EVMS.

People

People denotes the individuals who represent the interests of their respective stakeholders (e.g., project business manager, project control analyst, project schedule analyst, acquisitions/subcontracts, control account manager, Integrated Project/Program Team (IPT) or line/resource management) and are adept in the relevant subject matter, in order to contribute to the process that leads to favorable project control outcomes.

Practices

Practices are internal and external procedures and processes that can positively or negatively influence the outcome of a project/program. Internal business practices and methods are specific to a given organization, including internal standards, requirements and best practices. External business practices, regulations, requirements, procedures, and methods are across organizational boundaries (e.g., government to contractor, software provider to contractor, subcontractor to prime, and so forth).

Resources

Resources are the availability of key tools, data, funding, time, personnel, and technology/software to support the EVMS process.

Table 1.3. IP2M Environment Categories and Factors

1. Culture (7 factors)	
1a.	The **contractor organization is supportive and committed** to EVMS implementation, including making the necessary investments for regular maintenance and self-governance.
1b.	The project/program **culture fosters trust, honesty, transparency, communication, and shared values** across functions.
1c.	The **customer organization is supportive and committed** to the implementation and use of EVMS.
1d.	Project/program leaders make **timely and transparent decisions** informed by the EVMS.
1e.	The project/program **leadership effectively manages and controls change** using EVMS, including corrective actions and continuous improvement.
1f.	**Effective teamwork exists** and team members are working synergistically toward common project/program goals.
1g.	**Alignment and cohesion exist among key team members** who implement and execute EVMS, including common objectives and priorities.
2. People (6 factors)	
2a.	The **contractor team is experienced and qualified** in implementing and executing the EVMS.
2b.	The **customer team is experienced** in understanding and using EVM results to inform decision-making.
2c.	Project/program **leadership is defined, effective, and accountable.**
2d.	**Project/program stakeholder interests are appropriately represented** in the implementation and execution of the EVMS.
2e.	**Professional learning and education** of key individuals responsible for EVMS implementation and execution, **is appropriate** to meet project/program requirements.
2f.	**Team members** responsible for the EVMS implementation and execution phases **are co-located and/or accessible**.
3. Practices (8 factors)	
3a.	The project/program **promotes and follows standard practices** to implement and execute an EVMS.
3b.	**EVMS requirements definition is in place, and agreement exists** among key stakeholders and customer.
3c.	**Roles and responsibilities are defined, documented and well-understood** for implementing and executing EVMS.
3d.	**Communication is open and effective,** including consistent terminology, metrics, and reports.
3e.	**Effective oversight is in place and used,** including internal and external surveillance and independent reviews.
3f.	**Contractual terms and conditions** that impact the effectiveness of EVMS **are known and have been addressed.**
3g.	Appropriate **Subject Matter Expert (SME) input is adequate** and timely.
3h.	**Coordination exists** between the key disciplines involved in implementing and executing the EVMS.
4. Resources (6 factors)	
4a.	**Adequate technology/software and tools are integrated and used** for the EVMS.
4b.	**Sufficient funding is committed** and available **for implementing and executing the EVMS**.
4c.	The team that implements and executes the EVMS for the project/program is adequate in **size and composition**.
4d.	**Sufficient calendar time and work-hours are committed and available** for implementing and executing the EVMS.
4e.	**Data are readily available** to populate EVMS tools supporting analyses for decision-making.
4f.	The **project/program utilizes an appropriate periodic cycle** for executing the EVMS effectively and efficiently.

The Rest of this Document

The subsequent chapters of this guidebook are organized in the following manner: *Chapter 2:* Benefits of the IP2M METRR; *Chapter 3:* Instructions for Assessing a Project/Program; *Chapter 4*: Assessment Example; *Chapter 5*: What Do IP2M Maturity and Environment Scores Mean?; *Chapter 6:* Strategies to

Implement IP2M METRR in an Organization; and *Chapter 7:* Concluding Remarks. Finally, the corresponding appendices are attached including the tool as well as examples and facilitation instructions.

2. Benefits of the IP2M METRR

Effective early identification of project/program EVMS implementation problems can improve project/program performance in terms of both cost and schedule, meeting objectives and business drivers, and achieving customer satisfaction. IP2M METRR provides a method by which gaps can be identified early and acted upon. The ability to identify these gaps makes the maturity and environment assessments a remarkably powerful method for proactive management action, thus providing a pathway for improvement. Moreover, IP2M METRR can be used as a method for benchmarking the project/program versus its potential expected outcomes. The IP2M METRR can be utilized in a variety of ways, including:

- As a **checklist** that a project/program team can use to determine the necessary steps for defining project/program EVMS compliance plans
- As a **checklist** to determine environment issues and identify corrective actions before performing surveillance and risk analysis
- As a listing of **standardized EVMS sub-processes terminology** for large and complex federal projects/programs
- As an industry standard for rating the compliance and effectiveness of the project/program EVMS and to facilitate **risk assessment**
- As a means of **monitoring compliance and team efficiency** when used successively during project/program acquisition process until the end of implementation
- As a means to establish a **supportive team environment** prior to initiating EVMS
- As a **forensic assessment** tool for evaluating success or failure of completed projects/programs
- As a tool that promotes **communication and alignment** among customers and contractors by highlighting poorly defined areas in an EVMS, including maturity and environment
- As a means by which project/program team participants can **reconcile differences**, when used as a common basis for EVMS evaluation
- As a means by which members of the project/program team can **identify gaps and act upon them** before the project/program is negatively affected
- As a **training tool** for organizations and individuals in the industry (particularly those with less EVMS experience) to understand the critical requirements of large and complex federal projects/programs
- To support **EVMS maturity validation** moving into execution

- As a **benchmarking tool** for organizations to use in evaluating completion of implementation versus the performance of past projects/programs, both within their organization and externally, in order to predict the probability of success on future projects/programs.

Who should use the IP2M METRR?

Any organization wishing to improve the overall performance of its projects/programs should use IP2M METRR.

The IP2M METRR can be used by appropriate project/program stakeholders (e.g., project owner, local customer, contractor) to support informed decision-making regarding the project/program and how it is being managed. The tool may be used internally by an organization or supported by a qualified facilitator (in-house or third-party) to assist the project/program in the assessment of the maturity and environment of the EVMS. It is recommended that the project/program team be well represented during an evaluation session (including project manager, project control analyst, project schedule analyst, acquisitions/subcontracts, control account manager, and so on). The project/program leadership team can also use the environment component to assess whether changes to leadership, team members, organizational culture, resources, or practices are needed early on.

IP2M METRR has been designed to be used by those who have familiarity with the concepts of IP2M and EVM. In addition, it is recommended that some members of the review team have knowledge of the current working environment of the project/program being evaluated. Without direct knowledge of the project/program, environment ratings, such as "management support of EVM" may not be accurately represented. Regardless of familiarity, the reviewer must be impartial in order to ensure the most comprehensive and thorough rating possible.

Customers can use IP2M METRR to establish a comfort level that, when reached, prompts them to move forward with execution for their projects/programs and as a final authorization check. Moreover, contractors can use it to identify poorly defined maturity attributes as part of their self-governance process. IP2M METRR provides a common basis for EVMS implementation and a means for project/program participants to communicate and reconcile any differences they have. Clients can use the IP2M METRR as a way to communicate and manage specific areas of interest or concern. It also provides an opportunity for the client and stakeholders—including operations and maintenance—to gain an understanding of the project/program.

Communication is essential to ensure the implementation of the EVMS is proceeding to meet the expectations and requirements of the customer stakeholders. During the EVMS assessment, every attempt

should be made to get as many of the key project/program stakeholders as possible involved in the assessment session to ensure that the team is making the correct evaluation and assumptions.

Also, IP2M METRR is an effective alignment tool that helps to gauge understanding of the effectiveness of the EVMS and the environment among project/program team members and leadership. During all phases of project/program execution, it can help customers and contractors alike clarify EVMS implementation requirements and ensure the right input is gained from key internal and external stakeholders.

3. Instructions for Assessing a Project/Program

Assessing a project/program is direct and relatively easy.

When to Use IP2M METRR?

IP2M METRR should be used in IP2M when applying EVMS to ensure effective and efficient IP2M using EVMS in terms of attributes, enablers, and barriers. The tool can be used at any point between initiation of the project/program and the end of execution (e.g., construction, manufacturing, etc.). As an example, IP2M METRR (using EVMS) application points are shown using arrows in Figure 3.1.

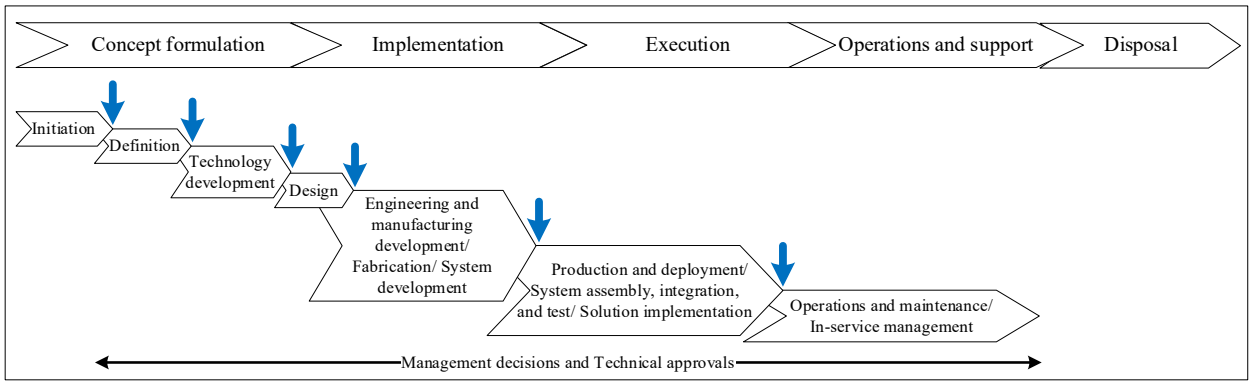

Figure 3.1. Employing IP2M METRR, Example Application Points

Regardless of the timing for the IP2M METRR assessment, utilize the same score sheets/descriptions and conduct the evaluation according to the guidelines outlined in this document.

When the IP2M METRR is used at any point between project/program initiation until the end of execution, it should focus on ensuring that the leadership team is working properly together and needed resources are available. It also checks for efficacy of the EVMS sub-processes so that corrective actions, if needed, can be implemented to ensure proper self-governance and meet surveillance expectations.

Typical maturity and environment scores can typically range from 200 to 900 (on the scale of zero to 1,000) depending on when the assessment is conducted and how much attention has been paid to improvement of the System. A low score will often need immediate attention. Assessments should also be used to establish baseline values of maturity and environment before moving onto the next phase of the project or program.

The purpose of completing the IP2M METRR maturity and environment assessment is to help stakeholders ensure that they are progressing favorably after implementation and before execution. In order for the maturity and environment assessment to provide value, it should be conducted at any point between project/program initiation until the end of execution.

The maturity and environment assessments of IP2M METRR can be completed at the same time by the same entity or split into a stand-alone maturity assessment and a stand-alone environment assessment completed by different parties to inform decision makers as needed.

Who Should Be Involved in Assessing the Project/Program?

One of the most important components of an IP2M METRR maturity and environment assessment is to have the right people participating in the assessment. Experience has shown that assessment sessions with seven to 15 personnel are optimal. Suggested functional representatives participating in the maturity assessment session may include:

- Project/program business manager
- Project/program management
- Compliance management
- Executive/senior management
- Consulting
- Project/program control analyst
- Project/program controls management
- Project/program schedule analyst
- Acquisitions/subcontracts
- Control account manager
- Integrated Project/Program Team (IPT) or line/resource management
- Financial analyst
- Subcontractors' manager

It is important that all assessment session participants come prepared to actively engage in the assessment. Typically, this can be facilitated by sending the maturity assessment sheets and attribute descriptions as well as environment assessment sheets and factor descriptions out ahead of time with a pre-reading assignment. More information on facilitation can be found in Appendix G. Expectations of participants include:

- All should be prepared to discuss their understanding and concerns of the attributes that apply to them.
- Leadership team should voice their concerns regarding the team environment.
- Finance team should be ready to voice their concerns regarding budgeting and accounting issues.

Roles and responsibilities during the maturity assessment session should include:

- The project/program manager should assist the facilitator to probe the team members for answers and insight.
- The facilitator will ensure that everyone has an opportunity to voice their opinions and concerns.

Note that IP2M maturity and environment can be assessed in the same session, or in separate sessions, depending on the organization's culture and preferences. However, maturity assessment is based on consensus by all project/program participants while environment assessment is more of an individual assessment by each of the participants captured anonymously to voice everyone's concerns and identify the gaps for proper treatment. During the environment evaluation, the project/program leadership team should also be represented. It has been found that having individuals fill out the environment ratings anonymously can help identify issues of concern in a better manner. These issues can be compiled by the facilitator for further discussion.

Philosophy of Use

Ideally, the project/program team conducts an IP2M METRR assessment at various points in the project/program life cycle. Experience has shown that the scoring process works best in a team environment with a neutral facilitator familiar with the process. The facilitator provides objective feedback to the team and controls the pace of team meetings. See Appendix G for details on facilitation. If this arrangement is not possible, an alternate approach is to have key individuals evaluate the project/program separately, then evaluate it together, ultimately agreeing on a final evaluation. Even using the IP2M METRR from an individual standpoint provides a method for project/program evaluation.

Experience has shown that the IP2M METRR is best used as a tool to help project/program managers (project coordinators, project planners) organize and monitor progress of the IP2M using EVMS effort. In many cases, a planner may use the IP2M METRR prior to the existence of a team in order to understand major risk areas.

The IP2M METRR is an excellent tool to use in early project/program team meetings in that it provides a means for the team to align itself on the project/program and organize its work. Experienced IP2M METRR users feel that the final score is less important than the process used to arrive at that score. If the

organization has EVMS procedures and execution standards and deliverables in place, many EVMS attributes may be partially mature when the project/program begins implementing EVMS.

IP2M METRR Maturity Assessment

Individuals involved in assessing projects/programs should use the score sheets shown in Appendices A and B. Note that two score sheets are provided—the first is simply an unweighted scoresheet in Appendix A. The second contains the weighted values and allows a project/program team to quantify the level of maturity at any stage of the project/program life cycle on a 1000-point scale. The unweighted version should be used in the team scoring process to prevent bias in choosing the level of maturity and in "targeting" a specific score. Each attribute has a relative weight associated with it, and all maturity attribute scores roll up to a 1000-point scale, with higher scores being better. The score helps quantify the overall level of EVMS maturity for the project/program being assessed. The team leader or facilitator can easily score the project/program as the weighting session is being held using a paper version or the provided software. To be used effectively, the maturity tool should be used by personnel with the necessary experience, technical background, and training in the relevant subject matter.

As noted earlier, the IP2M METRR maturity component consists of 10 sub-processes. Each sub-process is then organized by attributes (56 total) reflecting a core characteristic that is essential to fielding an effective EVMS; these attributes are also given a score for each maturity level. The attributes are individually described in Appendix C showing maturity attribute descriptions in the left column of each matrix. Each attribute is evaluated on a 1 to 5 maturity scale: "1" means that work on this attribute has –not yet started; while "5" means the attribute has been optimized and is best in class –as indicated in the legend at the bottom of the score sheet. Attributes that are mature enough for a compliant system should receive a maturity level of "4". Attributes that are not yet mature should receive scores of "2" or "3", depending on their levels of maturity as determined by the team. Those attributes deemed not applicable for the project/program under consideration should be marked as N/A, thus not affecting the final maturity score. A clear justification must be added to explain why a certain attribute is considered not applicable or scored a maturity level of 3 or below.

Table 3.1 depicts the typical layout of a maturity attribute showing how each maturity level is graded. For each of the 56 attributes, each maturity level is described in detail to ensure an informed assessment. The descriptions of the maturity levels are additive, meaning that level 5 already includes everything that is in level 4; level 4 already includes everything that is in level 3, and so on. It should be noted that each attribute also contains additional technical details unique to it. Basic descriptions of the corresponding maturity levels with potential impacts are outlined in the list below:

- A maturity level of N/A indicates that the attribute is not required for the project/program and thus will not affect the overall maturity assessment.
- A maturity level of 5 indicates that the attribute is best in class. It has been completed, documented, and approved by key stakeholders, minimizing uncertainty, and will not affect cost and schedule estimates. At this level, the appropriate processes are continuously improved and optimized, routine surveillance results are fully disclosed with all appropriate stakeholders, and so on.
- A maturity level of 4 indicates that the attribute is compliant with EVMS guidelines and should not adversely affect cost and schedule estimates. At this level, there are no gaps. Any problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions.
- A maturity level of 3 indicates that the attribute is somewhat addressed, with minor gaps only, and may adversely affect cost and schedule estimates through further development.
- A maturity level of 2 indicates that for this attribute, only initial thoughts have been applied to the execution effort. It is expected that attributes with maturity level 2 have major gaps and high levels of uncertainty which will adversely impact cost, schedule, and operational characteristics of the project/program as well as compliance.
- A maturity level of 1 indicates that work on this attribute has not been started thus significantly affecting uncertainty around cost, schedule, and operational characteristics of the project/program.

Table 3.1. Structure of IP2M Maturity Attributes

SUB-PROCESS NAME	**Maturity Level**				
	LOW		**MEDIUM**		**HIGH**
Attribute name	**1**	**2**	**3**	**4**	**5**
Attribute description. Items to consider when evaluating this attribute across the levels: • Item The attribute should be integrated with the other specified EVMS sub-processes, mentioned here. *References:* References used to draft the attribute description and the detailed narratives.	**Not yet started.**	**Major gaps. High-level description of level 2.** Detailed narratives of maturity level 2 for this attribute.	**Minor gaps. High-level description of level 3.** Detailed narratives of maturity level 3 for this attribute.	**No gaps. High-level description of level 4.** Detailed narratives of maturity level 4 for this attribute. Note: at level 4, attribute is compliant with standards and guidelines.	**Best in class. High-level description of level 5.** Detailed narratives of maturity level 5 for this attribute.

IP2M METRR Environment Assessment

The environment assessment tool of IP2M using EVMS is meant to help stakeholders assess 27 factors affecting the quality of the project/program EVMS. Recall that environment is defined as "the conditions (i.e., people, culture, practices, and resources) that enable or limit the ability to manage the project/program using the EVMS, serving as a basis for timely and effective decision-making".

Appendices D and E contain the unweighted and weighted environment factors scoresheets and allow an IP2M team to quantify the level of EVMS effectiveness on a 1000-point scale, with higher scores being better/more effective. Similar to the maturity scoresheet, the unweighted version should be used in a team scoring process to prevent bias in choosing the level of definition or in "targeting" a specific score.

Each category contains six to eight factors related to the environment that supports EVMS development. The factors are individually described in Appendix F with *description* in the right column of each matrix. Table 3.2 is provided to illustrate how each of the environment factors is assessed. The assessor can choose one of five levels ranging from *Not Acceptable* to *High Performing* for each of the factors in terms of its description at the time of the assessment. Basic descriptions of the corresponding environment factor rating are outlined in the list below:

- A rating level of *High Performing* indicates that the factor's criteria is fully met within the context of its respective category.
- A rating level of *Meets Most* indicates that the factor's criteria are consistently met and understood, with minor gaps, leading to effective management of project/program.
- A rating level of *Meets Some* indicates that the factor's criteria are partially met and without improvement, the ability to effectively manage the project/program could be in jeopardy.
- A rating level of *Needs Improvement* indicates that the factor's criteria are not consistent in meeting project/ program expectations and without improvement, the ability to effectively manage the project/program is at risk. Substantial action is required to meet expectations.
- A rating level of *Not Acceptable* indicates that the factor's criteria are consistently below expectations and current performance is unacceptable. The ability to effectively manage the project/program cannot be achieved in this current state and actions are required to improve.

Table 3.2. Structure of IP2M Environment Factor Assessment

Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing
Factor title	Rating a factor Not Acceptable indicates that the factor's criteria are consistently below expectations and current performance is unacceptable. The ability to effectively manage the project/program cannot be achieved in this current state and actions are required to improve.	Rating a factor Needs Improvement indicates that the factor's criteria are not consistent in meeting project/ program expectations and without improvement, the ability to effectively manage the project/program is at risk. Substantial action is required to meet expectations.	Rating a factor Meets Some indicates that the factor's criteria are partially met and without improvement, the ability to effectively manage the project/program could be in jeopardy.	Rating a factor Meets Most indicates that the factor's criteria are consistently met and understood, with minor gaps, leading to effective management of project/program.	Rating a factor High Performing indicates the factor's criteria are fully met within the context of their respective category (e.g., culture, people, practices, or resources).

Adjusting the Score

If an organization is assessing maturity of a project/program which has many attributes that are deemed "not applicable," then caution must be taken in interpreting the results. Each time an attribute is deleted

from the score sheet, the maximum maturity score for the project/program is reduced by that attribute's weight at level 5, and the total score is adjusted accordingly in a relative fashion.

For example, on a project where subcontracting is not used nor required by the contract, the IP2M maturity can still be assessed effectively with some caution as some attributes may be deemed as not applicable for these projects/programs (e.g., I.1. Subcontract Identification and Requirements Flow Down, I.2. Subcontract Integration and Analysis, I.3. Subcontract Oversight). A "not applicable" attribute essentially provides no risk (no potential negative impact) to the project's score. If the three subcontracting attributes are not applicable for the project, their total combined 60 points would be deducted from the usual maximum possible score of 1,000, and now the new maximum possible maturity score for this project would be 940. Therefore, an 80% maturity score is now equivalent to 752 (out of 940) as opposed to 800 (out of 1,000).

A software has been developed to facilitate the maturity and environment assessments and calculations. Its description and direction to use can be found in Appendix H.

4. Assessment Example

The following discussion provides instructions for assessing both maturity and environment using the IP2M METRR. An example of an ongoing project is included as well.

Assessing an IP2M Maturity Attribute

To assess an attribute, the user should first refer to the un-weighted score sheet in Appendix A and then read its corresponding attribute description in Appendix C. Some attributes contain a list of items to be considered as their maturity levels are evaluated. These lists may be used as checklists. All elements have five pre-assigned scores, one for each of the five possible maturity levels along with the not applicable (N/A) option.

The maturity assessment tool consists of 10 sub-processes that are each broken down into 56 maturity attributes. The attributes are individually described in Appendix C: *IP2M Maturity Attribute Descriptions*. As previously indicated, maturity attributes are rated numerically from 1 to 5 with an N/A option. Those attributes deemed not applicable for the project/program under consideration should be marked and the score will be later adjusted such that they will not affect the final maturity score. All maturity attribute assessments will result in the final maturity score for the project/program.

Users should choose only one maturity level (1, 2, 3, 4, or 5) or N/A for an attribute, based on their perception of how well it has been addressed or if it is required by the project/program contract. The suggested method for making this determination is through open discussion among the project/program team members, using objective evidence as appropriate, with a consensus decision made. In considering the completeness of each maturity attribute, the IP2M team should consider the possible impact of this attribute on project/program performance. The team must have an adequate understanding of the issues with each attribute and the work required to achieve compliance and maturity.

As shown in Appendix C, each maturity attribute is described in the left column of the table. The requirements to meet each maturity level are briefly described in the bolded section at the top of the table, representing each score from 1 to 5. We call this bolded section “above the line” and use it to bracket the two short descriptions that most closely resemble the current status of the project. The detailed version of these requirements is described in the bottom row of the table for each level (i.e., below the line). First, the team reads the left side and understands what each attribute entails. Then, the five short sections in bold are read to narrow down to the two maturity levels that are closest to the status of the project/program. The detailed descriptions of these two maturity levels are then read to make a maturity level selection for the

project or program being assessed. In some organizations, metrics are established and used to provide an objective analysis of data and artifacts for the project/program with respect to these detailed descriptions.

On certain issues, it is important to defer to the most knowledgeable team members (for example, subcontract management issues should be deferred to a subcontract manager), while at the same time respecting the concerns of other team members. As the discussion unfolds, it is critical to capture action items or "gaps." Appendix I provides an example of an action item (gap) list for a sample completed project that used IP2M METRR as shown in Appendix J.

The maturity attributes that are compliant with the guidelines will perhaps require less work at this time. For attributes with minor gaps, a little more work will be needed, and the issues may not adversely affect project/program performance; however, the project/program team will need to track and address the minor gaps identified as the project/program proceeds into execution. For those attributes that are assessed as having some serious problems or major gaps, or are not compliant, the team will have to perform further mitigation during EVMS validation before the end of the implementation phase.

Once users have chosen the appropriate maturity level for each of the 56 attributes, they select the value of the score that corresponds to that level on the paper maturity score sheet shown in Appendix B. Alternatively, the IP2M METRR software discussed in Appendix H can be used to capture each score. Regardless, it is important to assess each attribute.

All of the attribute scores within a sub-process should be added together to produce a score for that sub-process. The 10 sub-processes scores should then be combined to determine the total IP2M maturity score. Finally, an IP2M maturity score can be extracted based on a 1000-point scale. The IP2M METRR software described in Appendix H will perform these steps automatically.

Assessing an IP2M Environment Factor

To assess an environment factor the user should first refer to the un-weighted score sheet in Appendix D and then read its corresponding description in Appendix F. Some factors contain a list of items to be considered as their rating levels are evaluated and these lists may be used as checklists. All factors have five pre-assigned scores, one for each of the five possible rating levels.

As noted earlier, the environment assessment tool consists of four main categories of factors. There is a total of 27 environment factors that have been shown to affect the outcome of IP2M using EVMS. The factors are individually described in Appendix F: *IP2M Environment Factor Descriptions*. Factors are rated from *Not Acceptable* to *High Performing*. The factors that are rated *High Performing* are considered fully defined and the factor's criteria are met within the context of their respective environment category. Factors that are rated *Not Acceptable* indicate that the factor's criteria are below expectations and current

performance is unacceptable. Each environment factor should receive a rating depending on its assessment. Rating all four environment factor categories will result in the final environment score for the project/program.

Users should choose only one rating level (*High Performing*, *Meets Most*, *Meets Some*, *Needs Improvement,* or *Not Acceptable*) for a factor, based on their perception of how well it has been addressed. The suggested methods for making this determination are either through open discussion among the project/program team members, through interviews and dialogues with key project/program team participants, or through comparison of project/program and executive team opinions. In considering the rating of each environment factor, the assessor(s) should consider the possible impact of this factor on project/program performance. The assessor(s) must have an adequate understanding of each environment factor and the actions required to improve it. Unlike the maturity assessment process, the assessors do not have to come to consensus on the environment rating level. Instead, they do the discussion as a group, but the scoring part is done individually with each individual providing their scores and comments. As with maturity, objective evidence may be used as appropriate to support the rating level.

Example of Maturity and Environment Assessment

Consider for example, that you are a member of the project/program team responsible for achieving a compliant EVMS for plant infrastructure and core facilities. Your team has identified major milestones throughout the EVMS validation process and times you plan to use the IP2M METRR tool to evaluate the current level of maturity and environment. Assume that at the time of this evaluation the project is at 5% project completion.

Maturity Assessment Example

Your responsibility is to evaluate how well the project material management requirements have been identified and implemented to date. This information is covered in sub-process H of the IP2M maturity assessment tool as shown below and consists of five elements: “Recording Actual Material Costs,” “Material Performance,”, “Residual Material”, “Material Price/Usage Variance”, and “Identification of Unit Costs and Lot Costs” as shown in Figure 4.1. It is recommended to use the unweighted assessment sheet when evaluating a project in a team setting.

SUB-PROCESS H: MATERIAL MANAGEMENT							
Attribute	Maturity Level						Comments
	N/A	1	2	3	4	5	
H.1. Recording Actual Material Costs							
H.2. Material Performance							
H.3. Residual Material							
H.4. Material Price/Usage Variance							
H.5. Identification of Unit Costs and Lot Costs							
Column Frequency Totals							

Maturity Levels
N/A= Not Applicable; 1 = Not Yet Started; 2 = Major Gaps; 3 = Minor Gaps; 4 = No Gaps; 5 = Best in Class

Figure 4.1. Unweighted Sub-process H. Material Management Score Sheet

To assess Sub-process H. Material Management, follow these steps:

Step 1: Read the description for each attribute in Appendix C. Visually scan the bolded first sentence from each of the five definition levels and bracket the two bolded sentences that most closely relate to your project's status. Read the detailed statements under each of the bolded sentences and select the one that most closely defines your project. The maturity attribute description for attribute *H1. Recording Actual Material Costs*, is given in Figure 4.2.

Step 2: Collect all data or input that you may need to properly evaluate and select the maturity level for each attribute in this sub-process. This may require obtaining input from other individuals involved in the EVMS validation effort.

SUB-PROCESS H: MATERIAL MANAGEMENT	Maturity Level				
	LOW		MEDIUM		HIGH
H.1. Recording Actual Material Costs	**1**	**2**	**3**	**4**	**5**
Material costs are collected in the accounting system and transferred to the Earned Value Management System (EVMS) allowing an accurate comparison to material budgets and the cost of material received and/or utilized. Material costs must be accurately charged to contract Control Accounts (CAs) using recognized, acceptable costing techniques. Actual Cost of Work Performed (ACWP) for materials are recorded on the same basis in which Budgeted Cost for Work Scheduled (BCWS) for materials are planned and Budgeted Cost for Work Performed (BCWP) for materials are claimed. But when progress payments are made based on proof of physical/technical accomplishment, then they form the basis for earned value. When necessary and significant, and when material actuals are not yet available, the use of estimated ACWP is required to ensure accurate performance measurement. Items to consider include: □ Processes are documented for planning, charging and taking material performance □ EVMS budgeting tool reports □ Accounting system (general ledger) □ Material control account plans, system and records □ Estimated ACWP log □ Vendor negotiation documentation □ Defined and documented categories of material □ Variance analysis reports □ Bill of Materials (BOM)/Priced Bill of Materials (PBOM)/indenture parts list for material □ Material commitment reports, inventory reports, purchase orders, and payment records □ Other Recording Actual Material Costs should be integrated with the Accounting Considerations sub-process and Analysis and Management Reporting sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 21; DoD EVMSIG GL 21; DOE CAG GL 21; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some documented processes exist ensuring material ACWP is recorded on the same basis as material BCWS is planned and material BCWP is claimed. Material is reconciled between the EVMS and accounting system annually or at contract completion.** Material anomalies identified during reconciliation are documented but may not be corrected and could recur. Incurred cost reports comparing the EVMS material ACWP to the accounting system (general ledger) are not available and the project/program is unable to demonstrate the EVMS material ACWP is consistent with the way material was budgeted and performance claimed. The project/program is also unable to determine whether material actuals/performance differences are due to timing (estimated actuals), or whether the cost variance and associated performance management is accurate.	**Most documented processes exist ensuring material ACWP is recorded on the same basis as its BCWS and BCWP, with a few gaps. Material ACWP is reconciled between the EVMS and accounting system quarterly and anomalies are corrected periodically.** Incurred cost reports comparing the EVMS material ACWP to the accounting system (general ledger) are available on a quarterly basis. This allows the project/program to determine quarterly whether material actuals/performance differences are due to timing (estimated ACWP) or errors. Issues identified during reconciliation are documented and corrected within the quarter, but this lag adversely impacts the material cost variance, Estimate at Completion (EAC), and associated performance measurement reported to the customer each month. Recording Actual Material Costs is coordinated with the Accounting Considerations sub-process and Analysis and Management Reporting sub-process.	**All processes are documented and approved ensuring material ACWP is recorded on the same basis as its BCWS and BCWP. Material ACWP is reconciled between the EVMS and accounting system each month and errors are documented and corrected typically within two accounting periods.** Incurred cost reports comparing the EVMS material ACWP to the accounting system (general ledger) are available each month. Estimated ACWP or accounting accruals are used, if needed. This allows the project/program to determine whether material actuals/performance differences are due to timing (estimated ACWP) or errors. Issues identified during reconciliation are documented, tracked to closure, accurately reported, and corrected expeditiously, typically within two accounting periods. Recording Actual Material Costs is fully integrated with the Accounting Considerations sub-process and Analysis and Management Reporting sub-process.	**The project/program proactively ensures material ACWP is consistent with the corresponding material budget and performance. Metrics are documented and maintained each month. Corrections are monitored to completion, typically within one accounting period.** A formal process has been implemented ensuring EVMS material ACWP is reconcilable to material budgets in the accounting system, on a monthly basis. Any anomalies identified during reconciliation are documented, tracked to closure, and corrected in the following accounting period. This ensures that the impact to material cost variances, EAC, and associated performance measurement are minimized, and the material data reported to the customer each month represents actual performance. Material costs are monitored and used for management control and are automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of material costs are fully disclosed with all key stakeholders. The recording of material costs is continuously improved and optimized.

Figure 4.2. Attribute H1. Recording Actual Material Costs Maturity Description

Step 3: Select the maturity level for each attribute as described below:

Attribute H1: Referring to Figures 4.1 and 4.2, **the project proactively ensures material ACWP is consistent with the corresponding material budget and performance. Metrics are documented and maintained each month. Corrections are monitored to completion, typically within one accounting period.** In this example, material costs for the project have been defined and documented. There is a rigorous review on actual cost of work performed in a timely manner. The corrections are properly and timely monitored. This attribute has high maturity. **Maturity Level = 5.**

Attribute H2: After looking at the description of Attribute H2 (in Appendix C), your team decides that this attribute has high maturity. **Maturity Level = 5.**

Attribute H3: After looking at the description of Attribute H3 (in Appendix C), your team realized that the material control system contains some processes addressing residual material, but the project is unable to identify residual material. **Maturity Level = 2.**

Attribute H4: After looking at the description of Attribute H4 (in Appendix C), your team decides that this attribute is well mature. **Maturity Level = 4.**

Attribute H5: After looking at the description of Attribute H5 (in Appendix C), your team realized that this attribute is not applicable for the project. **Maturity Level = N/A.**

As each attribute is assessed, be sure to capture action items/comments as the discussion progresses for reference in Step 6. This list is referred to as a "gap" list in that it identifies those issues that need to be addressed to move the project forward and identifies a gap in the EVMS activities. Figure 4.3 captures this step.

SUB-PROCESS H: MATERIAL MANAGEMENT							
Attribute	**Maturity Level**						**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**	
H.1. Recording Actual Material Costs						X	Rigorous review on actuals, in a timely manner.
H.2. Material Performance						X	
H.3. Residual Material			X				Need to plan heavy equipment and shipping materials resale.
H.4. Material Price/Usage Variance					X		
H.5. Identification of Unit Costs and Lot Costs	X						
Column Frequency Totals	**1**		**1**		**1**	**2**	

Maturity Levels
N/A= Not Applicable; 1 = Not Yet Started; 2 = Major Gaps; 3 = Minor Gaps; 4 = No Gaps; 5 = Best in Class

Figure 4.3. Unweighted Sub-process H. Material Management Score Sheet, Attributes Assessed and Gaps Captured

Step 4: For each attribute, circle the score that corresponds to its level of maturity. If the team feels that any or all of the attributes were not applicable for this project, they would have had a maturity level of "N/A". The weighted score sheet is given in Figure 4.4. Circle the chosen maturity levels for the assessed attribute.

SUB-PROCESS H: MATERIAL MANAGEMENT								
Attribute	**Maturity Level**						**Score**	**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**		
H.1. Recording Actual Material Costs		0	4	8	12	(15)	15	Rigorous review on actuals, in a timely manner.
H.2. Material Performance		0	4	8	11	(15)	15	
H.3. Residual Material		0	(2)	5	7	9	2	Need to plan heavy equipment and shipping materials resale.
H.4. Material Price/Usage Variance		0	3	6	(9)	12	9	
H.5. Identification of Unit Costs and Lot Costs	X	0	2	4	6	8	N/A	
Maximum Column Totals		**0**	**15**	**31**	**45**	**59**	**41**	

Maturity Levels
N/A= Not Applicable; 1 = Not Yet Started; 2 = Major Gaps; 3 = Minor Gaps; 4 = No Gaps; 5 = Best in Class

Figure 4.4. Weighted Sub-process H. Material Management Score Sheet, Attributes Assessed and Sub-process Scored

Step 5: Add the attribute scores to obtain a sub-process score as shown in Figure 4.4. Repeat this process for each attribute in the IP2M METRR maturity tool. In this example, the sub-process has a total score of 41. Add sub-process scores to obtain a raw maturity score on a 1000-point scale (remember, higher score is better here). Extract the maturity score into the adjustment equation at the end of Appendix B to obtain an adjusted maturity score on a 1000-point scale; alternatively, the IP2M METRR software will automatically calculate adjusted maturity.

Step 6: Take Action. In this example, Sub-process H has a total raw score of 41 (out of 59 total points) and probably needs more work particularly for attribute H3. Use the gap list to identify issues that need additional attention. Note that an example gap list is presented in Appendix I.

Environment Assessment Example

For the environment assessment, members of the project team either achieve consensus in a team environment (collectively) or individually evaluate it. In case of individual assessment, the scores are averaged across all participants for each factor to get the environment score for the project. Once again, at the timing of this evaluation, the project is at 5% project completion of the project. All of the environment assessments are anonymously collected and aggregated by the facilitator to get an average score for each that shows the team how they are performing. This example shows how an environment assessment is done by an individual respondent which is the same for a collective assessment.

One of the important tasks of the environment assessment is to help evaluate the project leadership team and how it is performing during EVMS validation. This information is covered in the environment category “People” as shown in Figure 4.5.

2. **People:** the people category addresses the individuals who represent the interests of their respective stakeholders (e.g., project business manager, project control analyst, project schedule analyst, acquisitions/subcontracts, control account manager, Integrated Project/Program Team (IPT) or line/resource management) and are adept in the relevant subject matter, in order to contribute to the process that leads to favorable project control outcomes.					
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing
2a. The **contractor team is experienced and qualified** in implementing and executing the EVMS.					
2b. The **customer team is experienced** in understanding and using EVM results to inform decision-making.					
2c. Project/program **leadership is defined, effective, and accountable**.					
2d. **Project/program stakeholder interests are appropriately represented** in the implementation and execution of the EVMS**.**					
2e. **Professional learning and education** of key individuals responsible for EVMS implementation and execution, **is appropriate** to meet project/program requirements.					
2f. **Team members** responsible for the EVMS implementation and execution phases **are co-located and/or accessible**.					
Column Frequencies					

Figure 4.5. Unweighted Category 2. People Score Sheet

To fill out the environment category, People, follow these steps:

Step 1: Read the description for each factor in Appendix F. Each factor has a specific description associated with it and should be considered when evaluating their rating levels. The description for Factor 2a is given in Figure 4.6.

2. **People**		
Factor	**Title**	**Description**
2a.	The **contractor team is experienced and qualified** in implementing and executing the EVMS.	The contractor leadership team (e.g., executive management, functional organizational manager, project/program manager, contracts manager) and the contractor's project/program team (e.g., project/program manager, project controls managers, control account managers) are experienced in implementing and executing the EVMS to inform decision-making on a project/program of similar size, scope, and/or location. They are also qualified to effectively implement and execute the EVMS based on relevant training, education, certification or past experience given the nature of the project/program, its level of risk, local conditions, schedule constraints and so on. Experience and qualification may differ for implementation versus execution of the EVMS. The contractor team should have the right mixture experienced to make sure that the outcomes are successful throughout the project/program. Previous experience increases the contractor leadership team's familiarity with the project/program planning, design, and execution sub-processes. Relevant experience is important because repetition plays a major role in both organizational learning (e.g., lessons learned, mentoring, continuous improvement) and in creating routines and capabilities in general. Realizing that everyone is inexperienced at some point, there should be a structured method for mentoring and professional development to bring these individuals up to the right level of technical knowledge and skills, given the nature of this specific project/program.

Figure 4.6. Factor 2a. Contractor Team Experience and Qualifications Description

Step 2: Collect all the input needed to properly evaluate and select the rating level for each factor in this environment category. This may require obtaining input from other individuals involved in the project/program who have knowledge of the environment.

Step 3: Select the rating level for each factor as described below:

Factor 2a: Using the definition given in Figure 4.6, the evaluator decides that the contractor team is somewhat experienced and qualified in implementing and executing the EVMS but could be improved. **Rating Level = Meets Some.**

Factor 2b: Referring to Factor 2b. in Appendix F, the evaluator decides that the customer team is not experienced in understanding and using EVM results to inform decision-making. **Rating Level = Needs Improvement.**

Factor 2c: After looking at the description of Factor 2c. in Appendix F, the evaluator decides that the project leadership is not defined, effective nor accountable. **Rating Level = Needs Improvement.**

Factor 2d: Similarly, the evaluator decides that the project stakeholder interests are somewhat appropriately represented in the implementation and execution of the EVMS. **Rating Level = Meets Some.**

Factor 2e: The evaluator decides that the professional learning and education of key individuals responsible for EVMS implementation and execution, is very good to meet project/program requirements. **Rating Level = High Performing.**

Factor 2f: The evaluator determines that team members responsible for the EVMS implementation and execution phases are co-located and/or accessible. **Rating Level = Meets Most.**

The results of this individual assessment of the People are shown in Figure 4.7. Again, be sure to capture action items/comments as the discussion progresses for reference in Step 6. This list is referred to as a "gap" list in that it identifies those issues that need to be addressed to move the project forward and identifies a gap in the EVMS activities.

2. **People:** the people category addresses the individuals who represent the interests of their respective stakeholders (e.g., project business manager, project control analyst, project schedule analyst, acquisitions/subcontracts, control account manager, Integrated Project/Program Team (IPT) or line/resource management) and are adept in the relevant subject matter, in order to contribute to the process that leads to favorable project control outcomes.					
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing
2a. The **contractor team is experienced and qualified** in implementing and executing the EVMS.			X		
2b. The **customer team is experienced** in understanding and using EVM results to inform decision-making.		X			
2c. Project/program **leadership is defined, effective, and accountable**.		X			
2d. **Project/program stakeholder interests are appropriately represented** in the implementation and execution of the EVMS**.**			X		
2e. **Professional learning and education** of key individuals responsible for EVMS implementation and execution, **is appropriate** to meet project/program requirements.					X
2f. **Team members** responsible for the EVMS implementation and execution phases **are co-located and/or accessible**.				X	
Column Frequencies					

Figure 4.7. Unweighted Category 2. People, All Factors Assessed

Step 4: For each factor, circle the score that corresponds to its rating level. The weighted score sheet is given below. Circle the chosen rating levels for the assessed factor as shown in Figure 4.8.

2. **People:** the people category addresses the individuals who represent the interests of their respective stakeholders (e.g., project business manager, project control analyst, project schedule analyst, acquisitions/subcontracts, control account manager, Integrated Project/Program Team (IPT) or line/resource management) and are adept in the relevant subject matter, in order to contribute to the process that leads to favorable project control outcomes.							
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing	Score	Comments
2a. The **contractor team is experienced and qualified** in implementing and executing the EVMS.	0	17	(34)	50	67	34	Team not experienced in EVMS at the level required by the client.
2b. The **customer team is experienced** in understanding and using EVM results to inform decision-making.	0	(13)	27	40	54	13	Customer EVMS team is very poor experience in EVMS.
2c. Project/program **leadership is defined, effective, and accountable**.	0	(12)	25	37	49	12	There are issues with who is in charge.
2d. **Project/program stakeholder interests are appropriately represented** in the implementation and execution of the EVMS**.**	0	8	(17)	25	34	17	EVMS team is a core group, that does not include outside stakeholders.
2e. **Professional learning and education** of key individuals responsible for EVMS implementation and execution, **is appropriate** to meet project/program requirements.	0	6	13	19	(25)	25	
2f. **Team members** responsible for the EVMS implementation and execution phases **are co-located and/or accessible**.	0	2	5	(7)	9	7	
Maximum Column Totals	**0**	**58**	**121**	**178**	**238**	**108**	

Figure 4.8. Weighted Category 2. People, All Factors and Category Scored

Step 5: Add the factor scores to obtain an environment type score as shown in Figure 4.8. Repeat this process for each environment factor in the tool. In this example, this category has a total score of 108 out of 238. However, this is only as scored by one team member. If the assessment is done on an individual basis and the team needs an aggregated score that represents the views of all the participants, the facilitator or project manager can calculate an aggregated average score from all the individual scores. The average score can then be compared against the maximum possible score for each factor to understand each factor's environment level in the project. Whether it is the aggregated average scores or a collective score, add the environment category scores to obtain the total environment score on a 1000-point scale.

Step 6: Take Action. In this example, "People" has a total score of 108 (out of 238 total points, where higher is better) and probably needs more work particularly for factors 2b and 2c. Use the gap list to identify issues that need additional attention. Since this is at 5% project completion, the decision makers still have time to improve the project environment from a project leadership perspective, with perhaps a lot that could be done. Note that an example gap list is presented in Appendix I.

5. What Do IP2M METRR Maturity and Environment Scores Mean?

Although the IP2M METRR is a new tool, it has been used on a number of projects and programs worth several billions of U.S. Dollars in capital investment. The following discussion provides an overview of these projects and programs that were evaluated during research investigations along with the maturity and environment scores results and associated performance metrics.

First, this chapter explains the assessment components, i.e., IP2M maturity and IP2M environment, and what their scores mean to project and program performance. The chapter provides insights around what to look for in the IP2M maturity and environment scores, and how organizations can learn from these assessments.

A high IP2M METRR maturity score represents a project/program EVMS that is mature and, in general, corresponds to an increased probability for project success. Lower scores signify that certain EVMS attributes lack adequate maturity for compliance. Similarly, a high environment score represents a project/program with a good team environment, which also corresponds to an increased probability of project success. Lower scores indicate that certain factors or attributes need action.

A large number of projects/programs have been evaluated by the research team using the IP2M METRR. For each of these projects/program, IP2M METRR scores and project success criteria were computed. Note that these projects/programs were scored after the fact while retrospectively looking at the project/program at 20% completion. An analysis of these data yielded a strong correlation between high (good) IP2M METRR scores and project success. For more information on the methodology and thresholds definition, see Report 5 EVMS Performance Journal Paper and Report 5 Annex A - EVMS maturity and environment performance workshops and data analysis.

The analysis revealed a significant difference in cost growth and schedule growth performance between the projects/programs scoring above 550 and the projects/programs scoring below 550 for maturity, and those scoring above 800 and below 800 for environment.

The sample size of collected data is 35 in total, with 28 projects and 7 programs representing approximately $21.8 billion in installed cost. These projects/programs are located in 17 U.S. states and territories, as follows: Alabama, California, Florida, Idaho, Illinois, Indiana, Louisiana, Missouri, New Mexico, New York, Pennsylvania, South Carolina, Tennessee, Texas, Virginia, Washington, and Washington DC. Table 5.1 shows the types of projects/programs represented, and Table 5.2 shows the descriptive statistics of the maturity and environment scores for this sample. It is important to note that the Table 5.2 shows both the raw maturity scores and the adjusted maturity scores for the collected sample. The transition from raw to adjusted was explained earlier in Chapter 3.

Table 5.1. Types of Project/programs

Type of projects/programs	Number of projects/programs
Construction	12
Defense	9
Environmental	6
Software	3
Aerospace	3
Science	2

Table 5.2. Project/programs Maturity and Environment Scores

	N	Mean	Median	Min	Max	Standard Deviation
Raw Maturity Score (out of 1,000)	35	616	629	57	887	176
Adjusted Maturity Score (out of 1,000)	35	657	703	78	898	182
Environment Score (out of 1,000)	35	657	686	200	897	158

The maturity and environment scores were plotted on a maturity-environment matrix, as shown in Figure 5.1. Threshold values for maturity (550) and environment (800) were calculated from a stepwise sensitivity analysis of the collected project performance data. For more details on how the thresholds were calculated, see Report 5 EVMS Performance Journal Paper, and Report 5 Annex A - EVMS maturity and environment performance workshops and data analysis. Figure 5.1 shows the data from 34 projects considering that one project in the sample was dropped since did not provide performance information.

One key outcome of the combined analysis is to be able to plot maturity and environment scores on a four-quadrant matrix and correlate these scores with performance. For instance, Figure 5.1 shows adjusted maturity and environment scores plotted for 34 large projects/programs (a similar matrix is automatically generated for your project when using the IP2M METRR software). Then cost change percentages and schedule change percentages for each project/program were calculated and studied for each quadrant. These are also shown in Figure 5.1.

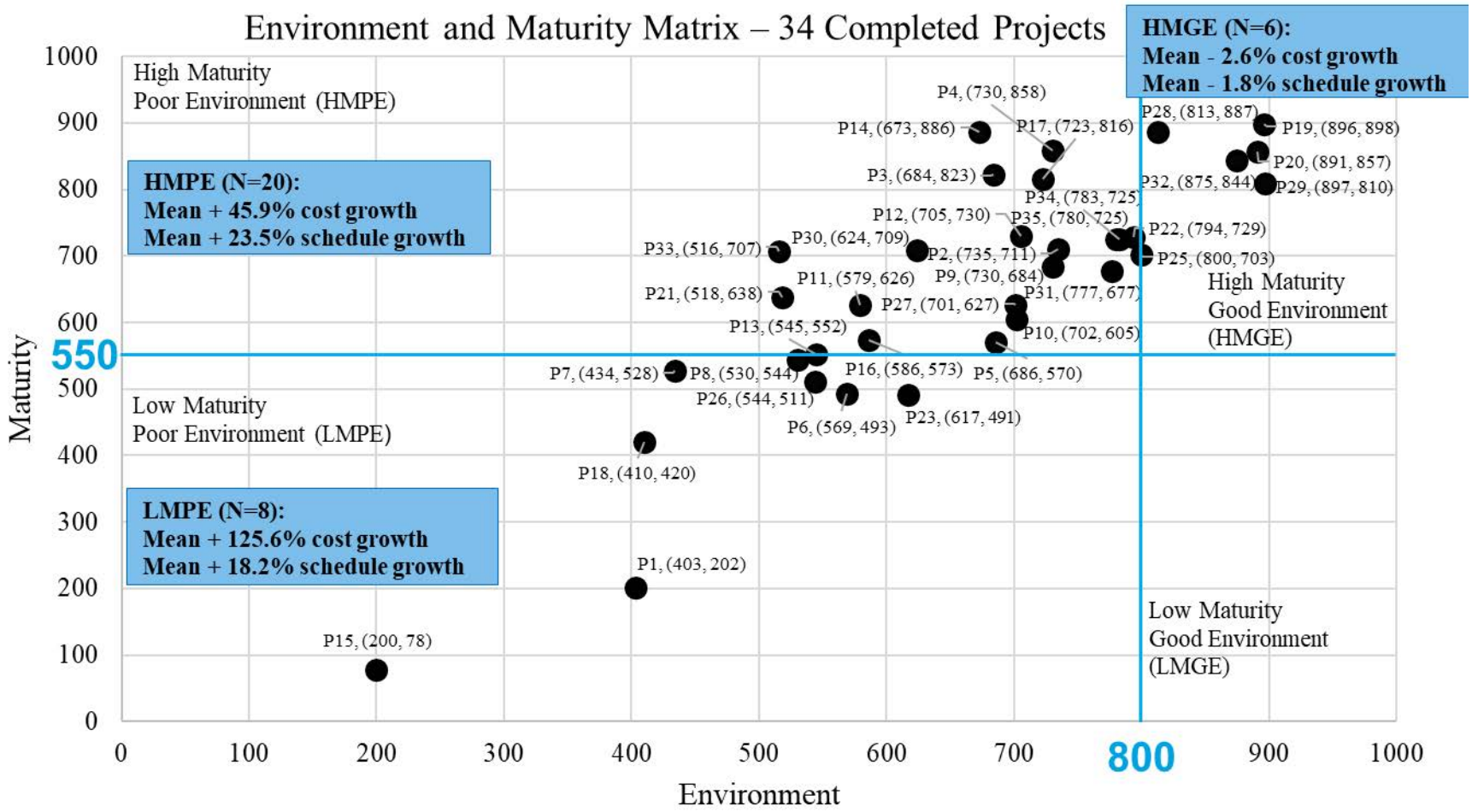

Figure 5.1. Environment-Maturity Matrix

The lower left corner (low maturity poor environment projects/programs) exhibited the largest cost growth and large schedule overruns. As for the high maturity good environment quadrant, negative cost growth and schedule growth were observed, meaning the projects exceeded their baseline cost and schedule objectives.

Figure 5.2 shows the same projects on a heat map with four bands for four different pairs of maturity and environment score thresholds based on data distributions. The sample used in this figure is 33 projects/programs considering that an outlier project was removed (for more details, see Report 5 EVMS Performance Journal Paper, and Report 5 Annex A - EVMS maturity and environment performance workshops and data analysis).

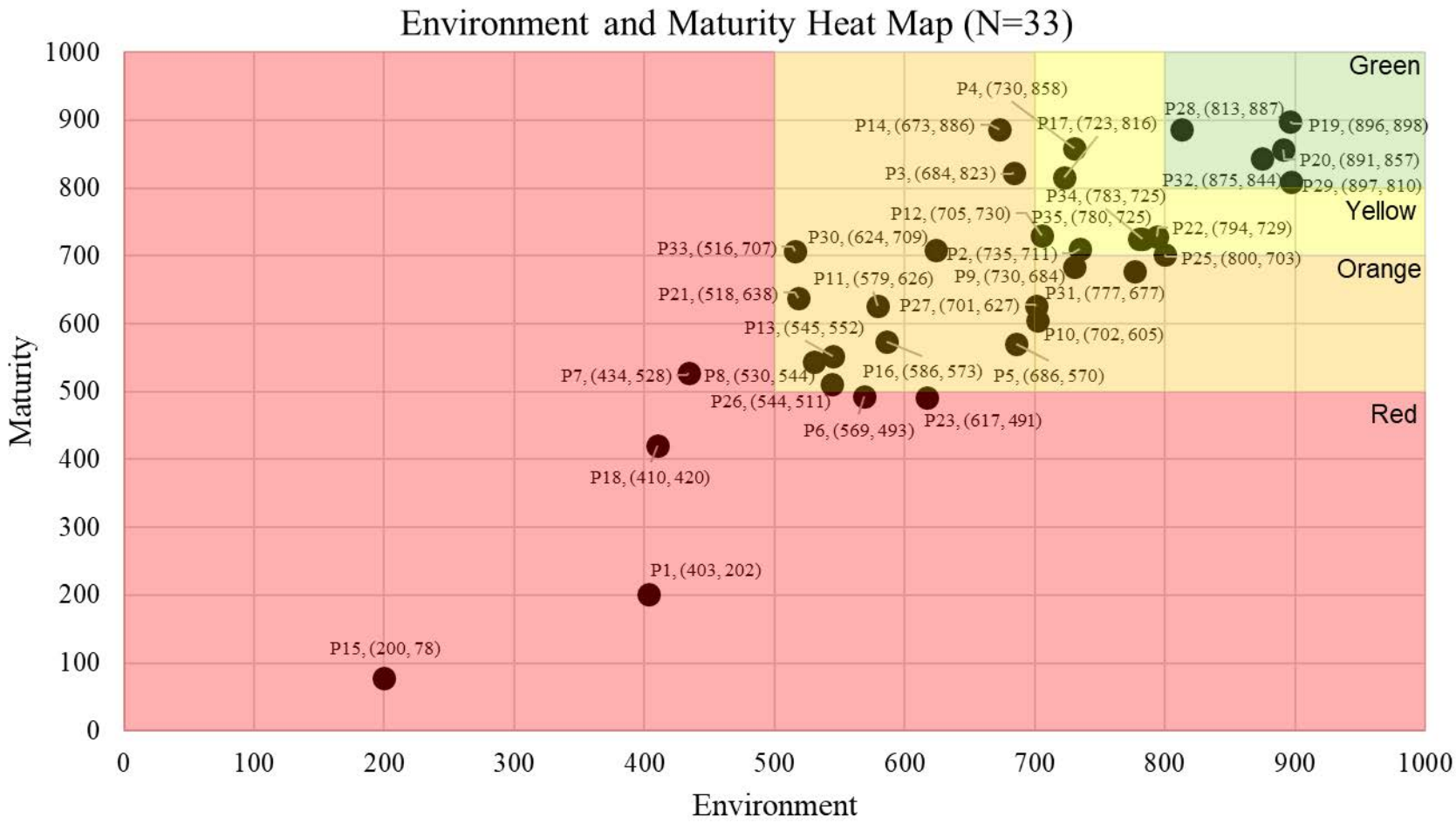

Figure 5.2. EVMS Environment and Maturity Heat Map

Next, Figure 5.3 shows the performance results across the heat map for cost and schedule growth, where cost growth and schedule growth are measured versus the performance measurement baseline (PMB) at 20% project completion. The results show that in the green zone (maturity and environment both >800), the mean cost growth and mean schedule growth are negative. This indicates that projects/programs in this zone exceed the requirements for cost and time. Projects/programs in the red zone (maturity and environment both <500) perform the worst in cost and schedule growth.

Similarly, Figure 5.4 shows the performance results across the heat map for other metrics relevant to project/program management concerns. These are: compliance with EIA748-D, meeting business objectives, customer satisfaction, and EVMS helped proactively manage the project/program. This is shown for the complete sample (N=35). The results show that projects/programs in the green zone are all compliant with EIA748-D guidelines, fully meet business objectives and customer satisfaction, and do quite well in terms of EVMS helping proactively manage the project/program. As for the projects/programs in the red zone, only 16.7% of them are compliant with EIA748-D guidelines, and they scored 2.7 (out of 5.0) on meeting business objectives, achieving customer satisfaction, and EVMS helping proactively manage the project.

GREEN (>800)	
N:	5
Mean Cost Growth:	-0.3%
Mean Schedule Growth:	-5.9%

YELLOW (700-799)	
N:	7
Mean Cost Growth:	+13.7%
Mean Schedule Growth:	+3.8%

ORANGE (500-699)	
N:	15
Mean Cost Growth:	+48.2%
Mean Schedule Growth:	+26.9%

RED (<500)	
N:	6
Mean Cost Growth:	+92.3%
Mean Schedule Growth:	+24.3%

Figure 5.3. Cost Growth and Schedule Growth Performance Across the Heat Map (N=33)

GREEN (>800)	
N:	5
Compliance with EIA-748-D:	100%
Meet Business Objectives:	5.0
Customer Satisfaction:	5.0
EVMS Helped Proactively Manage:	4.0

YELLOW (700-799)	
N:	8
Compliance with EIA-748-D:	100%
Meet Business Objectives:	4.4
Customer Satisfaction:	4.4
EVMS Helped Proactively Manage:	3.9

ORANGE (500-699)	
N:	16
Compliance with EIA-748-D:	62.5%
Meet Business Objectives:	4.3
Customer Satisfaction:	4.3
EVMS Helped Proactively Manage:	3.5

RED (<500)	
N:	6
Compliance with EIA-748-D:	16.7%
Meet Business Objectives:	2.7
Customer Satisfaction:	2.7
EVMS Helped Proactively Manage:	2.7

Figure 5.4. Additional Key Performance Metrics Across the Heat Map (N=35)

The evaluations provided here are valid for the sample of projects and programs that was studied. These samples may or may not be indicative of all projects/programs in a specific organization and the results may reflect the size and types of projects/programs making up the sample. However, the results are convincing in terms of statistical significance and performance predictability.

IP2M METRR was also tested on current (i.e., in-progress) projects/programs to observe its effectiveness in helping project/program teams to complete EVMS implementation activities. Depending on the complexity of the project/program and familiarity of the participants with the process, a maturity assessment session can take approximately three to five hours, while an environment assessment session can take approximately two to three hours per project/program.

IP2M METRR was tested on eight projects/programs (from seven organizations) representing over $2.7 billion in expenditures. The facilitated maturity sessions took about 3.5 hours on average involving key stakeholders who were asked to reach consensus to rate the 56 attributes. The participants were urged to provide comments related to any uncovered gaps, and consequently gap lists were developed by the facilitators including team comments and areas for improvement. Similarly, the facilitated environment sessions required 2.5 hours on average involving the key stakeholders. Discussion was encouraged but anonymous individual ratings were provided for each factor. These ratings were later consolidated by the facilitators and analyzed for key gaps to provide to the stakeholders. In each case, maturity and environment assessments gave the project/program team an effective method with which to evaluate EVMS implementation on the project/program.

These exercises showed the value and capability of the different components of the tool. In general, the feedback from these users was extremely positive. The maturity and environment components of the tool performed very well in identifying critical risk issues during the EVMS implementation process and spurred important conversations about attributes not yet considered by the project/program teams. The environment component specifically indicated that management changes sometimes needed to be made to the project/program teams. As one user stated: "*This tool will force the project/program team to take a closer look at the project/program reporting and management, which is a good thing*."

IP2M METRR worked very effectively to help the team identify potential gaps, and having an experienced facilitator helped. The ability to bracket maturity levels allowed teams to move through the 56 maturity attributes fairly quickly, with much of the time spent on the discussions of gaps. The same can be said for the environment assessment, with the teams being quite open and honest in their assessments.

Several users reported that the tool is easy to use due to having more clarity on the maturity attribute descriptions. Project/program teams also welcomed the environment component as it helped them see the organization's readiness along with a document available that can be used for discussions with upper

management. Some project/program teams used the environment component to evaluate the project/program and identify needed resources.

Analyzing IP2M METRR Maturity Scores — What to Look For

The IP2M METRR is of little value unless the user takes actions based on the analysis and uses the assessment to identify and mitigate risk for the project/program. Among the potential uses when analyzing the maturity score are the following:

- Track EVMS validation and implementation compliance, using the overall maturity score as a macro-evaluation tool. Individual attributes and sub-processes can be tracked as well.
- Compare project-to-project or program-to-program scores over time to identify trends in reaching compliant EVMS within your organization.
- Compare different types of projects/programs (e.g., aerospace versus defense) and determine a threshold IP2M METRR score for those projects/programs and identify critical success factors from that analysis. The IP2M METRR also can be used to compare projects/programs for different clients or different size projects/programs with the same client.

> **Depending on the nature of your business, your internal EVMS implementation practices, and your requirements, you may wish to determine a comfort level (range of IP2M maturity scores) at which you are willing to move a project or program forward, from phase to phase.**

- Look at weak areas of the project/program on a sub-process or attribute level. For example, if any attribute has a maturity level of 1, 2, or 3, further work on this attribute or develop a risk mitigation strategy. This provides an effective method of risk analysis since each attribute and sub-process is weighted relative to each other in terms of potential risk exposure. The identification of the project/program's weak areas is critical as the project/program team continues its progress toward execution and should provide "path forward" action items.
- Another method of evaluation is to look at the score of each sub-process as a percentage of its maximum score in order to focus attention on critical items for the project/program. For example, if your score for Sub-process A. Organizing is 47 points, then it is roughly 50% of its potential maximum score (96). The attributes in this sub-process would then need much more work.
- Sub-process J. Risk Management does not have as much weighting as the other maturity sub-processes. However, do not underestimate the importance of this sub-process. Risk management has two attributes only, but it is very critical to a compliant EVMS and project/program success. These issues can significantly impact the project/program in regard to risk, cost, and schedule performance.

- Sometimes project/program teams are pressured to achieve EVMS compliance in a short period of time. To streamline the process, the team could focus on the top 13 attributes listed in Figure 5.5. These 13 attributes comprise almost 33% of the total score. This is in accordance with the Pareto principle (i.e., the 80/20 rule) in that a large portion of the effects can be attributed to a small number of activities. See Appendix C for a description of each of the top 13 attributes. However, remember that integrated project/program management requires teams to address all attributes.

1.Identify and Analyze Risk (J1)
2.Risk Integration (J2)
3.Critical Path and Flow (B7)
4.Time-Phased Performance Measurement Baseline (B10)
5.Management Analysis and Corrective Actions (F4)
6.Estimates at Completion (F5)
7.Integrated System with Common Structures (A4)
8.Incorporate Changes in a Timely Manner (G2)
9.Product-Oriented Work Breakdown Structure(A1)
10.Authorized, Time-Phased Work Scope (B1)
11.Schedule Provides Current Status (B2)
12.Scope, Schedule and Budget Alignment (C1)
13.Subcontractor Integration and Analysis (I2)

TOTAL POINTS = 321/1000

Figure 5.5. Thirteen Highest Ranking IP2M Maturity Attributes

Analyzing IP2M METRR Environment Scores – What to Look For

Similar to the IP2M maturity assessment, the IP2M environment assessment provides most value when the user takes action to improve the environment of the EVMS implementation process. Table 5.3 (once again in accordance with the Pareto principle) represents the top five environment factors that project/program teams may want to focus on to best improve their environment score. These five factors alone represent 31% of the environment total score.

Table 5.3. Five Highest Ranking Environment Factors

Rank	Factor	Factor Description	"High Performing" Weight
1	1a	The contractor organization is supportive and committed to EVMS implementation, including making the necessary investments for regular maintenance and self-governance.	78
2	2a	The contractor team is experienced and qualified in implementing and executing the EVMS.	67
3	1b	The project/program culture fosters trust, honesty, transparency, communication, and shared values across functions.	60
4	1c	The customer organization is supportive and committed to the implementation and use of EVMS.	54
5	2b	The customer team is experienced in understanding and using EVM results to inform decision-making.	54
TOTAL			313

Project/program teams can use environment scores in a number of ways including the following:

- The environment scores can be used as a benchmark for comparing projects or programs.
- The environment score can be used to assess gaps in the culture, people, practices, and resources related to the EVMS effort. For example, if any factor has a rating of *Meets Some*, *Needs Improvement* or *Not Acceptable* the project/program team should further address this factor or develop a risk mitigation strategy for it. This provides an effective method of risk analysis, since each factor is weighted relative to the others in terms of importance. Identifying the project/program's gaps is critical as the project team progresses toward execution, and it should provide clear, impactful action items for the path forward.

IP2M METRR maturity and environment scores are one result of a project/program assessment session. Experience has shown that the gaps identified during the assessment as well as the team alignment that occurs as a result of the discussions in these sessions, are just as valuable, if not more valuable than the score itself.

6. Strategies to Implement IP2M METRR in an Organization

Implementation Across the Organization

The first step towards a successful implementation of the IP2M METRR in one's organization for project/program management is to begin with the end in mind. Users need to first think of the IP2M METRR as an efficient and effective integrated management decision support system. They need to start thinking about engaging it in the project/program's control plan as soon as possible and use it for the first time early in the project, at least at around 20 percent project/program completion if not before.

The users need to implement it as a way to not only assess the project/program performance in regard to compliance with EVMS guidelines, but also to foster positive project outcomes. The descriptions of the levels of maturity attributes and environment factors are not only there to serve as a benchmark to the existing processes, but also to urge the users to rethink their EVMS implementation and review process in an integrative manner. This activity will inform risk mitigation and support achieving project and program management goals.

An important requirement for implementation of the IP2M METRR across any organization (i.e., using it on all projects/programs) is the unwavering support of upper management. Upper management may want to create a procedure that lists the utilization of the IP2M METRR assessment as a requirement prior to authorizing a project/program to proceed, if it makes sense for your organization. Industry and government feedback indicates that many successful organizations already require initial internal assessments as part of their project/program start of EVMS validation process. The IP2M METRR will help organize and formalize such assessments, and uncover gaps along the way. As mentioned previously, projects/programs with an IP2M maturity score higher than 550 and IP2M environment score higher than 800 (measured at around 20% project completion), were found to perform significantly better. That's one of the reasons why organization-specific guidance that encourages the use of IP2M METRR to gauge maturity and environment early in the project, and at various stages in a project/program's lifecycle, can help.

As stated before, common sense should prevail when reviewing IP2M METRR results from a project/program. There is some risk in putting too much focus on just the score. Placing too much emphasis on the scores can lead to the use of the tool as a perfunctory administrative exercise rather than a beneficial project/program evaluation or risk assessment tool. The gap list and team alignment developed as part of the effort are perhaps as important, if not more important than the score itself.

Another helpful practice for implementation across an organization is to have a champion. This individual is an enthusiastic supporter and advocate of EVMS applications to support project performance.

He or she gains knowledge about the tool and fosters its widespread application by staying in contact with other organizations that use the tool.

Training for successful IP2M METRR implementation is another helpful practice, and several facilitators should be trained within an organization. The number of facilitators that are needed will vary depending on the size of the organization and the number of projects/programs that require compliance with EVMS requirements. The objective is to ensure that every project/program has access to a trained facilitator in a timely manner. The facilitator should not be a stakeholder of the project/program team. In many organizations, project/program managers are trained as facilitators for their peers' projects/programs.

In addition to developing a cadre of facilitators, organizations may want to ensure that users understand the IP2M METRR tool. In many cases, this can be accomplished with just-in-time training. At the outset of each session, the facilitator should brief the participants on the purpose of the maturity and environment assessment process and explain their respective roles in making the session (and the project) a success. As IP2M METRR is implemented across the organization, its use should be monitored, which also allows for internal benchmarking of your organization's projects/programs.

While an IP2M maturity target of 550 or higher and an IP2M environment target of 800 or higher are preferable from a project/program performance standpoint, at some point on the highest marks of the 1,000-point scale, EVMS may reach a point of diminishing returns where organizations should look to balance EVMS validation costs with overall project/program downstream costs and risks.

Internal Use Cases

Internal use cases follow, but are not limited to, two distinct categories:

1. **Single project/contract application**: A contractor or customer would apply the IP2M METRR to a single project/contract to determine where along the maturity spectrum the EVMS application was. This would provide the contractor valuable information on the culture, people, practices, or resources being utilized by the particular contract.
2. **Multiple project/contract application**: A contractor or customer would apply the IP2M METRR to multiple projects/contracts making up a program and then take each of the individual IP2M METRR "scores" and analyze the group of project/contracts. This analysis would be used to determine trends, and to determine consistency or inconsistency in EVMS applications across the program. In this assessment a company could determine if the EVMS is consistently applied contract by contract or if positive or negative outliers exist.

Although not a unique use case, a comparison from different time periods applied to the two cases outlined above can be beneficial. Users may apply the IP2M METRR at different points in time, for example

every six months. This concept could be applied to single or multiple contracts and would be beneficial in determining maturity changes over time. This may be a result of changes to culture, people, practices, or resources. The differences could be assessed using root cause analysis techniques to understand the underlying cause of any substantial changes and enable the project/program team to make changes to environment factors to facilitate better project/program management information.

By applying the above use cases a company could monitor the maturity of the EVMS on a contract or on all their contracts, therefore providing critical information to determine the level of confidence management should have on the data output produced by the system. This application could provide the needed information for a contractors' self-assessment and internal governance which typically occur annually.

There are various points along a project/program lifecycle to apply the IP2M METRR on contracts such as: post baseline development, program re-plans, after incorporating significant scope changes, prior to internal or external reviews (including certification or surveillance reviews), after significant process, or after tool changes (including changes to interface tools that may affect the system integrity). Although these use case points are not all inclusive, they are provided as a general guide of when to apply the IP2M METRR assessment. The specific application strategy should be evaluated to maximize benefit to the project/program management's assessment of the EVMS.

Although the IP2M METRR can be used at various points in a project/program's life cycle, application during the initial start-up (less than 5% complete) as well as near completion may be limited. Initial start-up may only benefit from certain aspects of the framework while near completion would not be seen as useful. Early in the lifecycle is generally considered to be in the first 90 days or less than 5% complete; whichever is sooner. At this point in time, the project/program is in the baseline phase of work decomposition and initial planning; thus, there might be instable data possibly not reflective of an accurate IP2M METRR assessment. Similarly, later in the project/program existence, typically acknowledged as more than 90% complete, the benefit of the IP2M METRR assessment leaves little or no time to incorporate root cause analysis and corrective action; therefore, the exercise may not be considered as beneficial.

External Use Cases

External use cases follow, but are not limited to, two distinct categories:

1. **A single external agency or organization use**: The contractor's IP2M METRR results could be used by an external agency to determine where along the maturity spectrum the EVMS application exists. This would provide the external agency valuable information on the culture, people, practices, and resources being utilized by the contractor. Clearly, this would depend on

the level of trust between the external agency and the contractor to rely on the integrity of the IP2M METRR assessment. If trust between the two entities existed, this could be a cost and time savings approach to both EVMS surveillance and compliance review. Use of a common tool and common criteria would lead to a more collaborative approach to data integrity assessment. If the external agency is concerned about the contractor's objectivity, the IP2M METRR could still be used as a starting point to determine risk areas for additional external reviews. Again, this could assist in streamlining evaluation and therefore can be mutually beneficial.

2. **Multiple external agencies or organizations**: If the IP2M METRR application is generally accepted across multiple external agencies, then general acceptance of results could be the conclusion. If these principles are accepted, the IP2M METRR could provide a framework for reciprocity across agencies, therefore eliminating redundancy, excess cost burden both on the contracting community and the external government agencies. Again, the credibility of the contractor and the external agency assessment would be considered in this approach.

IP2M METRR Selective Component Use

The IP2M METRR can be used as a comprehensive assessment tool, or parts of the IP2M METRR could be used to assess various processes and their inputs/outputs at various points in time. For example, in the early phases, the planning and scheduling elements could be assessed to determine if those elements are tracking appropriately. During the execution phase a broader application can be applied.

In some cases, users can choose to perform an evaluation for just one of the two components of the tool, say, the IP2M maturity only. This approach is practical when the project has no obvious issues but perhaps the team is not well experienced in following certain EVMS guidelines or the project owner does not have clear EVMS requirements, and where the project team is wanting to ensure that their integrated project management system has no "blind spots."

Other project teams may be comfortable with their system's maturity but are looking to conduct an environment assessment only, to ensure the context of the project supports successful outcomes. A key to achieve the most out of an environment assessment is to have it facilitated by a third party. Also, it is a best practice to collect separate individual environment assessments from each of the team members anonymously, since anonymity would allow them to be more critical and direct in their evaluations. This is important since not all team members have the same view regarding where the environment of the team stands, especially when it comes to people-related factors. Moreover, having the customer perform an environment assessment as well as the contractor, and engaging with these review teams, will align points

of view and allow the customer to understand the issues the contractor is having, and most importantly communicating these issues to the customer in a manner that would help the project. Assessments also allow the contractor to reflect on where they stand in matters relevant to available resources and existing adequate processes.

When both environment and maturity are assessed, if the project/program exhibits a low IP2M environment score combined with a high IP2M maturity score, one should be concerned about the efficacy of the maturity without the right environment. If a project/program exhibits a high environment score combined with a low maturity score, then perhaps the team has not been allowed the time and resources needed to reach adequate maturity.

How IP2M METRR Scores Can Inform Organizations

When it comes to EVMS compliance, the IP2M METRR scores cover a spectrum with the less mature scores identifying an implementation which would present a higher risk of being compliant. In contrast, the higher end of the maturity spectrum scores would identify an implementation which has a higher probability of being compliant. Therefore, the probability of system "compliance" is in relation to where the project/program lies along this spectrum.

Keeping a corporate or organizational database of IP2M METRR maturity and environment scores may be desirable. As more projects/programs are completed and assessed with IP2M METRR, the ability to predict the probability of success on future projects/programs should improve. Organizations may come to depend on IP2M METRR as a gauge for deciding how to and when to move forward with projects, versus when to wait and invest to ensure the systems mature to a level that can support a successful project. Another use for IP2M METRR is as an external benchmark for measurement against EVMS guidelines and other industry and government standards.

In this study, we also found that environment and maturity are closely correlated, and maturity is oftentimes a function of environment. Or in other words, a good project/program's environment is expected to yield better levels of maturity. Hence, although maturity is the key to satisfy EVMS guidelines; good team environment is critical to achieve a reliable EVMS within an integrated project/program setting.

7. Concluding Remarks

IP2M METRR can benefit customers, developers, consultants, and contractors. Federal project/programs customers and developers can use it as an assessment tool for establishing a comfort level at which they are willing to control projects/programs. Contractors can use it as a means of communicating with customers in identifying EVMS guidelines attributes that are adequate versus those that still need work. IP2M METRR provides a forum for all project/program participants to communicate and reconcile differences using an objective tool as a common basis for assessing integrated project/program management using EVMS. It also provides excellent input into the execution process in the form of the maturity measure and a solid baseline for risk management.

Anyone who wishes to improve the overall performance on their complex projects/programs should use IP2M METRR.

How to Improve Performance on Future Projects/Programs

The following suggestions can help those who adopt the IP2M METRR with the desire to improve performance on their complex projects/programs:

- **Use IP2M METRR to assess your large, complex projects/programs.** The IP2M maturity and IP2M environment assessments have been shown to improve your project/program performance.
- **Commit to early project/program EVMS assessment.** Effective assessments in the early stages of complex projects/programs can identify gaps to resolve in order to greatly enhance cost, schedule, and operational performance while minimizing the possibility of financial failures.
- **Gain and maintain project/program team alignment** by using the IP2M METRR periodically during EVMS implementation. The IP2M environment measurement provides a proxy metric focused in part on team alignment. In addition, discussions around the score sheets are particularly effective in helping with team alignment.
- **Address gaps identified using IP2M METRR** as part of a continuing improvement process to enhance maturity and environment as EVMS implementation progresses on each project/program.
- **Use IP2M METRR to improve project/program portfolio performance**. Build your own internal database of projects/programs that are assessed using IP2M METRR. Compute IP2M maturity scores and IP2M environment scores at various times during EVMS implementation and compare versus project/program success. Based upon the relationship between IP2M METRR scores and project/program success, establish a basis for the level of maturity and environment that

is acceptable for controlling the project/program and making informed decisions accordingly. Also, gaps identified with the maturity and environment assessments can be used to improve the overall integrated project/program management for the organization.

- **Maturity and environment scores are only a portion of the output.** While IP2M METRR maturity and environment scores are correlated with project/program performance, another valuable output from the process is the insight that can be gleaned from the remarks, gaps, lessons learned, and coordinating tasks identified during the assessment session(s). Using this output, executive leadership (e.g., project sponsor, executive steering committees) has increased visibility into the project and can better assess where and how to commit resources to enhance project/program performance.

Research has shown that the IP2M METRR can effectively be used to improve project/program performance.

Appendix A: Unweighted IP2M Maturity Score Sheet

SUB-PROCESS A: ORGANIZING							
Attribute	Maturity Level						Comments
	N/A	1	2	3	4	5	
A.1. Product-Oriented Work Breakdown Structure (WBS)							
A.2. Work Breakdown Structure (WBS) Hierarchy							
A.3. Organizational Breakdown Structure (OBS)							
A.4. Integrated System with Common Structures							
A.5. Control Account (CA) to Organizational Element							
Column Frequency Totals							

SUB-PROCESS B: PLANNING AND SCHEDULING							
Attribute	Maturity Level						Comments
	N/A	1	2	3	4	5	
B.1. Authorized, Time-Phased Work Scope							
B.2. Schedule Provides Current Status							
B.3. Horizontal Integration							
B.4. Vertical Integration							
B.5. Integrated Master Schedule (IMS) Resources							
B.6. Schedule Detail							
B.7. Critical Path and Float							
B.8. Schedule Margin (SM)							
B.9. Progress Measures and Indicators							
B.10. Time-Phased Performance Measurement Baseline (PMB)							
Column Frequency Totals							

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION							
Attribute	Maturity Level						Comments
	N/A	1	2	3	4	5	
C.1. Scope, Schedule and Budget Alignment							
C.2. Summary Level Planning Packages (SLPPs)							
C.3. Work Authorization Documents (WADs)							
C.4. Work Authorization Prior to Performance							
C.5. Budgeting by Elements of Cost (EOC)							
C.6. Work Package Planning, Distinguishability, and Duration							
C.7. Measurable Units and Budget Substantiation							
C.8. Appropriate Assignment of Earned Value Techniques (EVTs)							
C.9. Identify and Control Level of Effort (LOE) Work Scope							
C.10. Identify Management Reserve (MR) Budget							
C.11. Undistributed Budget (UB)							
C.12. Reconcile to Target Cost Goal							
Column Frequency Totals							

SUB-PROCESS D: ACCOUNTING CONSIDERATIONS							
Attribute	Maturity Level						Comments
	N/A	1	2	3	4	5	
D.1. Direct Costs							
D.2. Actual Cost Reconciliation							
D.3. Recording Direct Costs to Control Accounts (CAs) and/or Work Packages (WPs)							
D.4. Direct Cost Breakdown Summary							
Column Frequency Totals							

SUB-PROCESS E: INDIRECT BUDGET AND COST MANAGEMENT							
Attribute	Maturity Level						Comments
	N/A	1	2	3	4	5	
E.1. Indirect Account Organization Structure							
E.2. Indirect Budget Management							
E.3. Record/Allocate Indirect Costs							
E.4. Indirect Variance Analysis							
Column Frequency Totals							

SUB-PROCESS F: ANALYSIS AND MANAGEMENT REPORTING							
Attribute	Maturity Level						Comments
	N/A	1	2	3	4	5	
F.1. Calculating Variances							
F.2. Variances to Control Accounts (CAs)							
F.3. Performance Measurement Information							
F.4. Management Analysis and Corrective Actions							
F.5. Estimates at Completion (EAC)							
Column Frequency Totals							

SUB-PROCESS G: CHANGE CONTROL							
Attribute	Maturity Level						Comments
	N/A	1	2	3	4	5	
G.1. Controlling Management Reserve (MR) and Undistributed Budget (UB)							
G.2. Incorporate Changes in a Timely Manner							
G.3. Baseline Changes Reconciliation							
G.4. Control of Retroactive Changes							
G.5. Preventing Unauthorized Revisions to the Contract Budget Base (CBB)/Project Budget Base (PBB)							
G.6. Over Target Baseline (OTB)/Over Target Schedule (OTS) Authorization							
Column Frequency Totals							

SUB-PROCESS H: MATERIAL MANAGEMENT							
Attribute	Maturity Level						Comments
	N/A	1	2	3	4	5	
H.1. Recording Actual Material Costs							
H.2. Material Performance							
H.3. Residual Material							
H.4. Material Price/Usage Variance							
H.5. Identification of Unit Costs and Lot Costs							
Column Frequency Totals							

SUB-PROCESS I: SUBCONTRACT MANAGEMENT							
Attribute	Maturity Level						Comments
	N/A	1	2	3	4	5	
I.1. Subcontract Identification and Requirements Flow Down							
I.2. Subcontractor Integration and Analysis							
I.3. Subcontract Oversight							
Column Frequency Totals							

SUB-PROCESS J: RISK MANAGEMENT							
Attribute	Maturity Level						Comments
	N/A	1	2	3	4	5	
J.1. Identify and Analyze Risk							
J.2. Risk Integration							
Column Frequency Totals							

Appendix B: Weighted IP2M Maturity Score Sheet

SUB-PROCESS A: ORGANIZING								
Attribute	**Maturity Level**						**Score**	**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**		
A.1. Product-Oriented Work Breakdown Structure (WBS)		0	5	11	16	22		
A.2. Work Breakdown Structure (WBS) Hierarchy		0	5	10	14	19		
A.3. Organizational Breakdown Structure (OBS)		0	4	7	11	14		
A.4. Integrated System with Common Structures		0	6	11	17	23		
A.5. Control Account (CA) to Organizational Element		0	4	9	13	18		
Column Totals		**0**	**24**	**48**	**71**	**96**		

SUB-PROCESS B: PLANNING AND SCHEDULING								
Attribute	**Maturity Level**						**Score**	**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**		
B.1. Authorized, Time-Phased Work Scope		0	6	11	17	22		
B.2. Schedule Provides Current Status		0	6	11	17	22		
B.3. Horizontal Integration		0	5	10	15	21		
B.4. Vertical Integration		0	5	10	14	19		
B.5. Integrated Master Schedule (IMS) Resources		0	4	9	13	17		
B.6. Schedule Detail		0	5	9	14	18		
B.7. Critical Path and Float		0	7	13	20	27		
B.8. Schedule Margin (SM)		0	2	5	7	10		
B.9. Progress Measures and Indicators		0	5	11	16	21		
B.10. Time-Phased Performance Measurement Baseline (PMB)		0	6	13	19	25		
Column Totals		**0**	**51**	**102**	**152**	**202**		

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION								
Attribute	Maturity Level						Score	Comments
	N/A	1	2	3	4	5		
C.1. Scope, Schedule and Budget Alignment		0	5	11	16	22		
C.2. Summary Level Planning Packages (SLPPs)		0	2	3	5	6		
C.3. Work Authorization Documents (WADs)		0	4	8	13	17		
C.4. Work Authorization Prior to Performance		0	3	6	9	12		
C.5. Budgeting by Elements of Cost (EOC)		0	4	8	12	16		
C.6. Work Package Planning, Distinguishability, and Duration		0	4	8	12	16		
C.7. Measurable Units and Budget Substantiation		0	4	7	11	15		
C.8. Appropriate Assignment of Earned Value Techniques (EVTs)		0	5	10	15	20		
C.9. Identify and Control Level of Effort (LOE) Work Scope		0	3	7	10	13		
C.10. Identify Management Reserve (MR) Budget		0	4	8	12	17		
C.11. Undistributed Budget (UB)		0	3	6	8	11		
C.12. Reconcile to Target Cost Goal		0	3	7	10	13		
Column Totals		**0**	**44**	**89**	**133**	**178**		

SUB-PROCESS D: ACCOUNTING CONSIDERATIONS								
Attribute	Maturity Level						Score	Comments
	N/A	1	2	3	4	5		
D.1. Direct Costs		0	4	9	13	17		
D.2. Actual Cost Reconciliation		0	5	9	14	18		
D.3. Recording Direct Costs to Control Accounts (CAs) and/or Work Packages (WPs)		0	5	9	14	18		
D.4. Direct Cost Breakdown Summary		0	3	6	9	12		
Column Totals		**0**	**17**	**33**	**50**	**65**		

SUB-PROCESS E: INDIRECT BUDGET AND COST MANAGEMENT								
Attribute	Maturity Level						Score	Comments
	N/A	1	2	3	4	5		
E.1. Indirect Account Organization Structure		0	3	6	9	12		
E.2. Indirect Budget Management		0	4	8	12	16		
E.3. Record/Allocate Indirect Costs		0	3	7	10	14		
E.4. Indirect Variance Analysis		0	3	7	10	13		
Column Totals		**0**	**13**	**28**	**41**	**55**		

SUB-PROCESS F: ANALYSIS AND MANAGEMENT REPORTING								
Attribute	Maturity Level						Score	Comments
	N/A	1	2	3	4	5		
F.1. Calculating Variances		0	4	8	12	17		
F.2. Variances to Control Accounts (CAs)		0	5	10	15	19		
F.3. Performance Measurement Information		0	5	10	16	21		
F.4. Management Analysis and Corrective Actions		0	7	13	20	26		
F.5. Estimates at Completion (EAC)		0	6	13	19	26		
Column Totals		**0**	**27**	**54**	**82**	**109**		

SUB-PROCESS G: CHANGE CONTROL								
Attribute	Maturity Level						Score	Comments
	N/A	1	2	3	4	5		
G.1. Controlling Management Reserve (MR) and Undistributed Budget (UB)		0	5	11	16	21		
G.2. Incorporate Changes in a Timely Manner		0	6	11	17	23		
G.3. Baseline Changes Reconciliation		0	5	10	15	20		
G.4. Control of Retroactive Changes		0	5	9	14	19		
G.5. Preventing Unauthorized Revisions to the Contract Budget Base (CBB)/Project Budget Base (PBB)		0	5	10	16	21		
G.6. Over Target Baseline (OTB)/Over Target Schedule (OTS) Authorization		0	3	6	9	12		
Column Totals		**0**	**29**	**57**	**87**	**116**		

SUB-PROCESS H: MATERIAL MANAGEMENT								
Attribute	Maturity Level						Score	Comments
	N/A	1	2	3	4	5		
H.1. Recording Actual Material Costs		0	4	8	12	15		
H.2. Material Performance		0	4	8	11	15		
H.3. Residual Material		0	2	5	7	9		
H.4. Material Price/Usage Variance		0	3	6	9	12		
H.5. Identification of Unit Costs and Lot Costs		0	2	4	6	8		
Column Totals		**0**	**15**	**31**	**45**	**59**		

SUB-PROCESS I: SUBCONTRACT MANAGEMENT								
Attribute	**Maturity Level**						**Score**	**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**		
I.1. Subcontract Identification and Requirements Flow Down		0	5	9	14	19		
I.2. Subcontractor Integration and Analysis		0	6	11	17	22		
I.3. Subcontract Oversight		0	5	9	14	19		
Column Totals		**0**	**16**	**29**	**45**	**60**		

SUB-PROCESS J: RISK MANAGEMENT								
Attribute	**Maturity Level**						**Score**	**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**		
J.1. Identify and Analyze Risk		0	8	16	24	32		
J.2. Risk Integration		0	7	14	21	28		
Column Totals		**0**	**15**	**30**	**45**	**60**		

IP2M Maturity raw score is transformed to IP2M maturity adjusted score by the following formula:

$$\frac{\text{IP2M maturity raw score}}{1{,}000 - \sum \text{maturity level 5 scores of the attributes assessed as "N/A"}} \times 1{,}000$$

IP2M MATURITY TOTAL SCORE

(Maximum Score = 1,000)

This score represents the maturity score between 0 and 1,000 with 1,000 having the highest maturity level.

Appendix C: IP2M Maturity Attribute Descriptions

The following maturity attribute descriptions help generate a clear understanding of the terms used in the project/program score sheet. Attribute descriptions include checklists of items to consider. These checklists clarify concepts and facilitate ideas, to make the assessment of each attribute easier. Note that these checklists are not all-inclusive, and that the user may supplement them when necessary; in some cases, items in the checklists are not applicable, so the user should just ignore them.

The descriptions follow the order in which they are presented in the project/program score sheet and are each contained on one page; they are organized in a hierarchy by sub-process then attribute. Users assess and select the maturity of each attribute by evaluating their project/program against the maturity level descriptions.

In case the user identifies any of the attributes as Not Applicable (N/A) to their project/program, the attribute(s) under consideration should be marked N/A accompanied with a justification for the N/A choice.

The following discussion lays out the structure of the tool at the sub-process level:

A. Organizing is *the sub-process that begins at project/program inception and includes preparations for executing the project/program's technical objectives, such as defining the Work Breakdown Structure and other organizational elements necessary for planning and control.* This sub-process includes the following five attributes:
    - A.1. Product-Oriented Work Breakdown Structure (WBS)
    - A.2. Work Breakdown Structure (WBS) Hierarchy
    - A.3. Organizational Breakdown Structure (OBS)
    - A.4. Integrated System with Common Structures
    - A.5. Control Account (CA) to Organizational Element

B. Planning and Scheduling is *the sub-process that aims to develop the project/ program's integrated master schedule, resource requirements, and performance measurement baseline for effective management.* This sub-process includes the following 10 attributes:
    - B.1. Authorized, Time-Phased Work Scope
    - B.2. Schedule Provides Current Status
    - B.3. Horizontal Integration
    - B.4. Vertical Integration
    - B.5. Integrated Master Schedule (IMS) Resources

B.6. Schedule Detail
B.7. Critical Path and Float
B.8. Schedule Margin (SM)
B.9. Progress Measures and Indicators
B.10. Time-Phased Performance Measurement Baseline (PMB)

C. Budgeting and Work Authorization is *the sub-process for allocating cost targets to individual segments of authorized work, providing permission only for authorized work to occur, and reflecting the authorized changes to budget.* This sub-process includes the following 12 attributes:

C.1. Scope, Schedule and Budget Alignment
C.2. Summary Level Planning Packages (SLPPs)
C.3. Work Authorization Documents (WADs)
C.4. Work Authorization Prior to Performance
C.5. Budgeting by Elements of Cost (EOC)
C.6. Work Package Planning, Distinguishability, and Duration
C.7. Measurable Units and Budget Substantiation
C.8. Appropriate Assignment of Earned Value Techniques (EVTs)
C.9. Identify and Control Level of Effort (LOE) Work Scope
C.10. Identify Management Reserve (MR) Budget
C.11. Undistributed Budget (UB)
C.12. Reconcile to Target Cost Goal

D. Accounting Considerations is *the sub-process for coordination between the control accounts and the organization's accounting system for accurate reporting of project/program direct and indirect costs.* This sub-process includes the following four attributes:

D.1. Direct Costs
D.2. Actual Cost Reconciliation
D.3. Recording Direct Costs to Control Accounts (CAs) and/or Work Packages (WPs)
D.4. Direct Cost Breakdown Summary

E. Indirect Budget and Cost Management is *the sub-process to establish, control, and manage the project/program indirect budgets and costs (e.g., indirect rates, indirect cost variances, indirect account structure).* This sub-process includes the following four attributes:

E.1. Indirect Account Organization Structure
E.2. Indirect Budget Management
E.3. Record/Allocate Indirect Costs
E.4. Indirect Variance Analysis

F. Analysis and Management Reporting is *the sub-process for calculating, analyzing, and reporting the cost and schedule variances, along with providing reasons for significant variances, implementing corrective actions, and calculating new Estimates at Completion.* This sub-process includes the following five attributes:

F.1. Calculating Variances
F.2. Variances to Control Accounts (CAs)
F.3. Performance Measurement Information
F.4. Management Analysis and Corrective Actions
F.5. Estimates at Completion (EAC)

G. Change Control is *the sub-process for systematically controlling, analyzing, communicating, and recording the changes to the project/program baseline (e.g., performance measurement baseline, management reserve, undistributed budget).* This sub-process includes the following six attributes:

G.1. Controlling Management Reserve (MR) and Undistributed Budget (UB)
G.2. Incorporate Changes in a Timely Manner
G.3. Baseline Changes Reconciliation
G.4. Control of Retroactive Changes
G.5. Preventing Unauthorized Revisions to the Contract Budget Base (CBB)/Project Budget Base (PBB)
G.6. Over Target Baseline (OTB)/Over Target Schedule (OTS) Authorization

H. Material Management is *the sub-process for planning, controlling, and cost accounting for the acquisition, disbursements, and disposition of material.* This sub-process includes the following five attributes:

H.1. Recording Actual Material Costs
H.2. Material Performance
H.3. Residual Material
H.4. Material Price/Usage Variance
H.5. Identification of Unit Costs and Lot Costs

I. Subcontract Management is *the sub-process for determining the flow down of EVMS requirements to subcontractors, integrating subcontractor data into the prime contractor's EVMS, and surveilling the subcontractor(s).* The *Subcontract Management* sub-process includes the following three attributes:

I.1. Subcontract Identification and Requirements Flow Down
I.2. Subcontractor Integration and Analysis

I.3. Subcontract Oversight

J. Risk Management is *the sub-process for identification of risks and opportunities, analysis and mitigation of risks, and integration of risks into the EVMS.* This sub-process includes the following two attributes:

J.1. Identify and Analyze Risk

J.2. Risk Integration

SUB-PROCESS A: ORGANIZING

Organizing is the sub-process that begins at project/program inception and includes preparations for executing the project/program's technical objectives, such as defining the Work Breakdown Structure and other organizational elements necessary for planning and control.

SUB-PROCESS A: ORGANIZING	Maturity Level				
	LOW	MEDIUM			HIGH
A.1. Product-Oriented Work Breakdown Structure (WBS)	**1**	**2**	**3**	**4**	**5**
A product-oriented Work Breakdown Structure (WBS) is developed for a given project and extended to the control account level, as a minimum, and lower levels (e.g., work package/planning package) as necessary for management control. A WBS displays and defines the products, and/or services, to be developed and/or produced. It is a product structure and not an organizational structure. Only one WBS exists. A WBS is a decomposition of all the work necessary to complete all authorized project scope including any revisions resulting from authorized changes and modifications. It uses nouns and adjectives to define work and is arranged in a hierarchy. It is constructed to allow for clear and logical groupings, either by activities or deliverables. The WBS should represent the work identified in the approved Project Scope Statement or Statement of Work (SOW)/Statement of Objectives (SOO) and serves as an early foundation for effective schedule development and cost estimating and map to the authorization documentation. Programs typically will develop a WBS as a precursor to a detailed project schedule. The WBS is accompanied by a WBS Dictionary, as required, which lists and defines WBS elements. The goals of developing a WBS are to define the work elements 1) for the project team to proactively and logically plan out the project to completion, 2) to collect the information about work that needs to be done for a project, 3) to organize activities into manageable components that will achieve project objectives, 4) facilitates data collection and traceability, and 5) provides a control framework for integrated project/program management. The number of levels of the WBS should be determined by management needs, project/program risk and complexity, and similar driving factors. Items to consider include: □ Singularity of Work Breakdown Structure (WBS) □ WBS tied to the project/program SOW/SOO □ Traceability matrix (e.g., SOW, design requirements and build specifications) to WBS □ WBS reflects base contract and modifications □ WBS descriptive documents, such as a WBS dictionary, index, or similar document(s), that reflect and expand on the contract SOW/SOO □ Work Authorization Documents (WADs) based on the dictionary pages (optional) □ Other The WBS should be integrated with the Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process, Change Control sub-process, Accounting Considerations sub-process, and Analysis and Management Reporting sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 1; DoD EVMSIG GL 1; DOE CAG GL 1; EIA748-D; NDIA PASEG; MIL STANDARD 881 Rev E; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**A singular, high-level product-oriented WBS is established. WBS does not decompose to capture all work requirements.** The process to establish a singular, product-oriented WBS has started, but is not documented. The hierarchical WBS is not fully traceable to the SOW and is missing SOW scope. The WBS is functionally oriented and lacks product orientation. Products often do not fulfill project/program requirements.	**Processes to require a singular, product-oriented WBS are established. WBS is traceable, and decomposed to the appropriate levels for effective project/program management. The WBS includes most of the authorized work scope / requirements.** The process to establish a singular, product-oriented WBS that accurately reflects the products, services, and deliverables required to complete the project/program has been developed. No internal checks are in place to validate that the WBS meets requirements. Most products fulfill project/program requirements. The WBS hierarchy initially is product-oriented, but the WBS as extended to lower levels becomes functionally oriented in an organizational or functional orientation. The WBS is coordinated with the Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process, Change Control sub-process, Accounting Considerations sub-process, and Analysis and Management Reporting sub-process.	**Processes requiring a singular, product-oriented WBS are established and approved. WBS is traceable, encompassing all authorized work and decomposed to the appropriate levels for effective project/program management and external reporting. The required WBS is validated through internal checks per approved processes annually.** The process to establish a singular, product-oriented WBS that accurately reflects the products, services, and deliverables required to complete the project/program has been developed, documented and approved. Internal checks are in place to validate that the WBS meets project/program requirements. Checks may be outside the WBS process flow. The project/program ensures that the WBS is verified as product-oriented, with corrections performed as required during project/program start-up. Products fulfill all project/program requirements. If required, WBS descriptive documents such as a WBS dictionary, index, or similar document(s) have been developed. The WBS is fully integrated with the Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process, Change Control sub-process, Accounting Considerations sub-process, and Analysis and Management Reporting sub-process.	**The singular product-oriented WBS is reviewed, revised and validated annually or more frequently as needed, with revision history, per approved processes, through in-process internal checks.** The WBS is optimized to streamline management of the project/program. Internal checks are in place to validate that the WBS meets project/program requirements within the WBS process flow. Automated testing ensures that the established WBS is a product-oriented hierarchical decomposition of hardware, software and services. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of the WBS are fully disclosed with all key stakeholders, who maximize use of these results. The WBS is continuously improved and optimized.

SUB-PROCESS A: ORGANIZING	Maturity Level				
	LOW		MEDIUM		HIGH
A.2. Work Breakdown Structure (WBS) Hierarchy	**1**	**2**	**3**	**4**	**5**
The Work Breakdown Structure (WBS) scope is arranged in clear and logical groupings and is inclusive of all authorized contract and project life cycle work efforts regardless of the entity performing the work. The WBS is decomposed from a high-level "system" and de-constructed into sub-systems and components to ensure a hierarchy that helps effectively manage the project/program. There is clear vertical integration traceability between the WBS hierarchy and the authorized work scope. Items to consider include: ☐ Statement of Work (SOW)/Statement of Objectives (SOO) ☐ Work Breakdown Structure (WBS) ☐ Traceability matrix from project/program requirements (e.g., SOW/SOO, build specifications) to WBS ☐ WBS descriptive documents, such as a WBS index/dictionary, or a method to reconcile the SOW/SOO to the WBS structure exist ☐ External report, such as Integrated Program Management Report (IPMR) or other ☐ Base contract and modifications ☐ The WBS allows for clear and logical groupings, including identification of subcontractors ☐ Future work scope should be separately planned from the authorized contract work scope to enhance project life cycle planning. ☐ Other The WBS Hierarchy should be integrated with the Analysis and Management Reporting sub-process, the Accounting Considerations sub-process, and the Subcontract Management sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 1; DoD EVMSIG GL 1; DOE CAG GL 1; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Little vertical integration exists between the WBS hierarchy and authorized work scope.** The process to maintain a logically grouped WBS has started, with hierarchical integration of all authorized scope that accurately reflects the products, services, and deliverables required to complete the program. Many of the WBS elements are missing from external reports. There is little logical grouping of the program scope and how it is arranged in the WBS. Products sometimes meet the project/program requirements.	**Vertical integration exists between the WBS hierarchy and authorized work scope, with only minor gaps or errors.** Most of the process to develop and maintain a logically grouped WBS has been defined, with limited open items. The process includes hierarchical integration of all authorized scope that accurately reflects the products, services, and deliverables required to complete the program. There is consistent logical grouping of the program scope and how it is arranged in the WBS. Products mostly meet the project/program requirements. The WBS Hierarchy is coordinated with the Analysis, the Accounting Considerations sub-process, and Management Reporting and the Subcontract Management sub-processes.	**Complete vertical integration exists between the WBS hierarchy and authorized work scope.** The process to develop and maintain a logically grouped WBS has been defined, documented, and approved. The logic is consistent, and groupings of work scope are arranged with vertical integration throughout the WBS hierarchy. Any issues are minor, not repetitive, and can be quickly and easily corrected. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. WBS descriptive documents such as a WBS dictionary, index, or similar document(s) have been developed. Products meet all project/ program requirements. The WBS Hierarchy is consistently and fully integrated with the Analysis and Management Reporting sub-process, the Accounting Considerations sub-process, and the Subcontract Management sub-process.	**Vertical integration between the WBS hierarchy and authorized work scope reflects all authorized changes within a reporting period of the change.** All authorized WBS elements and groupings are consistent and have clear vertical integration that is 100 percent traceable. They reflect any contractual changes, and this process is repeatable from month to month, including changes and additions to the WBS. WBS elements are clearly specified for external reporting and are traceable to authorized work scope. The WBS hierarchy is monitored and used for management control, and automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of the WBS hierarchy are fully disclosed with all key stakeholders, who maximize use of these results. The WBS hierarchy is continuously improved and optimized.

SUB-PROCESS A: ORGANIZING	Maturity Level				
	LOW		MEDIUM		HIGH
A.3. Organizational Breakdown Structure (OBS)	**1**	**2**	**3**	**4**	**5**
A single Organizational Breakdown Structure (OBS) is used to identify the project/program organizational structure, including major subcontractors, responsible for the accomplishment of authorized work. It is also used to define the organizational elements in which work will be performed. The OBS identified the project/program management hierarchy, which may not equate to functional management and supervision roles on stakeholder organizational charts. Organization elements include work teams, functions, or other units used by the organization for execution of the project/program work efforts. Subcontracted and inter-organizational units' work should be defined and identified to the appropriate subcontractor or organizational unit within the proper Work Breakdown Structure (WBS) element. Items to consider include: □ A single Organization Breakdown Structure (OBS) □ OBS intersections with the WBS □ Project/program organization chart (i.e., OBS Chart) and organizational structure (to include functional management and the Integrated project/program Team (IPT) when applicable) □ Documented roles and responsibilities (prime and major subcontractor(s)) □ List of major subcontractor/inter-divisional work orders with Earned Value Management System (EVMS) flow down □ OBS identified in external reports □ Definition of the project/program organization's roles and responsibilities in the execution of their authorized work scope □ Other The OBS should be integrated with the Analysis and Management Reporting sub-process and Subcontract Management sub-process. *Comments: A major subcontractor is any subcontracting entity that has a legal or contractual responsibility to report Earned Value Management data to their customer.* *References:* NDIA EVMS EIA-748-D Intent Guide GL 2; DoD EVMSIG GL 2; DOE CAG GL 2; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**The OBS development process may not require the inclusion of all major subcontractors and other organizations responsible for authorized work. An OBS is established, but not all structure is traceable to all authorized work. The OBS excludes some functions or major subcontractors.**	**Processes exist requiring a single OBS to be established, traceable and encompassing the authorized work. The OBS is decomposed to the appropriate organizational levels including all major subcontractors, with some gaps.**	**The process to develop and maintain a single OBS is in place and has been approved. The OBS is traceable and encompasses all authorized work. It is decomposed to the appropriate organizational levels for effective project/program management. The OBS is validated annually at a minimum.**	**The single OBS is established and can accommodate changes in a timely manner. The OBS is validated monthly through in-process internal checks.**
		The process to develop and maintain an OBS that accurately reflects organizational elements required to complete the project/program has started, but may not be documented. Products sometimes meet project/program requirements.	Most of the process to develop and maintain an OBS that accurately reflects organizational elements required to complete the project/program has been defined with open items. The OBS routinely contains only a few minor issues that are easily corrected and not repetitive. Products meet most project/ program requirements. The OBS is coordinated with the Analysis and Management Reporting sub-process and Subcontract Management sub-process.	The process to develop and maintain an OBS is defined, documented, reviewed and approved. The OBS is decomposed to the appropriate organizational levels including all major subcontractors. The required OBS is routinely validated through internal checks per approved processes. Products meet all project/ program requirements. The OBS is fully integrated with the Analysis and Management Reporting sub-process and Subcontract Management sub-process.	The approved OBS is decomposed to the appropriate organizational levels tying authorized scope to organizations involved in the project/program. As new scope is authorized, the OBS is updated as applicable. OBS data are monitored and used for management control, and are automatically tested to assess errors and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of the OBS are fully disclosed with all key stakeholders, who maximize use of these results. The OBS is continuously improved and optimized.

SUB-PROCESS A: ORGANIZING	Maturity Level				
	LOW	MEDIUM			HIGH
A.4. Integrated System with Common Structures	**1**	**2**	**3**	**4**	**5**
The planning, scheduling, budgeting, work authorization and cost accumulation systems should be integrated with each other. This integration occurs via common data elements and a common coding structure through the Work Breakdown Structure (WBS) and the Organizational Breakdown Structure (OBS). The integration of planning, scheduling, budgeting, work authorization, and cost accumulation management processes provides the capability for establishing the Performance Measurement Baseline (PMB), identifying work progress, and collecting actual costs, thereby facilitating management analysis and corrective actions. Having integrated data linked to WBS and OBS elements ensures the availability of program information needed to support all levels of management insight and control. The intent is to build a framework that integrates the project/program processes (e.g., planning, scheduling, budgeting, work authorization, and cost accumulation) to support effective management of the contract by accurately integrating cost, schedule, and technical information. Interoperability is an important characteristic of the EVMS to work between and amongst sub-systems. The data and/or narrative from one sub-system must be consistent with the data and/or narrative in other related sub-systems. Items to consider include: □ Data item matrix describing the unique coding structure that defines the common data elements that link the management systems □ A unique and flexible coding structure (e.g., code structure used to identify Control Account (CA), work package/planning package, earned value technique, charge code, risk identification number, etc.) that integrates sub-systems to support current and future internal and external data requirements □ Consistency among common data elements between sub-systems □ Work authorizations and documentation □ Master, intermediate, and detail level schedules □ Manufacturing/Enterprise Resource Planning (M/ERP) operational schedules □ Control account plans □ WBS and OBS, including management performance reports □ Responsibility Assignment Matrix (RAM) □ Statement of Work (SOW)/Statement of Objectives (SOO) □ A schedule hierarchy linked (either manually or electronically) to the other sub-systems (e.g., budget work authorization) □ Other The Integrated System requirement should be integrated with the Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process and Accounting Considerations sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 3; DoD EVMSIG GL 3; DOE CAG GL 3; EIA748-D; ANSI PMI 19-006-2019	**Not yet started.**	**Integration among planning, scheduling, budgeting and work authorization elements is lacking. A common coding structure is not in place.**	**Integration of the planning, scheduling, budgeting and work authorization elements, and a common coding structure throughout the project/program documentation and reports are mostly in place. Some issues, that are not easily corrected, still exist but these have minimal impact on the project/program.**	**Integration of the planning, scheduling, budgeting and work authorization elements, and a common coding structure throughout the project/program documentation and reports, are in place.**	**Integration is in place. Internal processes are in place to validate the integration of the structures and data flows and verify accuracy. Changes are readily accommodated to the integrated systems with no impact to the project/program data integrity.**
		The process to integrate systems has started. A number of significant issues still exist. The WBS or OBS structures are not integrated. WBS and OBS elements are missing and/or not clearly defined. Little mapping has occurred among the planning, scheduling, budgeting, work authorization and cost accumulation documents and systems. Key data is not aligned across sub-systems.	The process to integrate systems has been defined. Common structures accurately reflect the products, services, and deliverables. A few open items remain. Most WBS and OBS elements are present and linked throughout project/program documentation and systems. Management reports are traceable to the planning, scheduling, budgeting, work authorization and cost accumulation documents. There are minor gaps with a few traceability issues throughout the systems or elements that are not mapped to CA levels. Most key data is aligned across sub-systems. The Integrated System requirement is coordinated with the Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process and Accounting Considerations sub-process.	All WBS and OBS elements are clearly defined and traceable through all project/program documentation and systems. All key data is aligned across sub-systems. All CAs clearly map to one WBS and one OBS. Management reports are traceable to the planning, scheduling, budgeting, work authorization and cost accumulation documents and representative systems. Integration is rigorously monitored by management. Any issues are minor and easily correctable with no impact to the project/ program. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions The Integrated System requirement is fully integrated with the Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process and Accounting Considerations sub-process.	The project/program is actively checking its WBS and OBS common coding structure for each CA for traceability and accuracy on a monthly basis, with no errors in deliverables. System integration is monitored, used for management control, and automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. A Storyboard (or like) approach is routinely used to validate data integration and consistency. Surveillance results of system integration are fully disclosed with all key stakeholders, who maximize use of these results. Manual data entry has been reduced; key data is automatically aligned across systems. System integration is continuously improved and optimized.

SUB-PROCESS A: ORGANIZING	Maturity Level				
	LOW		MEDIUM		HIGH
A.5. Control Account (CA) to Organizational Element	**1**	**2**	**3**	**4**	**5**
A Control Account Manager (CAM) is assigned responsibility for each management control point known as a Control Account (CA). At a minimum, the management control point is at the intersection of the WBS and OBS where work will be managed and controlled. Every CA reflects a single organizational element of the Organizational Breakdown Structure (OBS) directly responsible for the work and identifiable to a single element of the Work Breakdown Structure (WBS). Each CA has only one CAM assigned. The CAM has full responsibility, accountability and authority over the scope and performance of the CA work. CAs are established at appropriate levels based on the complexity of the work and the control and analysis needed to manage the work effectively. The CA establishes a logical framework that links the products of the management processes through common data elements. Items to consider include: □ Manufacturing or Enterprise Resource Planning (M/ERP) operational schedules □ Control account plans □ WBS and OBS with management performance reports, including cost □ Responsibility Assignment Matrix (RAM) □ Adaptable coding structure supporting current and future internal management needs, as well as current and future external data requirements □ Other The CA and CAM assignments should be integrated with the Budgeting and Work Authorization sub-process, Analysis and Management Reporting sub-process and Change Control sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 5; DoD EVMSIG GL 5; DOE CAG GL 5; EIA748-D; NDIA PASEG; ISO 21508:2018(E)	**Not yet started.**	**Few CAs are designated to single organizational elements of the OBS and identifiable to single elements of the WBS. CAMs are assigned to few CAs; they report information but are not technically responsible for the work being performed.**	**Most CAs are designated to single organizational elements of the OBS and identifiable to single elements of the WBS. CAMs are assigned to most CAs at the appropriate levels based on complexity. For each CA, the CAM is responsible for the work and accountable for cost and schedule.**	**All CAs are designated to single organizational elements of the OBS and identifiable to single elements of the WBS. CAMs are assigned to all CAs at the appropriate levels based on complexity.**	**The size, risk and complexity of each CA is optimized, leading to proactive and effective management and control of the CA. When CA or CAM changes are necessary, the organization can handle the changes with no impact to the project/program.**
		The process to designate CAs to WBS/OBS, accurately reflecting the products, services, and deliverables required to complete the project/program has started. There is no clear OBS/WBS linkage to the CAs or CAMs.	The process to designate CAs to WBS/OBS, accurately reflecting the products, services, and deliverables required to complete the project/program is in place with open items. Most CAs are mapped to the WBS and OBS, but some are associated with more than one element or are not mapped. CAMs are assigned but not all take into consideration accountability/responsibility for the scope of work to be performed. CAs could be broken out to more appropriate levels. The CA and CAM assignments are coordinated with the Budgeting and Work Authorization sub-process, Analysis and Management Reporting sub-process and Change Control sub-process.	The process to designate CAs to WBS/OBS is approved and accurately reflects the products, services, and deliverables required to complete the project/program. The process is monitored and updated as needed. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. All CAs are clearly aligned to a single WBS and OBS, with appropriate documentation (e.g., RAM). The CA and CAM assignments are fully integrated with the Budgeting and Work Authorization sub-process, Analysis and Management Reporting sub-process and Change Control sub-process.	Assignments are monitored periodically (monthly or more often) as needed. New CAs and CAMs can be added seamlessly. The project/program continues to validate and check for consistency and traceability between CAs and the WBS/OBS. CA and CAM assignments are monitored and used for management control and are automatically tested to assess system health and integrity. For example, realism of forecasting over extended periods may indicate good versus poor CAM selection or span of control. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of CA and CAM assignments are fully disclosed with all key stakeholders, who maximize use of these results. CA and CAM assignments are continuously improved and optimized.

SUB-PROCESS B: PLANNING AND SCHEDULING

Planning and Scheduling is the sub-process that aims to develop the project/program's integrated master schedule, resource requirements, and performance measurement baseline for effective management.

SUB-PROCESS B: PLANNING AND SCHEDULING	Maturity Level				
	LOW	MEDIUM			HIGH
B.1. Authorized, Time-Phased Work Scope	1	2	3	4	5
The time-phasing of the authorized work scope is a key component of the Integrated Master Schedule (IMS). The IMS is a networked schedule containing all the detailed Work Packages (WPs) and Planning Packages (PPs) (or lower-level activities) necessary to support the events, accomplishments and criteria of the Integrated Master Plan (IMP) or similar high-level planning document. The IMS reflects all authorized, time-phased work scope to be accomplished, including details for any significant subcontracted effort and High Dollar Value (HDV) materials/Critical Items (CI) that could affect the critical path of the IMS. All discrete work scope in the IMS is traceable to the Work Breakdown Structure (WBS), Project Execution Plan (PEP), and the Statement of Work (SOW)/Statement of Objectives (SOO). A realistic network schedule and time-phased scope are key factors in ensuring the success of the program. Items to consider include: ☐ All authorized scope is fully planned ☐ Subcontractor baselines are integrated into the prime baseline ☐ Materials, especially those that may impact critical path, are considered when planning work scope ☐ Schedule Risk Assessment (SRA) ☐ Other The Time-Phased Work Scope should be integrated with the Material Management sub-process and the Subcontract Management sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 1, 6, 8, 9, 10; DoD EVMSIG GL 1, 6, 8, 9, 10; DOE CAG GL 1, 6, 8, 9, 10; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some identification of time-phased work scope within the IMS has occurred. Some work scope in the IMS are traceable by activity to the contract, PEP, SOW/SOO, IMP, WBS or similar documents.** Internal, subcontractor, and procurement work scope is not clearly identified or discernible in the IMS.	**The time-phased work scope in the IMS is mostly defined and most of the activities and work scope are traceable to the contract, WBS, PEP, SOW/SOO and IMP, or similar documents.** Identification of internal and subcontracted work scope has occurred. Most of the subcontractor and procurement work scope is separately identified and assigned to the appropriate WBS elements. The Time-Phased Work Scope is coordinated with the Material Management sub-process and the Subcontract Management sub-process.	**The IMS is fully defined, with few minor exceptions, and all of the activities and authorized work scope are traceable to the contract, WBS, PEP, SOW/SOO and IMP, or similar documents.** A defined and approved process and structure is in place to provide mapping and traceability of all activities to the contract, WBS, PEP, SOW/SOO, IMP or similar documents. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. Segregation of internal and subcontract or procurement work scope has occurred. Subcontractors or procurements designated as HDV/CI are separately identified and assigned to the appropriate WBS elements. Subcontractor and procurement work scope are integrated into the project/program's single IMS at a level to provide for accurate reporting and performance measurement. The Time-Phased Work Scope is fully integrated with the Material Management sub-process and the Subcontract Management sub-process.	**All items within the IMS are fully defined and traceable. The time-phased work scope in the IMS is monitored and automatically tested to assess system health and integrity.** A validation process exists to ensure that all discrete work scope (at a minimum) is authorized and fully integrated into the IMS. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of IMS time-phased work scope traceability are fully disclosed with all key stakeholders, who maximize use of these results. The traceability of the time-phased work scope in the IMS is continuously improved and optimized.

SUB-PROCESS B: PLANNING AND SCHEDULING	Maturity Level				
	LOW	MEDIUM			HIGH
B.2. Schedule Provides Current Status	1	2	3	4	5
The schedule provides current status including forecast start and completion dates consistent with the month-end status (data) date for all authorized work. The schedule can be updated to report current progress against the baseline and to forecast the schedule status of incomplete activities through project completion. The schedule of the project/program follows a standardized business rhythm, including a standard "time now" or "data date" to which status is reported against. There are no forecast dates prior to the "time now" date and no actual dates after the "time now" date. The Integrated Master Schedule (IMS) is updated at least as often as the external report is generated (e.g., Integrated Program Management Report or other reports). It is time-synchronized in accordance with all stakeholder updates/status (i.e., vendors, subcontractors, and government activities). The IMS status cycle should consider all organizational calendars and a common status date should be established for the integration of schedule data. Items to consider include: ☐ The schedule provides current status and forecast of completion dates for all discrete authorized work ☐ Objective completion criteria are determined in advance and used to measure progress towards the determination of technical achievement ☐ The schedule is updated monthly (at a minimum) in alignment with the accounting calendar, with realistic end dates; however, it may be updated more frequently if necessary ☐ Automated internal checking mechanism, to validate the quality of the schedule ☐ Schedule Risk Assessment (SRA) ☐ Other *References:* NDIA EVMS EIA-748-D Intent Guide GL 6; DoD EVMSIG GL 6; DOE CAG GL 6; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**The schedule is updated too infrequently to provide current status, or it is not capable of being updated to provide current status in alignment with accounting period information.** Updates are not processed in a manner in which to ensure consistent reporting of actual progress. Updates to date and durations of activities not yet in progress rarely occur.	**The schedule is updated to provide current status mostly in alignment with accounting period information. However, only activities within the status window are updated.** Status updates are primarily reserved only for those activities within the current execution window (Actual Starts, Actual Finishes and Percent Complete). In addition to updates to all activities within the execution window, most activities are reviewed and updates to durations and forecasted starts/finish are made as necessary. Scheduling assessment is available to validate current status. Schedule forecasting is coordinated with the Risk Management sub-process.	**The schedule is updated in alignment with the accounting calendar, in a consistent manner following an established business rhythm. Schedule forecasts are commensurate with risk identified on the project/program.** The "Time Now" status date is in alignment with accounting period information and updated monthly. Schedule forecasts consider the SRA. Activity duration estimates represent the most likely time the work should take. Schedule updates are reviewed monthly with schedule stakeholders, and changes are effectively communicated in order to inform management decision-making. Schedule status is monitored and tested to assess system health and integrity. Problems are identified, logged, tracked, mitigated, corrected and closed. Scheduling assessment may occur more frequently than monthly and results in the schedule providing current status, and related data used in project/program planning, re-planning, and decision-making. Schedule forecasting is fully integrated with the Risk Management sub-process.	**The schedule is updated more frequently than monthly and reviewed in a timely and effective manner to reflect accurate progress of started, completed, and in-progress work, and aligns with other earned value data, aiding in reporting and proactive decision-making.** The schedule is updated weekly during the accounting/reporting period. All activities are reviewed during each status cycle to ensure accuracy of dates and durations. Full bottom-up revisions to durations and start/finish dates are performed as necessary. Schedule status is monitored and used for management control, and is automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Scheduling assessment produce accurate updates used to effectively manage the project/program. EVM and scheduling assessment practices and products/outputs are effectively integrated to produce real-time or near-real-time current project/program status and informed decision-making. Routine surveillance results of the schedule status are fully disclosed with all key stakeholders, who maximize use of these results. The schedule status process is continuously improved and optimized.

SUB-PROCESS B: PLANNING AND SCHEDULING	Maturity Level				
	LOW	MEDIUM			HIGH
B.3. Horizontal Integration	1	2	3	4	5
The Integrated Master Schedule (IMS) is a network schedule that describes the sequence of work (horizontal integration) and clearly identifies significant interdependencies that are indicative of the actual way the work is planned and accomplished at the level of detail to support project driving and critical paths development. Horizontal integration refers to the logical relationships among tasks in the IMS, from project start through the project end. All activities aside from the project start and finish milestones should contain at least one predecessor and one successor. However, it is not enough to just ensure that every activity has a predecessor and successor. Schedules must consider all horizontal interdependencies between and among Control Accounts (CAs), Work Packages (WPs), planning packages, activities, and supporting schedules (e.g., engineering, production, and subcontractor). Items to consider include: □ Logic dependencies are reviewed and updated, especially within the forecast schedule, to eliminate unnecessary or out-of-sequence logic □ Permitted or prohibited constraints □ Elimination of redundant logic within the schedule can avoid confusion related to actual schedule drivers □ Logic ties primarily consist of Finish-to-Start, with Start-to-Start and Finish-to-Finish used appropriately to ensure the logic accurately models the execution plan of work □ A "push test" and "pull test" can help to ensure impacts to near-term scope appropriately impact down-stream efforts □ External logic ties when they exist (outside the project/program, such as government furnished equipment (GFE) and others) □ Risks related to horizontal integration □ Level of Effort (LOE) activities should not impact horizontal integration, drive the schedule performance, or impact the critical path □ Other The Horizontal Integration process should be integrated with the Subcontract Management sub-process. *Comments: The Finish-to-Start (FS) relationship type provides a logical path through the program. A relationship type such as Start-to-Start (SS) or Finish-to-Finish (FF) can cause resource conflicts when the tasks are dependent upon one another while also taking place at the same time.* *References:* NDIA EVMS EIA-748-D Intent Guide GL 6, 28; DoD EVMSIG GL 6, 28; DOE CAG GL 6, 28; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**The IMS contains little or no horizontal integration and logic dependencies are unclear or missing among activities.** Activities are held in place by constrained dates. Logical dependencies between activities are not identified. It is not possible to produce a credible critical path due to lack of logic among activities. LOE activities are on the critical or driving path in the Integrated Master Schedule (IMS) and are linked to discrete activities.	**The IMS contains most of the horizontal integration and logic dependencies among activities.** A few activities are not logically linked, with an over-use of constraints, leads and/or lags. Logic links exist within specific scopes of work, but some are not integrated within activities across the entire project/program. A critical path can be produced for the network with some logic flaws. Only a few LOE activities are on the critical or driving path in the IMS and linked to discrete activities. The Horizontal Integration process is coordinated with the Subcontract Management sub-process.	**All activities are logically defined within the IMS. The flow of work is appropriate for the effective execution of work.** No standalone activities are in the schedule (i.e., all activities have at least one predecessor and one successor). Logic links, including external links, are maintained and are explainable. Activities follow a logical relational sequence (i.e., Design, Procure, Construct). Out-of-sequence logic does not exist. The IMS only includes use of constraints, leads and/or lags that have appropriate justifications and are documented. A valid critical path can be produced for the network. The logic and critical path are continuously maintained, providing management with insight to make timely decisions. The IMS reflects any changes (contractual or other), and this process is repeatable from month to month. LOE activities are not on the IMS critical or driving path and are not linked to discrete activities. The Horizontal Integration process is fully integrated with the Subcontract Management sub-process.	**All activities are time-sequenced in the IMS based on horizontal logic. There are no "target/fixed" dates imposed except for incoming external milestones and the project start and finish dates. Driving and critical paths are clearly identified and used to proactively manage the project/program.** The IMS takes into consideration good work sequence planning with horizontal integration. Schedules are logic-linked among all key activities. Horizontal schedule integration is monitored and reflects the execution plan of the work. It is automatically tested to assess system health and integrity. Corrective actions are implemented, and recurring issues resolved. Logic ties maximize the use of Finish-to-Start logic relationships as appropriate, with other logic types justified and documented. Routine surveillance results are disclosed with key stakeholders, who maximize use of these results. The network is mostly free of lags and constraints. There are no redundant logic ties. Milestone dates are driven by logic, the only exception being incoming external milestones or other justified and documented constraints. The full horizontal integration detail can be clearly and logically explained. Horizontal integration is continuously improved and optimized.

SUB-PROCESS B: PLANNING AND SCHEDULING	Maturity Level				
	LOW		MEDIUM		HIGH
B.4. Vertical Integration	1	2	3	4	5
Vertical integration refers to the alignment and consistency of data throughout all levels of the schedule hierarchy, from detailed level field and sub-contractor schedules up through summary level or "milestone only" schedules. Schedules must consider all vertical interdependencies between and among Control Accounts (CAs), Work Packages (WPs), planning packages, activities, and supporting schedules (e.g., engineering, production, and subcontractor). In addition, detailed level schedules should be vertically traceable to deliverables found within the Work Breakdown Structure (WBS), Statement of Work (SOW)/Statement of Objectives (SOO), Integrated Master Plan (IMP) or similar contract requirements document. Whatever approach to scheduling is chosen, there must be both vertical integration (from detailed activities to top level) and horizontal integration (across activities at the same level; refer to B.3 Horizontal Integration). In general, the IMP can be thought of as the top-down planning tool and the Integrated Master Schedule (IMS) as the bottom-up execution tool. Items to consider include: □ Many schedule tools provide for "roll-up" of schedule data via coding structures □ All schedule data (i.e., field level schedules or sub-contractor schedules) do not need to reside within the IMS, however vertical traceability must be demonstrated regardless of implementation method chosen □ Procurement/Material delivery information (e.g., need dates, delivery dates) contained in the IMS must be traceable with other sources, such as a material management system □ Risks related to vertical integration □ Other This attribute should be integrated with the Subcontract Management sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 6; DoD EVMSIG GL 6; DOE CAG GL 6; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**The IMP/IMS contains little or no vertical integration, and vertical alignment of dates between various schedule levels cannot be demonstrated.** The schedule system and process does not provide for roll-up or decomposition of the schedule to higher or lower levels of detail. Where schedule roll-ups do exist, vertical alignment of start/finish dates between levels cannot be demonstrated.	**Consistent with the SOW/SOO and WBS, the IMP/IMS contains most of the vertical integration and most activities can be vertically traced within each level of the schedule.** Schedules of varied levels of detail can be produced, however there is not 100% vertical alignment of work scope and start/finish dates within each level of the schedule. Vertical Integration is coordinated with the Subcontract Management sub-process.	**All activities are vertically traceable within all levels of the schedule hierarchy. The flow of work is appropriate for effective planning and execution of work.** Schedules with various levels of detail can be produced and alignment of scopes and dates within each level can be demonstrated. Activities can be rolled up to align to dates of parent WPs; WPs can be rolled up to align to dates of parent CAs. Vertical integration reflects any changes (contractual or other), and this process is repeatable from month to month. The schedule hierarchy and vertical integration is continuously maintained, providing management with insight to make timely decisions. Regardless of whether the schedule levels exist within a single schedule tool or a variety of toolsets, supplemental schedules, such as subcontractor schedules and Material Requirements Planning (MRP) or like systems are consistent with the IMS at the aggregated level. Vertical Integration fully incorporates the Subcontract Management sub-process.	**A meaningful and thought out schedule hierarchy exists within a singular IMS and is utilized in the communication and decision-making process.** Schedules with various levels of detail are produced and utilized for communication and decision-making. The singular IMS aligns with major project/program milestones and events. Routine surveillance results are fully disclosed with all key stakeholders. Vertical schedule integration and traceability (i.e., consistency of data between various levels of schedules including subcontractor and field level schedules) are monitored, and data are automatically tested to assess system health and integrity. All levels of schedules align. Necessary corrective actions are implemented, completed, and recurring issues resolved. The IMS WBS coding structure allows for the summarization of the schedule at all levels and ensures that all MRP data are represented at some aggregate level of completion. Vertical integration is continuously improved and optimized.

SUB-PROCESS B: PLANNING AND SCHEDULING	Maturity Level				
	LOW		MEDIUM		HIGH
B.5. Integrated Master Schedule (IMS) Resources	1	2	3	4	5
A fully networked, resource-loaded Integrated Master Schedule (IMS) is a foundational component to a valid time-phased Performance Measurement Baseline (PMB). A valid project/program IMS must address the availability of resources to achieve the schedule objectives. At a minimum, a resource-loaded IMS must contain all labor, material and equipment costs to include unit prices and quantities. Resource planning of both labor (hours) and non-labor (currency) at the appropriate level to aid in the decision-making process is key to ensuring a fully executable plan. The IMS can also be used to roll up schedules at the program or portfolio level. Resource planning also can occur above the project level. Items to consider include: □ Labor resources within the IMS are planned in hours (or fractions of) at a minimum, however they may include "dollarized" rates as well □ Resource-loading of only critical activities may not accurately depict the true resource needs as compared to availability □ Resource-loading of only specific resource types may not accurately depict true resource shortfalls □ All resources in the IMS are cross-checked with the project/program budget and contractual cost constraints □ Resource coding is consistent among financial software, scheduling software and cost processing software □ Resource peaks and valleys are examined for the feasibility of the available budgets and the availability or limitations of resources □ Labor resource peaks and valleys are minimized □ The need for the time-phasing of resources is taken into account in the IMS □ Other The IMS should be integrated with the Authorization and Budgeting sub-process, the Material Management sub-process, the Subcontract Management sub-process, and the Risk Management sub-process. *Comments: Please reference the results of attribute A5 for resource and schedule alignment.* *References:* NDIA EVMS EIA-748-D Intent Guide GL 6, 8, 9, 10; DoD EVMSIG GL 6, 8, 9, 10; DOE CAG GL 6, 8, 9, 10; EIA748-D; NDIA PASEG; GAO-16-89G; GAO-20-195G; DOE O 413.3B; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some activities within the IMS contain assigned resources.** The IMS lacks resource-loading to aid in the development of the baseline plan and decision-making process.	**Most activities within the IMS include assigned resources.** The IMS may include resource-loading for resource types which are deemed critical to the project/program success. Full resource-loading may exist but only on activities which are identified as critical where resource-loading does not represent all requirements to achieve the planned objectives. For those critical activities with resource-loading, there is alignment between resource needs and activity durations (e.g., 2 hours/day for 10 days as compared to 10 hours/day for 2 days). The IMS is coordinated with the Authorization and Budgeting sub-process, the Material Management sub-process, the Subcontract Management sub-process, and the Risk Management sub-process.	**All activities within the IMS have allocated resources. Resource limitations have been defined and gaps identified.** There is an understanding of the resource requirements and limitations needed to develop a time-phased baseline plan and to complete the planned scope within the contract period of performance. For all activities there is alignment between resource needs and activity durations (e.g., 2 hours/day for 10 days as compared to 10 hours/day for 2 days). Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. The resource-loaded IMS is traceable to all labor, material and equipment costs to include unit prices and quantities, and both discrete and Level of Effort (LOE) work packages. The IMS is integrated with the Authorization and Budgeting sub-process, the Material Management sub-process, the Subcontract Management sub-process, and the Risk Management sub-process.	**The IMS reflects realistic resource requirements to effectively manage staffing and material requirements. Resources are consistently analyzed and leveled to minimize disruptions caused by the imbalance of resource requirements to resource availability levels.** Resource leveling/allocation is performed to proactively manage resources at the activity and project/program level. Resource optimization is a continuous process, ensuring requirements are identified far enough into the future to consider labor constraints and meet allocated material/equipment lead-times. The IMS resources are automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Resource details can be clearly and logically explained by the Control Account Managers (CAMs) and Project/Program Manager(s). Routine surveillance results are fully disclosed with all key stakeholders, who maximize use of these results. IMS resources are continuously optimized.

SUB-PROCESS B: PLANNING AND SCHEDULING	Maturity Level				
	LOW	MEDIUM			HIGH
B.6. Schedule Detail	1	2	3	4	5
The schedule detail should be at the lowest level needed to provide a foundation for horizontal and vertical schedule integration. It should include the detailed activities and milestones that depict the work scope that represent all discrete and/or Level of Effort (LOE) Work Packages (WPs) and Planning Packages (PPs) identified in the Performance Measurement Baseline (PMB), as required. It is developed and used as the blueprint for the day-to-day management and control of work by the Control Account Manager (CAM). Detailed schedules must contain activity start and finish dates that are based on physical accomplishment and are clearly integrated with project/program time constraints. Activities in the detailed schedule must contain sufficient detail including consideration of work calendars and the availability and allocation of resources. While the project/program schedule defines the scope of the work to be undertaken and the timetable for completion, it is the coding structure schema that includes the Work Breakdown Structure (WBS) that ensures the planning, scheduling, budgeting, work authorization, and cost accumulation management sub-systems are integrated. The intent is for the data derived from one sub-system to be relatable, and consistent with, the data of each of the other sub-systems. The schedule network is a model of how the project/program will accomplish the goals and deliverables reflected in the contract. The granularity of both the baseline and forecast schedule must be sufficient to promote a clear understanding of the work scope at the work performance level and to ensure accurate performance (statusing). This means the detailed activities must be planned and sequenced the way they will be performed. Items to consider include: ☐ Detailed activities and milestones depicting work scope ☐ Sub-systems are relatable ☐ Activities consider availability and allocation of resources ☐ Work calendars and constraints are identified ☐ Coding schema includes WBS ☐ Other Schedule Detail should be integrated with the Budgeting and Work Authorization sub-process and the Analysis and Management Reporting sub-process. *Comments: Consider agency or organizational/unique policies and contract requirements for this assessment.* *References:* NDIA EVMS EIA-748-D Intent Guide GL 6; DoD EVMSIG GL 6; DOE CAG GL 6; EIA748-D; NDIA PASEG; NDIA IBR Guide; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**The lowest level of the network schedule is missing a significant number of detailed activities and milestones.** The existing level of schedule detail does not depict the project/program work scope represented by WPs and PPs in the PMB. The schedule contains a mix of low-level and high-level activities which may reflect the entire project/program scope but provides minimal definition needed for execution of the work. The use and rationale of schedule calendars cannot be explained or justified. There is no documented "rolling wave" or event/planning horizon process.	**The lowest level of the network schedule includes most detailed activities and milestones.** The existing level of schedule detail depicts most of the project/program work scope represented by work packages and planning packages in the PMB. The schedule, though not fully documented, contains details needed to manage the execution of work and provides enough confidence to meet project constraints and committed timelines. Activity durations are proportionate to the reporting cycle and can be easily measured and managed. Schedule Detail is coordinated with the Budgeting and Work Authorization sub-process and the Analysis and Management Reporting sub-process.	**The lowest level of the network schedule includes all detailed activities and milestones to meet contract requirements.** The level of schedule detail depicts all of the project/program work scope, as required. The schedule flows in a logical manner and is reflective of the work to be accomplished. Milestones are clearly linked and logically relate to relevant activities. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. Activities have sufficient granularity and detail and are indicative of the way work scope will be accomplished and managed. There is a high level of confidence in the project delivery dates and associated costs. Project/program constraints, calendar(s) rationale and activity durations are documented, justified and supported by logical resource/cost allocations. The schedule links key detail WPs and PPs (or lower-level activities) with summary activities and milestones. The project/program adheres to a documented "rolling wave" or event/planning horizon process. The schedule has successfully completed an external review, such as an Integrated Baseline Review (IBR) to ensure all scope is captured at a level of detail commiserate with the scope of the project. Schedule Detail is fully integrated with the Budgeting and Work Authorization sub-process and the Analysis and Management Reporting sub-process.	**The level of detail in the schedule is used to proactively manage the project/program to meet contract requirements.** The schedule is clearly and competently structured at an appropriate level of detail. Schedule data are monitored and used for management control and are automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Identified issues resulting from the external assessment are monitored and tracked to closure. In case of major contract modifications, a new IBR is completed. Routine surveillance results of the schedule detail are fully disclosed with all key stakeholders, who maximize use of these results. The schedule detail can be clearly and logically explained by CAM(s) and the Project Manager. The schedule detail is continuously improved and optimized.

SUB-PROCESS B: PLANNING AND SCHEDULING	Maturity Level				
	LOW	MEDIUM			HIGH
B.7. Critical Path and Float	1	2	3	4	5
The schedule should identify a logical critical path(s) and driving path(s) to manage the project/program. The critical path is the path of longest duration through the sequence of activities with the least amount of total float. It is also defined as the longest path of related incomplete activities in the logic network from 'time-now' whose total duration determines the earliest project completion. Establishing a valid critical path is necessary for examining the effects of any delay in activities along this or adjacent paths. The project critical path determines the project's earliest completion date and focuses the team's energy and management's attention on the activities that will lead to the project's success. Changes to the forecasted project milestones may impact the critical path. Critical paths used for the project/program should be consistent among key stakeholders. The driving path is the longest sequence of tasks from time now to an interim program milestone. If a task on a driving path slips, the forecasted interim program milestone date should slip. Critical path and driving path identification and analyses are essential to ensure timely completion of the authorized work and to prevent slippage of the project/program end date. Total Float is the amount of time that an activity can be delayed from its early start date without delaying the project finish date. Excessive float may indicate that there are missing activities, or that the schedule contains incomplete or inaccurate logic or duration. Negative float in a schedule indicates that activities and milestones cannot meet their required finish dates based on precedence logic, duration, and status. The presence of Negative Float in the baseline schedule indicates an unachievable plan and should be addressed. Negative Float in the forecast schedule should be reported to support management review and decision. Excessive negative float in the forecast schedule that is not mitigated is reviewed and the constrained milestone is forecast for the impact. The critical path may change for the project/program as near-critical paths are delayed more than the critical path; schedule float provides an indication of this phenomena. Schedule float that is the least (positive or negative) indicates the activities, based on status, that are now the most critical to complete in order to maintain the overall critical path. Understanding the changes in float can help with the work prioritization, and excessive positive schedule float may indicate logic issues that need to be addressed. Items to consider include: □ Network schedule calculates the critical path reflecting work priorities, with key stakeholder interfaces, subcontracts, and material procurements considered □ Float values are calculated for each activity and milestone □ Float values can be explained and managed to optimize the schedule □ Schedule execution metrics □ Other *References:* NDIA EVMS EIA-748-D Intent Guide GL 6; DoD EVMSIG GL 6; DOE CAG GL 6; EIA748-D; NDIA PASEG; NDIA IBR Guide; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some negative or excessive float values exist in the network schedule impacting the critical path activities and milestones. Some activities may have incorrect durations or logic.** The schedule includes negative or excessive float and there may be missing activities and incomplete or inaccurate precedence logic. Activities and milestones may not be able to meet their required finish dates based on precedence logic, duration, and status.	**A critical path exists showing related activities and milestones from start to finish, with few negative or excessive float values.** The schedule includes the longest continuous path of activities and milestones from start to finish calculating the least amount of total float. Most activities and milestones can meet their required finish dates based on precedence logic, duration, and status.	**Logical critical and driving paths exist reflecting customer work priorities, with key stakeholder interfaces, subcontracts, and material procurements identified.** The critical/driving paths are logical and comprised of the longest sequence of activities and milestone to achieve the project/program completion objective. The critical path follows a logical relational sequence (i.e., plan, develop, design, procure, execute or other). Near-critical paths are also identified and assessed. Monthly performance and progress evaluation of the schedule is in place and provides management with continuing insight. Float values are managed to optimize the schedule. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. The schedule is designed for effective integrated project management purposes and contains a calculated critical path for the entire contractual period of performance. Baseline critical path activities and milestones report no negative float values with few float values deemed excessive. Control Account Manager(s) (CAMs) and project/program manager(s) can clearly and logically explain the critical path and float details. They manage float to result in an optimized schedule at all levels.	**Logical critical and driving paths reflecting current customer work priorities are used to proactively manage the project/program to meet contract completion objectives.** Baseline critical path activities and milestones report no negative or excessive float values. Schedule data are monitored and used for management control and are automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Each milestone (completion or interim) or control point has distinct driving and near-driving path(s) to identify the longest sequence from time now to that milestone or control point. The schedule and critical path have completed an external review, such as an Integrated Baseline Review (IBR). Routine surveillance results of the critical path and total float are fully disclosed with all key stakeholders, who maximize use of these results The critical path and total float are proactively managed and continuously optimized.

SUB-PROCESS B: PLANNING AND SCHEDULING	Maturity Level				
	LOW	MEDIUM			HIGH
B.8. Schedule Margin (SM)	**1**	**2**	**3**	**4**	**5**
The establishment of Schedule Margin (SM) within the schedule is an optional management technique available to help projects/programs deliver on time, on target, and on cost. SMs are created by inserting activities to represent the time necessary to account for estimated schedule risks/uncertainties. SM is used to mitigate schedule risk and to increase the accuracy of downstream forecasts. While SM duration will generally decrease over time as risks expire and uncertainties diminish, it is possible for the duration to increase as additional risks and uncertainties are discovered. Customer's schedule contingency, if included in the schedule, is reflected consistent with SM. The amount of SM established is directly related to the estimation of schedule risk inherent to accomplishing the project goals and deliverables. The relationship between SM and risk in the schedule must be documented and reviewable. There are clear ties between SM duration and the risk management process where its establishment can be based upon the results of a Schedule Risk Assessment (SRA). SM must be identified in the project schedule as a single non-resourced activity positioned between the last discrete resourced activity in a critical/major decision phase and the critical/major decision milestone. This placement will allow management to evaluate the impact of realized risks on the schedule to the next milestone and act to address possible risks to the project. While SM duration will generally decrease over time as risks/uncertainties diminish, it is possible for the duration to increase as additional risks and uncertainties are discovered. Items to consider include: □ SM activities are defined and justified through examining project risks □ SM activities precede only milestones □ The project manager actively manages the schedule margin □ Other SM should be integrated with the Risk Management sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 6, 27; DoD EVMSIG GL 6, 27; DOE CAG GL 6, 27; EIA748-D; NDIA PASEG; NDIA IBR Guide; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**The determination of SM is in the initial stages with some project risk factors having been identified.** There is no basis for determining the SM activity duration. SM is not based on the project/program risk management process. There is inadequate understanding and controls for maintaining and dispositioning use of SM.	**SM is mostly defined; most project risk factors are identified but not fully approved.** The schedule is informed by most risk factors from the risk register for establishing the SM. SM may have been identified, but its relationship to the critical/driving path(s) may be unclear. SM may not be fully integrated with the project/program risk management process. It not entirely clear how SM and total float analysis are reconciled and traceable to end-item milestone objectives. A plan is in place to complete the required outputs and meet the intent for the SM. The SM duration is justifiable, and traceable to its source, and coordinated with the Risk Management sub-process.	**SM is defined, documented, and approved. SM is commensurate with risk identified on the project/program.** The schedule is informed by all risk factors from the risk register for establishing the SM. Project /Program has established schedule margin by inserting an activity(s) to represent the time necessary to account for estimated schedule risks/uncertainties. The SM duration is fully justifiable, and traceable to its source, and fully integrated with the Risk Management sub-process.	**SM is actively managed to help inform management decision-making.** The schedule includes risk mitigation activities, as appropriate, and clearly demonstrates that the project is structured to be executable within schedule constraints and with acceptable risk. Routine surveillance results of the SM are fully disclosed with all key stakeholders, who maximum use of these results. Necessary corrective actions are implemented, completed, and recurring issues resolved. The SM detail has successfully completed an external review, such as an Integrated Baseline Review (IBR) and has key stakeholder approval.

SUB-PROCESS B: PLANNING AND SCHEDULING	Maturity Level				
	LOW	MEDIUM			HIGH
B.9. Progress Measures and Indicators	**1**	**2**	**3**	**4**	**5**
Progress measures and indicators are established to accurately assess schedule progress and to address the physical or tangible completion of work. They are typically established first by identification of interim goals to measure the progress of the project, which avoids subjectivity in the assessment of work accomplished. The objective interim performance measures should align with the Integrated Master Schedule (IMS) tasks/activities to enable accurate performance assessment. A sufficient number of interim measures are defined after the detailed schedule task/activities are established and are based on the completion criteria developed for each increment of work. Progress measures are necessary to justify progression to the next control account or lower-level task/activity. A key feature of an interdependent schedule is that it establishes and maintains the relationship between technical achievement and progress statusing. Progress measures serve as objective criteria for determining accomplishment of project/program phases and milestones that constitute the start or completion of work scope. Items to consider include: ☐ Interim goals are established by which to measure the progress of the project ☐ Objective product or milestone completion criteria are meaningful indicators of progress and address the physical or tangible completion of work ☐ Objective completion criteria are aligned with the accomplishments of the program's technical requirements and goals ☐ A sufficient number of interim measures are defined after the detailed schedule task/activities are established to ensure performance is measured as accurately as possible ☐ Other *References:* NDIA EVMS EIA-748-D Intent Guide GL 7; DoD EVMSIG GL 7; DOE CAG GL 7; EIA748-D; NDIA PASEG; DoD IMP/IMS; NDIA IBR Guide; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some progress measures and indicators are established. Few interim performance goals and measures are identified.** Few milestones and events by which to measure the progress of the project are identified. Accomplishment is assessed from the amount of work completed on the basis of time. Some schedule tasks contain meaningful progress indicators.	**Most progress measures and indicators are established based on physical products and performance goals. Interim performance goals and measures are identified.** The schedule is event-based and considers most, but not all, milestones and events traceable to the contract and project execution plan. Completion criteria are used to further assess the physical or tangible completion of work. Most schedule tasks contain meaningful progress indicators.	**Progress measures and indicators are established and used based on physical products and performance goals. Interim performance goals and measures are identified and approved.** The schedule is event-based and considers all milestones and events traceable to the contract and project execution plan. Anomalies are identified and informed corrective actions. Performance and progress evaluation occur, at a minimum, in alignment with the reporting of actual costs. Key project milestones are logically linked within the schedule. The schedule integrates directly from the master plan and supplements it with additional levels of detail. A sufficient number of interim measures are defined to ensure performance is measured as accurately as possible. Adequate numbers of milestones and goals are established to measure the progress of the project. Documented interim measures are based on the completion criteria developed for each increment of work used to assess the physical and technical completion of work.	**Progress measures are used to facilitate collaborative discussions and establish mutual expectations. They are integrated with, and substantiate, technical, schedule, and performance targets, deliverables, reviews, and events.** Performance measures are used for planning and goal-setting, creating mutual stakeholder expectations. The schedule is event-based consisting of a hierarchy of project events, with each event being supported by specific accomplishments, each associated with specific criteria to be satisfied for its completion. Critical target dates, project milestones, contractual events, accomplishment criteria, and project decision points are identified, and used to plan and assess the progress of work. Routine surveillance results are fully disclosed with all key stakeholders, who maximize use of these results. Schedule performance data are monitored and used for management control and are automatically tested to assess EVMS health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. The identification of interim goals by which to measure the progress has successfully completed an external review, such as an Integrated Baseline Review (IBR). In case major contract modifications occur, a new IBR has been completed. The schedule has a hierarchy of key milestones that fully identify key project/program decision points for effective progress measurement at all levels of the networked schedule.

SUB-PROCESS B: PLANNING AND SCHEDULING	Maturity Level				
	LOW		MEDIUM		HIGH
B.10. Time-Phased Performance Measurement Baseline (PMB)	1	2	3	4	5
The Performance Measurement Baseline (PMB) is an integrated, time-phased budget plan for the accomplishment of all work scope and technical requirements having full alignment to resource planning and the project schedule. This means that there is alignment between the authorized work activities in the Integrated Master Schedule (IMS) and the time-phased budget and resource plans. Items to consider include: □ Use of Earned Value Management System (EVMS) Budgeting Tool □ Control Account Plans (CAPs) □ Summary Level Planning Packages (SLPPs), if applicable □ CA/Work Package grouping in IMS □ Accounting calendar in place □ Human capital/resource plan □ Statement of Work (SOW) / Statement of Objectives (SOO) in place □ Over Target Baseline (OTB)/ Over Target Schedule (OTS), if applicable □ Other The Time-Phased PMB should be integrated with the Budgeting and Work Authorization sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 8; DoD EVMSIG GL 8; DOE CAG GL 8; EIA748-D; NDIA PASEG; DoD IMP/IMS; NDIA IBR Guide; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**The time-phased PMB and resource plan is inadequate or insufficient due to missing resources or being unrealistic. It does not reflect how it meets all work scope and technical requirements within budget and schedule constraints.** Technical requirements and key performance parameters are not aligned to work scope and the time-phased resource plan. The schedule shows inconsistent resource distributions with significant peaks and valleys reported for the levels needed. There is limited documentation related to how the time-phased resource plan was established for accomplishing work scope.	**Most of the time-phased PMB and resource plan is established but does not reflect how it meets all work scope and technical requirements within budget and schedule constraints.** Most technical requirements and key performance parameters are aligned to work scope and the time-phased resource plan. The documented time-phased resource plan, while not optimal, is considered achievable for accomplishing the work scope. The Time-Phased PMB is coordinated with the Budgeting and Work Authorization sub-process.	**The time-phased PMB and resource plan is fully established and meets all work scope and technical requirements within budget and schedule constraints.** All technical requirements and key performance parameters are aligned to work scope and the time-phased resource plan. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. The project/program has completed an external review, such as an Integrated Baseline Review (IBR), to ensure that the time-phased PMB and resource plan meets all work scope and technical requirements within cost and schedule constraints. The time-phased resource plan and subsequent resource levels are optimized for accomplishing the work scope. The Time-Phased PMB is fully integrated with the Budgeting and Work Authorization sub-process.	**The time-phased PMB and resource plan is tested automatically utilizing a parametric or other statistical method, and is actively used by management to inform decision-making.** Resource allocation determinations are documented and have been developed utilizing a parametric or other statistical method against previous similar work. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of the PMB are fully disclosed with all key stakeholders, who maximize use of these results. Identified issues resulting from the external assessment are monitored and tracked to closure**.** An external review is conducted with each major contract modification. The PMB is continuously improved and optimized.

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION

Budgeting and Work Authorization is the sub-process for allocating cost targets to individual segments of authorized work, providing permission only for authorized work to occur, and reflecting the authorized changes to budget.

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION	Maturity Level				
	LOW	MEDIUM			HIGH
C.1. Scope, Schedule and Budget Alignment	**1**	**2**	**3**	**4**	**5**
Alignment among the project scope, schedule, and budget, is critical for effective project control. The Performance Measurement Baseline (PMB) should be time-phased in alignment with the Integrated Master Schedule (IMS). Similarly, the budget should be aligned in accordance with the appropriate accounting calendar for the authorized work scope, including all Control Accounts (CA) and Summary Level Planning Packages (SLPPs). Items to consider include: □ Earned Value Management System (EVMS) budgeting tool □ Control Account Plans (CAPs) □ CA/Work Package (WP) and Planning Packages (PP) grouping in the IMS □ Accounting calendar □ Human capital/resource plan □ Other The Scope, Schedule and Budget Alignment for PMB development should be integrated with the Organizing, Planning and Scheduling, Analysis and Management Reporting, Material Management and Subcontract Management sub-processes. *References:* NDIA EVMS EIA-748-D Intent Guide GL 8; DoD EVMSIG GL 8; DOE CAG GL 8; EIA748-D; NDIA PASEG; DoD IMP/IMS; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**The scope, schedule and budget are not aligned. The budget data does not match the IMS for time-phasing of the PMB.** Both the EVMS budgeting tool and the IMS contain project data. However, the time-phased data in the budget tool does not align with what is being reported in the IMS. The IMS does not show time-phasing of scope, but rather it shows event timeframes or milestone events.	**The scope, schedule and budget are aligned at the CA level. The budget data is in alignment with the IMS for the time-phasing of the PMB to the CA level.** The time-phasing of the budget data aligns with both the work authorization documents and the IMS, at the CA level. The time-phasing of the budget data does not align at the WP/PP level in the IMS, nor does it align at the WP/PP level within the CAP. The Scope, Schedule and Budget Alignment for PMB development is coordinated with the Organizing, Planning and Scheduling, Analysis and Management Reporting, Material Management, and Subcontract Management sub-processes.	**The scope, schedule and budget are aligned at the WP/PP level. The budget data is in alignment with the IMS for the time-phasing of the PMB to the WP/PP level.** The time-phasing of the budget data aligns with the authorized scope, the IMS and the CAP at both the CA and WP/PP levels. The Scope, Schedule and Budget Alignment for PMB development is fully integrated with the Organizing, Planning and Scheduling, Analysis and Management Reporting, Material Management, and Subcontract Management sub-processes.	**The IMS time-phasing of the PMB is at least to the WP/PP level (or lower), matches the project/ program's resource plan, and is proactively used to inform management decision-making.** The time-phased data in the budgeting tool is supported by a resource plan that shows the project/program stakeholders have a viable plan for labor and resource allocation needed to perform the authorized scope. The scope, schedule and budget alignment is monitored, used for management control and automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of scope, schedule and budget alignment are fully disclosed with all key stakeholders, who maximize use of these results. The scope, schedule and budget alignment is continuously improved and optimized.

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION	Maturity Level				
	LOW		MEDIUM		HIGH
C.2. Summary Level Planning Packages (SLPPs)	**1**	**2**	**3**	**4**	**5**
Summary Level Planning Packages (SLPPs) are established above the Control Account (CA) level for future efforts that cannot be practically identified to a CA. Each SLPP identifies scope, schedule, and associated budget, which are amended to the end of the project/program delivery period. The SLPP budgets must be identified specifically to the work for which is intended, time-phased, periodically reviewed for validity, and not used to perform other scopes of work. SLPPs should be subdivided to the extent practical into CAs at the earliest opportunity. Items to consider include: □ Earned Value Management System (EVMS) budgeting tool □ Control Account Plan (CAP) □ Integrated Master Schedule (IMS) □ Statement of Work (SOW) / Statement of Objectives (SOO) □ Program budget log □ Other SLPPs should be integrated with the Planning and Scheduling sub-process and Change Control sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 8, 29; DoD EVMSIG GL 8, 29; DOE CAG GL 8, 29; EIA748-D; NDIA PASEG; DoD IMP/IMS; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**SLPP budgets have changed over time without evidence of scope addition or deletion. SLPPs contain scope that is actively being delivered.** SLPPs have incurred actual costs and are being performed. SLPPs exist in the IMS in the current period or within the freeze period. Subsequent to establishment of the initial Performance Measurement Baseline (PMB), SLPPs are not monitored or assessed for scope, schedule and budget to the end of the project/program, or reconciled in budget logs during conversion into CAs.	**SLPPs contain scope that has sufficient detail to be assigned to a Control Account Manager (CAM) and to be time-phased into the existing schedule.** Following issuance of a supplemental agreement, SLPP(s) are planned based upon the authorized scope, schedule and budget. Upon contract modifications, the internal contract authorization identifies the scope, period of performance and budget; and the PM assigns responsibility to plan the SLPP in the IMS. The SLPPs are coordinated with the Planning and Scheduling sub-process and Change Control sub-process.	**SLPPs contain scope that cannot be practically identified to a CA and is held at the project/program management level until further defined.** Existing SLPPs are routinely evaluated for scope, schedule and budget to the end of the project/program, and when converted to CAs, SLPPs are assigned to a CAM and reconciled in budget logs. The SLPPs are represented in the IMS and time-phased into the existing schedule. The project / program team ensures that the responsible engineer (or functional manager) assigned responsibility for the SLPP has properly planned the SLPP for the authorized scope, schedule and budget. The SLPPs are fully integrated with the Planning and Scheduling sub-process and Change Control sub-process.	**The project/program actively evaluates SLPP scope and enforces restrictions on the time allowed for scope to stay undefined.** SLPPs are continuously evaluated for scope, schedule and budget to the end of the project/program. SLPP and budget log data are monitored, used for management control and are automatically tested to assess system health and integrity. Routine surveillance results of SLPPs are fully disclosed with all key stakeholders, who maximize use of these results.

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION	Maturity Level				
	LOW		MEDIUM		HIGH
C.3. Work Authorization Documents (WADs)	**1**	**2**	**3**	**4**	**5**
Work Authorization Documents (WADs) identify the Scope of Work (SOW)/Statement of Objectives (SOO), period of performance, and budgets (including hours, as applicable). The EVMS is used to verify that the start of work and the expenditure of costs is initiated through a documented authorization process. This process provides budget authorization for the Control Account Manager (CAM) to start work efforts. Approved work authorization precedes the baseline start and actual start of work. Work should not begin before authorized by an initial work authorization. Formally authorizing the work ensures the assignment of all project/program work scope to the responsible organization is clearly documented and the resources required for completing the work are budgeted and acknowledged by the management team prior to commencement of work. A budget is established for the work scope which is then further broken down by the Element of Cost (EOC) for labor, material, subcontractor, and other direct charges required to accomplish it. Inadequate authorization of work increases the risk of mischarges, operating inefficiencies, and cost overruns. Lack of planning and establishing budget by EOC impacts management's ability to allocate resources effectively and ensure all required resources are committed and available to the project. Ensuring Control Account (CA) budgets are authorized and planned by EOCs facilitates management insight into program performance at the resource level. Inadequate work authorization increases the risk of performing unauthorized work leading to cost overruns. Unauthorized expenditures, budgets, and scheduled activities prior to formal work authorization may be an indicator of lack of program management attention and control over resources, baseline plans, and schedule resulting in poor execution of contract requirements. The inability to roll up costs will prevent reconciliation with the performance measurement baseline and impact visibility and analysis of cost performance at key management control levels. Items to consider include: □ CA Plans (CAP) by EOC □ WAD scope definition and traceability to the SOW/SOO □ Performance Measurement Baseline (PMB) □ Undistributed Budget (UB) logs □ Bills of Materials (BOM) □ Responsibility Assignment Matrix (RAM) □ Schedules (prime and subcontractor) □ Basis of Estimate (BOE) □ Work Breakdown Structure (WBS) Dictionary □ Other Work Authorization should be integrated with the Organizing sub-process and the Planning and Scheduling sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 9; DoD EVMSIG GL 9; DOE CAG GL 9; SAE EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some WADs identify SOW, period of performance, and budgets, and are traceable to the WBS, OBS, CAP, CAM's BOE, and schedule.** WAD policies and procedures are not yet reviewed. WAD data sources (WBS, OBS, CAP) are not fully developed. WADs/CAPs are not fully supported by EOC breakouts and period of performance. They are not traceable to time-phasing in the schedule nor planned according to the manner in which work will be executed. Some WADs authorize scope, schedule, and budget, based in part on the associated BOE.	**Most WADs identify scope of work, period of performance, and budgets, and are traceable or reconcilable to the WBS, OBS, CAP, CAM's BOE, and schedule.** WAD policies and procedures are drafted and reviewed. WAD data sources (WBS, OBS, CAP) are in various stages of development. WADs/CAPs are supported by EOC breakouts and period of performance. WADs may not be fully traceable to time-phasing in the schedule nor planned according to the manner in which work will be executed. Most WADs authorize scope, schedule, and budget, based on an associated BOE. Procedures are in place addressing development and use of BOEs by those responsible for authorizing, planning and performing the work. Differences between BOE and WAD values are traceable and reconcilable. Work Authorization is coordinated with the Organizing sub-process and the Planning and Scheduling sub-process.	**All WADs identify scope of work, period of performance, and budgets, and are traceable or reconcilable to the WBS, OBS, CAP, CAM's BOE, and schedule.** WAD policies and, procedures are approved and implemented across the applicable scope for all CAs. WAD data sources are fully developed, approved for use, and under configuration control. CAPs are budgeted by EOC as an extension of the WADs. WADs are fully traceable to time-phasing in the baseline schedule and planned according to the manner in which work will be executed. All project/program work scope, schedule, and budget (including hours, as applicable) identified in the WADs are realistic and reconcilable with the associated BOE based on past performance of similar nature, documented or proven estimating practices, or similar methods. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. WADs provide the basis for a mutually agreed-to scope, schedule, and budget that serves as the basis for measuring performance, forecasting budgets, schedules, and managing work. Differences between BOE and WAD values are understood, reconcilable to material, procurements and subcontracts, and used as a basis for identification of risks and opportunities. Work Authorization is fully integrated with the Organizing sub-process and the Planning and Scheduling sub-process.	**Traceability and reconciliation of WADs is institutionalized in the tools, monitored and documented monthly, and proactively used to track authorized work and associated scope, schedule, and budget and to assign or transfer ownership to each CA.** Throughout the project/program lifecycle, BOEs are continually updated based on known risks, realized risks, and performance to date. WADs are continuously maintained and automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved, leading to continuous improvement and optimization. Routine surveillance results of WADs data are fully disclosed with all key stakeholders, who maximize use of these results.

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION	Maturity Level				
	LOW		MEDIUM		HIGH
C.4. Work Authorization Prior to Performance	**1**	**2**	**3**	**4**	**5**
Scope, schedule, and budget authorization are needed before work performance is executed and actual costs are incurred. Approved Work Authorization Documents (WADs) precede the baseline start and actual start of work. Work should not begin before work scope, schedule, and budget are formally authorized by an approved WAD. This process serves as both a planning and control function. It ensures that the assignment of program work scope to the responsible organization is clearly documented. It also ensures that the resources required for completing the work are budgeted by Elements of Cost (EOC) within the baseline schedule period of performance and are acknowledged by the management team prior to commencement of work. For emerging work associated with Authorized Unpriced Work (AUW), authorization is needed before work is performed, and actual costs are incurred. Interim authorization may be approved by the contractor project/program manager (PM) through a directive as long as it is replaced with a formal work authorization approved by the Control Account Manager (CAM). This process is to allow for authorization of emergency work consistent with the intent of earned value. Items to consider include: □ Control Account Plans (CAPs) by EOC □ WADs approval process □ Performance Measurement Baseline (PMB) □ Undistributed Budget (UB) logs □ Bills of Materials (BOM) □ Responsibility Assignment Matrix (RAM) or similar documentation □ Schedules (prime and subcontractor) □ Material requirements documentation identifying when the material is expected to be used □ Other The Work Authorization Prior to Performance process should be integrated with the Planning and Scheduling sub-process and Accounting Considerations sub-process to ensure actual costs are not incurred prior to WAD signature. *References:* NDIA EVMS EIA-748-D Intent Guide GL 9, 16; DoD EVMSIG GL 9, 16; DOE CAG GL 9, 16; EIA748-D; NDIA PASEG; DoD IMP/IMS; MIL STANDARD 881 Rev E; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some WADs are approved before the work is allowed to begin and actual costs are incurred.** WAD policies, procedures, processes identifying roles and responsibilities (signature approvals) not yet drafted and reviewed for alignment with the governing requirements. WADS are unsigned and are not issued prior to work performance. A dollarized RAM or similar document identifying intersection of the Work Breakdown Structure (WBS) and the Organizational Breakdown Structure (OBS) at the Control Account (CA)/CAM level is not yet developed. CA charge numbers unique to the control account for cost accumulation and reporting not yet established.	**Most WADs are approved before the work is allowed to begin and actual costs are incurred, but the authorized value does not align or is not reconcilable to the budgeting tool.** WAD policies, procedures, processes identifying roles and responsibilities (signature approvals) drafted and reviewed for alignment with the governing requirements, but not yet approved. WADS are signed and issued prior to work performance for most scope. A dollarized RAM or similar document identifying intersection of the WBS and the OBS at the CAM level is in draft development but requires reconciliation and validation. CA charge numbers unique to the control account for cost accumulation and reporting established, but reports require reconciliation and validation. The Work Authorization Prior to Performance process is coordinated with the Planning and Scheduling sub-process and the Accounting Considerations sub-process.	**All WADs are approved before the work is allowed to begin and actual costs are incurred. The authorized value in the WAD aligns and is fully reconcilable to the budgeting tool.** WAD policies, procedures, processes identifying roles and responsibilities (signature approvals) align with governing requirements and are approved and implemented for use. WADS are authorized prior to work performance for all applicable scope. A dollarized RAM or similar document identifying intersection of the WBS and the OBS at the CA/CAM level is reconciled, validated, approved and implemented for use. All necessary change control documentation has been generated including cost account charge numbers unique to the CA (for cost accumulation and reporting) are established, reconciled and validated. The Work Authorization Prior to Performance process is fully integrated with the Planning and Scheduling sub-process and Accounting Considerations sub-process.	**WADs authorized values are traceable and continually reconcilable to the budgeting tool.** Work authorization prior to performance is monitored, used for management control and automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of the work authorization process are fully disclosed with all key stakeholders, who maximize use of these results. The work authorization process is continuously improved and optimized.

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION	Maturity Level				
	LOW	MEDIUM			HIGH
C.5. Budgeting by Elements of Cost (EOC)	**1**	**2**	**3**	**4**	**5**
EOCs are a subset of the Control Accounts (CAs) and Work Package (WP) budgets. CAs are planned, budgeted, and segregated by EOC (i.e., labor, material, subcontract, other direct costs, and indirect costs (e.g., an EOC equivalent)) when applicable. Budgets for direct costs are those chargeable to a specific WP and include labor, materials, equipment, and any other resources defined by the project along with indirect burdens. The time-phasing of material budgets should be consistent when the material is expected to be received and consumed for acceptable points for planning and measuring material. Budgets for subcontractors are time-phased to support project schedule requirements at acceptable points for planning and measuring subcontracts to vendors. Budgets may be stated in units of currency, hours, or other measurable units consistent with the budget values reflected in the Control Account Plans (CAPs). Budgeting indirect costs supports reconciliation between the accounting system cost elements and EVMS cost system EOCs, mitigates distortion of direct EOC variances, and enhances management's analysis and understanding the indirect rate impacts. Items to consider include: ☐ Budget reflected in CAPs by EOC ☐ EOC budgets found in WAD ☐ Subcontractor budgets are time-phased ☐ Budgets are stated in units of currency, hours, or other measurable units ☐ Prime budgets are integrated with schedules ☐ Disclosure Statement (e.g., Cost Accounting Standards (CAS)) ☐ Other The EOC should be integrated with the Indirect Budget and Cost Management sub-process and the Material Management sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 9, 10, 13; DoD EVMSIG GL 9, 10, 13; DOE CAG GL 9, 10, 13; SAE EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some CA budgets are planned and authorized by EOC (i.e., labor, material, subcontract, other direct costs, and indirect costs).** Policies, procedures, processes establishing segregation by EOC not yet drafted or reviewed for alignment with the governing requirements. System structure and resource coding for cost element segregation is not yet developed. EOCs are not yet integrated in the EVMS.	**Most CA budgets are planned but not all authorized by EOC.** Policies, procedures, processes establishing segregation by EOC drafted, but not yet reviewed for alignment with the governing requirements. System structure and resource coding for cost element segregation are developed, but not yet reconciled or validated. EOCs are integrated in the EVMS, but not yet reconciled or validated. The EOCs are coordinated with the Indirect Budget and Cost Management sub-process and the Material Management sub-process.	**All CA budgets are planned and authorized by EOC.** Policies, procedures, processes establishing segregation by EOC reviewed for alignment with the governing requirements and approved for implementation. System structure and resource coding for cost element segregation are reconciled and validated for implementation and use. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. EOCs are integrated in the EVMS, traceable, reconciled, and validated for use. The EOCs are fully integrated with the Indirect Budget and Cost Management sub-process and the Material Management sub-process.	**CA budgets by EOCs are traceable, reconciled on a monthly basis, and proactively used to track authorized work and associated scope, schedule, and budget and to assign or transfer ownership to each CA.** EOC budgets are monitored, used for management control and automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of EOCs are fully disclosed with all key stakeholders, who maximize use of these results. The EOC budgets are continuously evaluated for opportunities to improve or optimize.

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION	Maturity Level				
	LOW	MEDIUM			HIGH
C.6. Work Package Planning, Distinguishability, and Duration	**1**	**2**	**3**	**4**	**5**
Work Package (WP) planning begins with the logical decomposition of authorized Control Account (CA) scope, schedule and budget into executable and measurable segments of work. A WP must be a distinguishable subdivision of the CA, reflecting the way work will be executed, assignable to a single organizational element. WPs support accurate performance measurement through assignment of the appropriate Earned Value Technique (EVT), segregated by elements of cost and include an appropriate EVT. WPs must be distinguishable from other WPs. WPs are where the work is planned in detail, technical progress is measured, and earned value is determined. WPs contain specific time-phased resource requirements in dollars, hours, or other measurable units. WPs have relatively short durations. Longer tasks are acceptable, but progress must be objectively measured using the appropriate EVT and Quantifiable Backup Data (QBD). Items to consider include: ☐ WPs are planned as far in advance as practicable ☐ WPs contain authorized scope and budgets that include specific time-phased resource requirements in dollars, hours, or other measurable units ☐ WPs reflect the expected way the work is to be executed and are a distinguishable subdivision of a CA, assignable to a single program organizational element ☐ WPs contain small, manageable segments that support accurate performance status and task execution is measured at the working level ☐ WPs are distinguishable from other WPs by titles and/or other unique attributes/descriptors consistent with the scope of work ☐ WP durations are realistic (i.e., durations are substantiated by a technical or other realistic basis of estimate) ☐ WP duration is limited to a relatively short span of time ☐ Longer duration WPs need objective intermediate measures of physical progress to enable accurate performance assessments ☐ Other The WP Planning process should be integrated with the Planning and Scheduling sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 10; DoD EVMSIG GL 10; DOE CAG GL 10; EIA748-D; NDIA PASEG; ANSI PMI 19-006-2019	**Not yet started.**	**Some WPs are logical decompositions of authorized scope, schedule and budget, distinguishable subdivisions of a CA, with realistic durations.** Some processes are in place to ensure that the WPs are established correctly. WPs are not decomposed and planned in sufficient detail to manage the project/program effectively.	**Most WPs are logical decompositions of authorized scope, schedule and budget, distinguishable subdivisions of a CA, with realistic, short durations.** Most processes are in place to ensure that the WPs are established correctly. The process requires that the WPs are planned as far in advance as practicable, reflect the actual way the work will be executed, and contain authorized scope, schedule, and budget distinguishable from other WPs. They are based on time-phased resource requirements in dollars, hours, or other measurable units, and are assigned appropriate EVTs. Some WPs have realistic durations that are supportable by a technical or other realistic basis of estimate with relatively short durations. However, the level of detail is not sufficient to effectively manage the project/program. WP Planning is coordinated with the Planning and Scheduling sub-process.	**All WPs are logical decompositions of authorized scope, schedule and budget, distinguishable subdivisions of a CA, with realistic, short durations.** The processes to establish WPs have been developed, documented and approved. WPs are planned as far in advance as practicable, reflecting the actual way the work will be executed. WPs are based on the most current definition of work and contain authorized scope and budgets that include specific time-phased resource requirements in dollars, hours, or other measurable units. Progress is objectively measured using the appropriate EVT and QBD. WPs have realistic durations that are supportable by a technical or other realistic basis of estimate with relatively short durations (e.g., 1 to 2 months), with longer duration work packages having objective intermediate measures of performance and QBDs. WP Planning is fully integrated with the Planning and Scheduling sub-process.	**WPs are planned, current, distinguishable and continually monitored by project/program management to inform proactive decision-making.** All WPs are planned as far in advance as practicable, reflecting the actual way the work will be executed. All WPs are distinguishable and have realistic durations. WP planning, distinguishability and duration are monitored, used for management control and automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of WP planning, distinguishability and duration are fully disclosed with all key stakeholders, who maximize use of these results. The WP planning process is continuously improved and optimized.

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION	Maturity Level				
	LOW		MEDIUM		HIGH
C.7. Measurable Units and Budget Substantiation	**1**	**2**	**3**	**4**	**5**
Work Packages (WPs) and Planning Packages (PPs) contain authorized scope of work and budgets that include time-phased requirements in dollars, hours, or other measurable units. Use of measurable units provides a basis for planning and accurate and objective performance assessment. WP and PP budgets must be based on authorized work and realistic timelines to substantiate their accuracy and planning value. WP and PP quantities, sizes and durations will vary subject to scope, internal management needs, and the size and complexity of the project/program. PPs should be broken down to the extent practical for scope, schedule and budget substantiation. Distributing all control account budgets to either work packages or planning packages ensures the Performance Measurement Baseline (PMB) is planned at an executable level that supports meaningful performance measurement. Items to consider include: ☐ WP/PP budgets are expressed in specific time-phased resource requirements in dollars, hours, or other measurable units ☐ All Control Account (CA) budgets are distributed to either WPs or PPs ☐ CA planning fully utilizes dollars, hours, or other appropriate measurable units ensuring the Performance Measurement Baseline (PMB) is planned in a way that supports meaningful performance measurement ☐ Appropriate measurable units can be associated with time-phased work package and planning package budgets and are used for performance measurement ☐ Budgets for high value production and critical material are planned discretely ☐ Measurable units associated with the planning and assessment of material can be associated with need dates and are time-phased by dollar amounts suitable for the type of material category ☐ Each WP/PP should have both budget and associated authorized scope of work ☐ WP/PP budgets are consistent with subcontractor baseline plans and are integrated and traceable ☐ The sum of all WP budgets plus PPs within CAs should equal the budgets authorized to those CAs in order to prevent duplicate recording of budgets ☐ Budgets for LOE activity must have supporting documentation for the estimate ☐ Other *References:* NDIA EVMS EIA-748-D Intent Guide GL 10, 11; DoD EVMSIG GL 10, 11; DOE CAG GL 10, 11; EIA748-D; NDIA PASEG; ANSI PMI 19-006-2019	**Not yet started.**	**Some WP/PP budgets are based on dollars, hours, or other measurable units and assigned to authorized scopes of work and realistic timelines.** A documented process to establish measurable units and substantiate WP/PP budgets does not exist. Few measurable units are used as the basis for planning and performance measurement. WP and PP budgets when added together do not equal the value of the CAs.	**Most WP/PP budgets are based on dollars, hours, or other measurable units and assigned to authorized scopes of work and realistic timelines.** A documented process to establish measurable units and substantiate WP/PP budgets exists with some gaps. In many cases, measurable units are used by management as the basis for planning and performance measurement. Most WP/PP budgets are established in terms of dollars, hours, or other measurable units. WP and PP budgets when added together do not equal the value of the CAs.	**WP/PP budgets are based on dollars, hours, or other measurable units and assigned to authorized scopes of work with realistic timelines.** A documented and approved process to establish measurable units and substantiate WP/PP budgets exists. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. Measurable units are used by management as the basis for planning and performance measurement, with minor exceptions. WP/PP budgets are established in terms of dollars, hours, or other measurable units. WP/PPs are consistent with detailed engineering, manufacturing, construction, or other schedules. WP/PP budgets are consistent with subcontractor baseline plans and are integrated and traceable. All of the WP and PP budgets when added together equal the value of the CAs.	**WP/PP budgets are proactively used by management as a basis for decision-making ensuring that the PMB is planned at an executable level that supports meaningful performance measurement.** The governance process requires verifications of WP/PP budgets to ensure alignment. All measurable units are associated with WP/PP budgets. Measurable units are automatically monitored to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved easily. Budgets for high value production and critical material are planned discretely. All measurable units are used by management as the basis for planning and performance measurement. Routine surveillance results of measurable units are fully disclosed with all key stakeholders. The units are realistic, meaningful, and accurately used to status, report, and analyze performance. All material planning and performance measurement is based on dollars, hours, or other measurable units. The measurable units process is continuously improved and optimized.

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION	Maturity Level				
	LOW		MEDIUM		HIGH
C.8. Appropriate Assignment of Earned Value Techniques (EVTs)	**1**	**2**	**3**	**4**	**5**
Selection of Earned Value Technique (EVT) is based on the duration and nature of the work contained in the Work Package (WP) and supported by how the work is planned and performance will be earned. The overarching goal is to ensure that a single EVT (at the WP level) is consistent with the type of work, how the work is planned, and provides for accurate performance measurement. EVTs can be: 1) Discrete: associated with work that has a specific product or service with distinct and measurable outputs; 2) Apportioned: associated with work of a supporting nature tied directly to a discrete technical activity; or 3) Level-of-Effort (LOE): associated with work of a general or supportive nature, not tied directly to a discrete technical activity. Discrete EVTs may be further broken down into other subcategories to better define how performance will be taken (e.g., percent complete, 50/50, 0/100). EVTs also may be assigned to a level below the WP, provided that the lower level EVTs are in alignment with the parent WP EVT. For example, a discrete WP may contain lower level details (activities) comprised of percent complete, 50/50 and 0/100 EV methods, however it shall not contain LOE or apportioned effort assignments co-mingled with the discrete assignments. Items to consider include: □ WP scope is partitioned into measurable segments and measured using a single EVT (e.g., discrete, LOE, or apportioned) □ Selection and use of appropriate EVTs allow for accurate and objective measure of work accomplishment and provide project/program management with accurate performance status and situational awareness of project/program execution □ EVTs represent the best method to measure work accomplishment □ EVTs are established based on how work is planned, and performance is earned consistent with the EVT □ When EVTs are assigned to sub-WP level details, proper controls are in place to prevent co-mingling of discrete and LOE to limit potential for distortion of performance measurement and variance analysis □ Discrete EVTs are used for materials; consumables in some cases can be measured using LOE □ EVTs support and/or are integrated with detailed engineering, manufacturing or other schedules □ EVTs used to assess performance of subcontractors, vendors, and others must be consistent, integrated, and traceable to prime and/or higher tier planning □ EVTs are not identified for work held in Summary Level Planning Packages (SLPP) or planning packages □ Use of discrete EVTs and objective progress measurement should be maximized wherever applicable □ Other The Assignment of EVTs should be integrated with the Organizing sub-process and the Planning and Scheduling sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 10, 12; DoD EVMSIG GL 10, 12; DOE CAG GL 10, 12; EIA748-D; NDIA PASEG; ANSI PMI 19-006-2019	**Not yet started.**	**Some WPs are assigned appropriate EVTs.** The process to appropriately assign EVTs to the WPs is not documented. Some WPs contain an EVT that is appropriate for the duration and type of work and consistent with the manner in which the resource budgets are planned, performed, and progress measured. Where EVTs are assigned below the WP level, co-mingling of various EVTs may exist.	**Most EVTs are consistent with the manner in which the resource budgets are planned, performed, and progress measured.** A documented process to appropriately assign EVTs to WPs is established, with some gaps. Most WPs contain an EVT that is appropriate for the duration and type of work, resulting in an accurate and objective performance measurement assessment. Where EVTs are assigned below the WP, most can demonstrate an absence of co-mingling of various EVTs. The Assignment of EVTs is coordinated with the Organizing sub-process and the Planning and Scheduling sub-process.	**EVTs are assigned and performance is earned consistent with the way work was planned, performed, and progress measured.** A documented and approved process to appropriately assign EVTs to WPs is established. WPs contain an EVT that is appropriate for the duration and type of work, resulting in accurate and objective performance measurement assessment. To the extent possible, WPs maximize use of discrete EVTs. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. Where EVTs are assigned below the WP level, there is a documented process of how the Budgeted Cost for Work Performed (BCWP) is summarized to the WP. Each WP can demonstrate an absence of co-mingling of various EVTs. Control Accounts (CAs) that co-mingle discrete and LOE techniques have proper controls to limit distortion of performance measurement and variance analysis. The Assignment of EVTs is fully integrated with the Organizing sub-process and the Planning and Scheduling sub-process.	**Appropriate EVTs are used to proactively manage the project/program toward completion and to inform effective decision-making.** WPs with appropriate EVTs are used to assess performance of subcontractors, vendors, and others in accordance with the business rhythm. EVT assignments are monitored, used for management control and automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. EVTs are fully integrated with detailed engineering, manufacturing or other schedules. EVTs are consistent with the manner in which the resource budgets are planned, performed, and progress measured. Routine surveillance results of EVT assignments are fully disclosed with all key stakeholders, who maximize use of these results. CAs that co-mingle discrete and LOE are actively monitored and managed to limit distortion of performance measurement and variance analysis. EVT assignments are continuously optimized.

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION	Maturity Level				
	LOW		MEDIUM		HIGH
C.9. Identify and Control Level of Effort (LOE) Work Scope	**1**	**2**	**3**	**4**	**5**
Level of Effort (LOE) is defined as those authorized work activities that, by their nature, are either not measurable (i.e., there is no measurable output/product), or for which measurement is impracticable. LOE activities are typically administrative or supportive in nature and may include work in areas such as program management, contract administration, financial management, security, field support, help desk support, or clerical support. LOE work packages should be separately identified from discrete effort work packages and apportioned effort work packages. Co-mingling of LOE and discrete effort within a Control Account (CA) should be minimized. When LOE and discrete scope are co-mingled within a CA, performance of the discrete effort and LOE should be separately evaluated to ensure visibility into the Earned Value Technique (EVT) for measuring performance of the discrete effort and LOE. Items to consider include: □ LOE and discrete work scope should be discernable and appropriately separated □ The amount of LOE work scope should be proportionate to the type of work being performed. □ Proper coding of activities is emphasized □ LOE activities do not drive project performance reporting □ Other Identifying and Controlling LOE Work Scope should be integrated with the Planning and Scheduling sub-process and the Analysis and Management Reporting sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 12; DoD EVMSIG GL 12; DOE CAG GL 12; EIA748-D; NDIA PASEG; ANSI PMI 19-006-2019	**Not yet started.**	**LOE work scope is not appropriately identified and has no distinction between LOE and discrete activities.** Documented processes explaining the appropriate use of LOE for measuring work performance are largely not in place and inconsistently applied. Substantial work scope that is general or supportive in nature or has no product, cannot be measured or is impractical to measure, is not identified or coded as LOE. No discernable effort has been taken to minimize the use of LOE for measuring the performance of work scope.	**Most LOE work scope is identified, with some lack of distinction between LOE and discrete activities.** Documented processes explaining the appropriate use of LOE for measuring work performance are mostly in place and consistently applied however with exceptions. Most work scope that is general or supportive in nature or has no product, cannot be measured or is impractical to measure, is identified or coded as LOE. Separate evaluation (managerial analysis) of LOE and discrete is challenging. Some discernable effort has been taken to minimize the use of LOE for measuring the performance of work scope. Identifying and Controlling LOE Work Scope is coordinated with the Planning and Scheduling sub-process and the Analysis and Management Reporting sub-process.	**LOE work scope is identified and controlled, with minor exceptions. CAs have separate WPs for LOE and discrete activities.** Documented processes explaining the appropriate use of LOE for measuring work performance are fully in place and consistently applied. With a few minor exceptions, work scope that is general or supportive in nature or has no product, cannot be measured or is impractical to measure, is coded as LOE. Discernable effort has been taken to minimize the use of LOE for measuring the performance of work scope. The co-mingling of LOE and discrete effort within a CA is minimized; and if co-mingled, LOE and discrete have unique codes to minimize any potential distortion of CA performance. Problems are identified, logged, tracked, mitigated, corrected and closed. Identifying and Controlling LOE Work Scope is fully integrated with the Planning and Scheduling sub-process and the Analysis and Management Reporting sub-process.	**The LOE EV is thoughtfully applied only where appropriate and is segregated to avoid distorting or masking discrete performance, allowing for meaningful cost and schedule variances and metrics.** Documented LOE measurement processes are approved and consistently applied with no exceptions. All work scope that is general or supportive in nature or has no product, cannot be measured or is impractical to measure, is coded as LOE. LOE work scope is evaluated, tracked, adjusted and updated monthly to support management decision-making. LOE work scope is automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. The amount of LOE is well understood and able to be communicated by management. Routine surveillance results of LOE work scope are fully disclosed with all key stakeholders, who maximize use of these results.

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION	Maturity Level				
	LOW		MEDIUM		HIGH
C.10. Identify Management Reserve (MR) Budget	**1**	**2**	**3**	**4**	**5**
Management Reserve (MR) is budget set aside for in-scope unforeseen events that may arise during the course of the project/program. Because MR is a separate budget that is not yet tied to work, it does not form part of the Performance Measurement Baseline (PMB). The MR budget should be commensurate with the level of risks and opportunities identified by the project/program. As such, MR budget is used for risk mitigation and opportunity capture efforts, but only when in scope to the contract and scope of work. MR budget is not a contingency that can be eliminated from contract prices during subsequent negotiations or used to absorb the cost of project changes. The MR budget being held in reserve must not be viewed by the project/program as a source for added work scope. Items to consider include: ☐ MR budget is associated with the project/program, owned by the prime contractor project/program manager and not associated with a specific scope of work ☐ MR budget enables project/program management to respond to future unforeseen events within the contractual work scope ☐ MR budget is not a source of funding for additional work scope or for the elimination of performance variances ☐ Other The establishment of the MR Budget should be integrated with the Risk Management sub-process and the Subcontract Management sub-process as applicable. *Comments: When Earned Value Management System (EVMS) requirements are flowed down to subcontractors, the prime must be able to account for the subcontractor's MR budget.* *References:* NDIA EVMS EIA-748-D Intent Guide GL 14; DoD EVMSIG GL 14; DOE CAG GL 14; EIA748-D; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**MR budget has not been established.** The process to identify MR budget has been started, but the project/program has no MR budget set aside for unplanned events yet.	**An MR budget is established but is not commensurate with risk levels on the project/program.** An MR budget is established as a cumulative value, usually as a percentage of total PMB, without regard to current or future risk events. Often times this value is mandated by the customer or by rule of thumb. The establishment of the MR Budget is coordinated with the Risk Management sub-process and the Subcontract Management sub-process as applicable.	**An MR budget is established and identified separately from the PMB. MR is commensurate with risk identified on the project/program.** An MR budget is established based on prime contractor's estimated risk values for the project/program, and further defined through a comprehensive probabilistic event-based analysis. The MR budget is not tied to a specific PMB work scope. Any problems are identified, logged, tracked, mitigated, corrected and closed. The establishment of the MR Budget is fully integrated with the Risk Management sub-process and the Subcontract Management sub-process as applicable.	**The MR budget and associated risks and opportunities are proactively managed through an identified risk management process and used to inform decision-making.** The MR budget is proactively monitored and continuously managed through a comprehensive probabilistic event-based analysis. The MR budget is automatically adjusted and optimized as the project/program progresses. Necessary corrective actions or adjustments are implemented, completed, and recurring issues resolved. The MR budget is supported with a schedule risk assessment. Unrealized risk is evaluated on an established periodicity and forecast MR needs are updated relative to updated risk analysis. Routine surveillance results of MR budget are fully disclosed with appropriate key stakeholders, who maximize use of these results.

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION	Maturity Level				
	LOW		MEDIUM		HIGH
C.11. Undistributed Budget (UB)	**1**	**2**	**3**	**4**	**5**
Undistributed budget (UB) is an identified and controlled budget that is applicable to specific project/program effort and identified with authorized work scope; it has not yet been distributed below the project Work Breakdown Structure (WBS) reporting level either directly to Control Accounts (CAs) or to Summary Level Planning Packages (SLPPs), or dispositioned to be removed from the contract. UB is a transient amount because once it is distributed to either CAs/SLPPs, or dispositioned to be removed from the contract it ceases to be UB. Because UB is tied to work scope, it does form part of the Performance Measurement Baseline (PMB). UB accounts are to be distributed/dispositioned in a timely manner as work scope is finalized and distributed to MR/CA's or to SLPPs. This authorized work scope and budget relationship must also be maintained when work scope and the related budget is removed from the distributed budget and placed in UB pending further negotiations and disposition with the customer. For Authorized Unpriced Work (AUW) prior to definitization, it is acceptable to plan and budget near term effort in CAs while the remaining effort and budget is planned at a higher level and/or in UB. Such situations necessitate that a budget be formulated for distribution purposes in spite of the fact that this budget amount has not been formally negotiated with the customer. In these situations, where work is authorized before negotiations, appropriate change order planning will need to be accomplished, and budgets will need to be established based on the contractor's cost estimate for the change. The contractor may allocate estimated budget for the immediate, near-term work requirement while maintaining the remainder of the budget estimate in a UB account (AUW is not subject to the same normal length of time UB may exist for a negotiated change). Scope and associated budgets that may reside in UB include: □ AUW □ Newly definitized work scope □ Work that has been de-scoped but not yet contractually removed from the project/program Items to consider include: □ UB is part of the PMB and has budget associated with contractually authorized work scope that has not yet been distributed to an organizational element at or below the WBS reporting level □ UB, unlike Management Reserve (MR), always has scope. Each project change must be tracked within UB until totally allocated to the time phased PMB or MR □ UB is a short-term holding account where the budget is expected to be distributed into the PMB or removed from the contract. Delays in contract direction may impact the timely distribution of UB into CAs □ Other UB Identification should be integrated with the Analysis and Management Reporting sub-process and the Change Control sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 14; DoD EVMSIG GL 14; DOE CAG GL 14; EIA748-D; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**No formal UB process is identified or utilized for the project/ program.** Some effort has been initiated to identify UB, but no documented process exists on the use and/or management of UB.	**The process to identify and control UB is documented. However, UB values have no clearly identified and associated scope. Values are not distributed in a timely manner to CAs or SLPPs.** The UB identification process may not always be followed or has gaps. UB transactions are distributed/dispositioned (either to MR/definitized CA/Work packages, or contractually removed from project/program, or transferred to) periodically. UB Identification is coordinated with the Analysis and Management Reporting sub-process and Change Control sub-process.	**UB values have a clearly identified work scope, and are logged appropriately in a UB or Contract Budget Base (CBB)/Project Budget Base (PBB) log. They are distributed/dispositioned in a timely manner.** The project/program has an approved process for the establishment and control of UB, and follows the process monthly while maintaining a UB log. UB accounts are distributed/dispositioned in a timely manner as work scope is finalized and distributed/ dispositioned to CAs, summary level planning packages, or for removal from the contract. If not possible to disposition UB in a timely manner (i.e., three months), documentation has been completed inclusive of an explanation and a plan to disposition UB. All transactions to/from UB are managed by the Change Control Board (CCB), and they are always documented through formal change control. UB Identification is fully integrated with the Analysis and Management Reporting sub-process and Change Control sub-process.	**UB is monitored and distributed within one accounting period. Scope being dispositioned for removal from the contract may require more than one accounting period.** Transactions to/from UB are monitored and automatically distributed/dispositioned in a timely manner, usually within one accounting period from log entry, with exception of delays in contract direction. All UB transactions are managed through a formal project/program Change Control process including a project/program CCB. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of UB transactions are fully disclosed with all appropriate stakeholders, who maximize use of these results. The UB identification and control process is continuously improved and optimized.

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION	Maturity Level				
	LOW		MEDIUM		HIGH
C.12. Reconcile to Target Cost Goal	**1**	**2**	**3**	**4**	**5**
A project/program baseline that reflects the common agreement between the two parties, for example a customer and contractor, provides a common reference point for progress assessment. It provides recognition of contractual requirements and precludes unauthorized changes to the Performance Measurement Baseline (PMB). The target cost must be reconciled with the PMB and Management Reserve (MR). This reconciliation includes a comparison of the Contract Budget Base (CBB) (sometimes known as the Project Budget Base (PBB)) to the Negotiated Contract Cost (NCC) plus Authorized Unpriced Work (AUW). The CBB is also reconciled with the Total Allocated Budget (TAB) to consider the cost value of an OTB. The sum of the Control Account (CA) budgets for higher-level Work Breakdown Structure (WBS) elements, Undistributed Budget (UB), and MR must reconcile with the TAB. Items to consider include: □ MR (showing month end values; monthly sources and applications to CAs; current value) □ UB (showing month end values; monthly sources and applications to CAs; current value) □ PMB (showing month end values; monthly changes from/to management reserve and undistributed budget; current value) □ CBB/PBB (showing month end values; monthly changes identifying contract modifications; current value) reconciled to the target cost □ TAB reconciled to the contract budget base and any recognized over target baseline □ Other The CBB/PBB reconciliation should be integrated with the Analysis and Management Reporting sub-process. *Comments: PBB is sometimes used when multiple distinct projects make up one contract.* *References:* NDIA EVMS EIA-748-D Intent Guide GL 15; DoD EVMSIG GL 15; DOE CAG GL 15; EIA748-D; NDIA PASEG; DOE EVMS GOLD CARD; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**The target cost for the project/program cannot be reconciled with the PMB and MR with confidence.** The project/program control log has been established and some of the following are populated: MR, UB, PMB, CBB/PBB, TAB. Reconciling project/program cost and developing internal reports showing the summarization from cost account to PMB is not easily achievable, with little confidence in accuracy.	**The target cost for the project/program is reconciled with the PMB and MR with minor gaps.** The project/program control log contains most of the following data: MR, UB, PMB, CBB/PBB, TAB. The CBB reconciliation is coordinated with the Analysis and Management Reporting sub-process.	**The target cost for the project/program is reconciled with the PMB and MR.** The project/program control log contains all of the following data: MR, UB, PMB, CBB/PBB, TAB. A complete reconciliation of the project/program control log occurs monthly and is reconciled to the TAB. Monthly performance and progress evaluation is in place and provides management with continuing insight into effective closed-loop corrective actions and the ability to adjust in a timely fashion through closure. The CBB/PBB reconciliation is fully integrated with the Analysis and Management Reporting sub-process.	**Project/program management proactively uses a process to reconcile target cost with PMB and MR, to continuously improve performance.** A complete reconciliation of the project/program control log is automatically performed each month and reconciled to the TAB. Monthly verification is part of management performance reports. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of the CBB/PBB reconciliation are fully disclosed with appropriate stakeholders, who maximize use of these results. The CBB/PBB reconciliation process is continuously improved and optimized.

SUB-PROCESS D: ACCOUNTING CONSIDERATIONS

Accounting Considerations is the sub-process for coordination between the control accounts and the organization's accounting system for accurate reporting of project/program direct and indirect costs.

SUB-PROCESS D: ACCOUNTING CONSIDERATIONS	Maturity Level				
	LOW		MEDIUM		HIGH
D.1. Direct Costs	1	2	3	4	5
Direct cost must be assigned to a project/program consistent with the pertinent budgets to achieve effective performance management. A project/program's cost-charging structure established in the accounting system should help ensure that actual costs collected are directly compared with associated budgets for that completed work (i.e. Budgeted Cost for Work Performed (BCWP)). The project/program should classify its direct costs (e.g., direct labor, material, other direct costs) consistent with the approved Cost Accounting Standards (CAS) disclosure statement. The project/program's directs costs are recorded at or below the Control Account (CA) on the same basis as budgets were established and, at a minimum, by Element of Cost (EOC). EOCs are defined in the cost accounting system disclosure statement for the project/program and must be consistent with the accounting system tracking of EOCs for direct cost elements. Items to consider include: ☐ Processes documented for direct cost classification and CA requirements ☐ CAS disclosure statement approval ☐ Anomalies identified and corrected immediately ☐ Reconciliation of subcontract reported actual costs to subcontract payments ☐ Estimated Actual Cost of Work Performed (ACWP) log ☐ Internal and external performance reports for subcontractors ☐ Subcontractor CA plans, when used ☐ Other Direct Costs should be integrated with the Subcontractor Management and Analysis sub-process and Management Reporting sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 16; DoD EVMSIG GL 16; DOE CAG GL 16; EIA748-D; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some documented processes exist addressing the classification of direct costs and the collection of direct costs in a CA. The cost accounting disclosure statement has not been submitted.** The project/program lacks documented processes for the collection of direct costs by EOC in a CA. The project/program has a cost accounting disclosure statement that identifies direct costs, but it has gaps. There is no documentation identifying anomalies or confirmation they have been corrected. As a result, the project/program cannot verify direct costs are recorded in the CA on the same basis as the budgets were established by EOC. Accordingly, cost variances submitted to the customer each month cannot be relied upon.	**Most processes addressing the classification of direct costs, and the collection of direct costs at or below the CA, are established, documented, but not yet approved. The cost accounting disclosure statement has been submitted but not yet approved.** The cost accounting disclosure statement identifies each of the direct costs along with the direct cost categories. Most direct costs are recorded in the CA on the same basis as the budget was established, and at a minimum by EOC. The project/program classifies most direct costs consistent with the accounting disclosure statement. Although some informal documentation exists identifying anomalies and their corrective action, the project program cannot confirm that direct costs collected by CA provide a valid comparison to budgets and performance. Direct Costs are coordinated with the Subcontractor Management sub-process and the Analysis and Management Reporting sub-process.	**All processes to record, manage, and control the classification of direct costs, are established and can be relied on for the accurate collection of direct costs. All direct costs are recorded at or below the CA on the same basis as the budget was established and recorded by EOC. The cost accounting disclosure statement has been approved.** Anomalies (labor cost transfers, material and subcontractor estimated actuals) between the accounting system and Earned Value Management System (EVMS) are documented regularly and corrective actions are tracked to closure. Adjustments to recorded costs are performed to correct accounting errors. All cost data and direct costs collected by CA provide a valid comparison to budgets and performance. Direct Costs are consistent with CAS disclosure statement. EOC and accounting cost elements are reconciled and consistent. Direct Costs are fully integrated with the Subcontractor Management sub-process ensuring accurate recording and reporting of direct cost data. Direct Costs are fully integrated with the Analysis and Management Reporting sub-process producing timely analysis of performance, development of forecasts, and decision-making.	**Direct costs associated with work performed by the prime, subcontractors, vendors and others charging to the contract are current and complete. The charge numbering system is structured in a manner that produces consistent recording and reporting of direct costs. Adjustments to recorded costs are performed only to correct minor accounting errors.** A process to identify and correct cost anomalies is established and used monthly. Anomalies are typically closed within two accounting periods. This ensures cost data is accurately collected and a valid comparison to budgets and performance is provided. Cost variances provided to the customer each month are timely and valid. Direct costs data are routinely monitored, continuously optimized, and used for management control and are automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of direct costs are fully disclosed with all key stakeholders, who maximize use of these results.

SUB-PROCESS D: ACCOUNTING CONSIDERATIONS	Maturity Level				
	LOW		MEDIUM		HIGH
D.2. Actual Cost Reconciliation	**1**	**2**	**3**	**4**	**5**
The Actual Cost of Work Performed (ACWP) in the Earned Value Management System (EVMS) budgeting tool must be formally reconciled each month with the actual costs in the accounting system, and any anomalies identified and corrected. This is a reconciliation of total cost of all cost elements, both direct and indirect, allocated to the project/program. The project/program needs to have timely, actual cost reports from collaborating partners. Estimated ACWP and accounting system accruals are used to account for incurred costs that have not yet been billed. Items to consider include: ☐ Processes are documented for reconciliation of EVMS ACWP with the accounting system ☐ Cost reports demonstrating reconciliation of EVMS ACWP with the accounting system ☐ Accounting system (general ledger) ☐ Estimated ACWP log and accruals ☐ Accounting procedures and Cost Accounting Standards (CAS) disclosure statement, as applicable ☐ Work Breakdown Structure (WBS) to cost collection mapping ☐ Control Account (CA) indirect cost reports ☐ Other The Actual Cost Reconciliation should be integrated with the Subcontractor Management sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 16; DoD EVMSIG GL 16; DOE CAG GL 16; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some documented processes exist addressing ACWP reconciliation. ACWP is reconciled between the EVMS and accounting system annually or at contract completion.** Issues identified during reconciliation are documented but may not be corrected and could reoccur. Incurred cost reports comparing the EVMS ACWP to the accounting system (general ledger) are not available. The project/program is unable to determine whether ACWP reconciliation differences are due to timing (estimated actuals), or more importantly, whether the cost variance and associated performance management is accurate.	**Most processes addressing ACWP reconciliation are in place. ACWP is reconciled between the EVMS and accounting system on a quarterly basis and identified issues are corrected.** The project/program implements processes designed to ensure ACWP reported in the EVMS is reconciled to the accounting system, but the processes are not formally documented and approved. The project/program is able to determine whether ACWP reconciliation differences are due to timing differences or due to errors. Issues identified during reconciliation are documented and corrected within a few months, but this time lag adversely impacts the cost variance and associated performance measurement reported to the customer each month. Actual Cost Reconciliation is coordinated with the Subcontractor Management sub-process.	**All processes addressing ACWP reconciliation are documented. ACWP is reconciled between the EVMS and accounting system on a monthly basis. Identified reconciliation errors are corrected in a timely manner.** The project/program has documented processes designed to ensure ACWP reported in the EVMS is reconciled by Element of Cost for total cost to the accounting system, and implements those processes on a monthly basis. During the reconciliation process the project/program can determine if anomalies are due to timing differences or errors. Both are documented and tracked to closure. Issues identified during reconciliation are documented and corrected expeditiously to minimize impacts on the reported cost variance and associated performance measurement. Actual Cost Reconciliation is fully integrated with the Subcontractor Management sub-process.	**ACWP is reconciled between the EVMS and accounting system more frequently than monthly. Identified reconciliation errors are corrected expeditiously.** The project/program implements automated processes designed to ensure ACWP reported in the EVMS is continuously reconciled to the accounting system. Cost reconciliation data are monitored, used for management control and automatically tested to assess system health and integrity. Routine surveillance results of cost reconciliation are fully disclosed with all key stakeholders, who maximize use of these results. Issues identified during reconciliation are documented and corrective action initiated immediately. This ensures the cost variances and associated performance measurement reported to the customer each month is representative of actual performance. The cost reconciliation process is continuously improved and optimized.

SUB-PROCESS D: ACCOUNTING CONSIDERATIONS	Maturity Level				
	LOW		MEDIUM		HIGH
D.3. Recording Direct Costs to Control Accounts (CAs) and/or Work Packages (WPs)	**1**	**2**	**3**	**4**	**5**
The charge numbers associated with the project/program's Control Accounts (CAs) and/or Work Packages (WPs) are opened for the cost collection on the start of work and closed at the completion of the associated work. The forecast schedule contains the most current detailed plan identifying the start date of the first WP and the completion date of the last WP in a CA. Charge numbers for each WP are opened and closed for cost collection consistent with the most current detailed plan. It is the responsibility of the CAM to proactively manage CAs and WPs to ensure they are opened and closed to charges consistent with the most current plan. While it is recognized that charge numbers may need to remain open for lagging vendor invoices (to reverse estimated actuals) and/or rate changes, any anomalies, such as mischarges, will continue to be investigated and resolved. Closed charge numbers may be reopened on a case by case basis for accounting reconciliation. The actual costs reported in the Earned Value Management System (EVMS) including estimated actual costs, must reconcile with the accounting system. The actual costs for accomplishing work must be recorded on the same basis that resource budgets are assigned, so that meaningful comparisons can be made. In all cases, the Actual Cost of Work Performed (ACWP) must be recorded in the same month that Budgeted Cost for Work Performed (BCWP) is recorded, with limited exceptions for some Level of Effort (LOE) WPs. There should not be months with significant BCWP without ACWP, or vice versa. Items to consider include: □ Process documented for opening and closing charge numbers associated with CAs and/or WPs for cost collection □ Accounting system direct costs □ Weekly Control Account Manager (CAM) direct cost report □ Other The process of Recording Direct Costs to CAs and/or WPs should be integrated with the Analysis and Management Reporting sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 16; DoD EVMSIG GL 16; DOE CAG GL 16; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some documented processes exist to ensure charge numbers associated with CAs and/or WPs are opened and closed for cost collection.** There are some project/program processes designed to ensure charge numbers assigned to CAs and/or WPs are opened/closed for cost collection consistent with the associated work. The EVMS does not have the capability to integrate open and closed charge numbers with the accounting system. Direct costs are not recorded in the EVMS consistent with start/completion of work and are not integrated with the accounting system. This lack of integration between the EVMS and accounting system results in direct ACWP not being accurately recorded in the EVMS consistent with the work being performed.	**Most processes are documented to ensure charge numbers associated with CAs and/or WPs are opened and closed for cost collection, as appropriate. The EVMS generally has the capability to integrate open and closed charge numbers with the accounting system.** The project/program implements processes designed to ensure charge numbers associated with CAs and/or WPs are opened/closed for cost collection on the start of work or the completion of work. Although most processes are documented, they are not yet approved. Direct costs are recorded in the EVMS consistent with the start/completion of work, with a few exceptions. Direct costs are generally integrated with the accounting system, but there may be exceptions. There is some informal documentation identifying these exceptions between the direct costs recorded in the EVMS and accounting system. But the project/program has not taken proactive steps to monitor and ensure the start/completion of work is consistent with the cost collection of direct ACWP in the EVMS. The process of Recording Direct Costs to CAs and/or WPs is coordinated with the Analysis and Management Reporting sub-process.	**All processes ensuring charge numbers associated with the CAs and/or WPs are opened and closed for cost collection, consistent with the start and completion of work requirements, are in place.** The project/program implements documented and approved processes each month to ensure charge numbers associated with CAs and/or WPs are opened/closed for cost collection consistent with the start/completion of work. The direct costs recorded in the EVMS are fully integrated with the direct costs in the accounting system. Charge numbers assigned to CAs and/or WPs are consistently opened/closed based on the start/completion of work. Identification of anomalies are investigated monthly and their corrective action documented to closure. The process of Recording Direct Costs to CAs and/or WPs is fully integrated with the Analysis and Management Reporting sub-process.	**All charge numbers associated with the CAs and/or WPs are fully integrated with the direct costs in the accounting system. Any errors are corrected expeditiously informing management decision-making.** Monthly actual charges expended accomplishing the work are recorded such that meaningful comparisons can be made. This ensures the validity of the cost variance analysis and enhances the EAC reported to the customer each month. Direct costs data are monitored, used for management control and automatically tested to assess system health and integrity. Metrics are documented and maintained each month monitoring any corrections. Necessary corrective actions are implemented, completed, and recurring issues resolved. A report is generated each month tracking CA and/or WP direct charges and this is provided to the appropriate project/program personnel (e.g., CAM, Project Controls, etc.) to review. Anomalies are tracked to closure and documented in a log and typically corrected in the following accounting period. This ensures that the integration between the EVMS and accounting system is continuously improved.

SUB-PROCESS D: ACCOUNTING CONSIDERATIONS	Maturity Level				
	LOW		MEDIUM		HIGH
D.4. Direct Cost Breakdown Summary	1	2	3	4	5
Actual direct costs can be accurately summarized at all levels of the Work Breakdown Structure (WBS) and Organizational Breakdown Structure (OBS) to support project/program management with performance measurement data. Cost collection accounts should be mapped to a single element within the WBS and OBS. The WBS and OBS roll-up structures contain no division/distribution of lower-level cost to multiple higher-level WBS and OBS elements, which helps to ensure performance measurement data integrity when summarized by WBS and OBS. A work order/job order/task code charge number must exist that uniquely identifies direct costs at the Control Account (CA) level at a minimum allowing for accumulation and summarization of costs to higher levels of the WBS and OBS. Through the use of this coding, allowable costs collected, at a minimum, within the CA by Element of Cost (EOC). Cost collection shall roll-up from the lowest defined level through the WBS and OBS hierarchies without distribution to two or more higher-level WBS and OBS elements. Items to consider include: □ Process documented for summarizing direct costs by WBS and OBS □ WBS and OBS/cost collection mapping showing the relationship between charge numbers and CAs (at a minimum) □ WBS structure (roll-up scheme) showing the hierarchy of WBS elements, CAs, and WPs □ OBS structure (roll-up scheme) showing the hierarchy of OBS elements, CAs, and WPs □ Management performance report □ Cost collection account structure or charge number methodology □ Other The Direct Cost Breakdown Summary should be integrated with the Organizing sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 17, 18; DoD EVMSIG GL 17, 18; DOE CAG GL 17, 18; EIA748-D; NDIA PASEG; ISO 21508:2018(E)	**Not yet started.**	**The project/program lacks the documented processes required to ensure CA direct cost EOCs are not distributed to two or more higher-level WBS and OBS elements.** The charge numbering system employed (if one exists) does not prevent a CA EOC from being distributed to two or more higher-level WBS and OBS elements.	**Most documented processes exist ensuring CA direct cost EOCs are not distributed to two or more higher-level WBS and OBS elements, with minor gaps.** Most processes ensuring CA EOCs are not distributed to two or more WBS's and OBS's are documented but they are not approved. The charge numbering system used by the project/program allows some CAs to be distributed to two or more higher-level WBS and OBS elements. Anomalies are identified and some are corrected. These anomalies limit accurate reporting at the WBS and OBS levels. Performance assessment is impacted since the actual costs may not all be related to work performed. The Direct Cost Breakdown Summary is coordinated with the Organizing sub-process.	**All processes are documented and approved ensuring CA direct cost EOCs are not distributed to two or more higher-level WBS and OBS elements.** The organization implements documented and approved processes each month. The project/program charge numbering system ensures that no CAs are distributed to two or more higher-level WBS and OBS elements. The project/program monitors direct cost distribution by WBS and OBS monthly. Anomalies are identified, tracked and corrected no later than the following accounting period, ensuring accurate performance assessment reported to the customer each month. The Direct Cost Breakdown Summary is fully integrated with the Organizing sub-process.	**Direct cost summary at the WBS and OBS is proactively managed each month, allowing the project/program to immediately inform management.** A formal monthly business rhythm process is used to automatically track all charge number anomalies each month in a log, with corrective actions initiated immediately. Recurring issues are resolved. Surveillance results that reveal systemic issues are utilized to continuously improve the system. This process fosters an accurate summarization by WBS and OBS and provides project/program management visibility into the current cost of products or services procured and enhances forecasting of potential future costs.

SUB-PROCESS E: INDIRECT BUDGET AND COST MANAGEMENT

Indirect Budget and Cost Management is the sub-process to establish, control, and manage the project/program indirect budgets and costs (e.g., indirect rates, indirect cost variances, indirect account structure).

SUB-PROCESS E: INDIRECT BUDGET AND COST MANAGEMENT	Maturity Level				
	LOW		MEDIUM		HIGH
E.1. Indirect Account Organization Structure	**1**	**2**	**3**	**4**	**5**
The organization or function responsible for indirect account management must be identified and its structure established. This structure includes indirect manager assignment, responsibility, and authority, and how indirect budgets are established, as well as how indirect cost expenditures are managed, controlled and documented. The designated indirect account manager(s) should have authority to implement documented processes that define resource assignment, budget establishment and control for indirect costs. An independent entity responsible for accounting and financial oversight (e.g., an auditing firm, or the Defense Contract Audit Agency (DCAA)) may audit specific indirect cost rates and/or the overarching accounting system for conformance with the organization's disclosure statement or for other contract administration purposes. However, under the construct of an Earned Value Management System (EVMS), visibility into indirect rates, budgets and costs, and the governing processes and formalized management structure, is not redundant to reviews conducted for other business systems, but is unique to the effective implementation and use of the EVMS for successful management of a project/program. Since indirect costs typically account for a major portion of project/program costs, written procedures that clearly define the indirect cost management processes, and formal assignment of roles, responsibilities and authorities to organizational staff are necessary. These procedures establish a framework for effective management and control of indirect costs. A mutual relationship must exist between project/program management staff charged with planning, executing and delivering within scope, schedule and cost objectives, and those charged with establishing and managing organizational efforts tied to indirect cost objectives. The former must incorporate indirect rates and indirect variance impacts into its project/program planning, budgeting, and forecasting processes to establish both realistic baselines and estimates at complete; the latter must be cognizant of the impacts of indirect cost variances and indirect rate changes will have on project/program cost objectives and take corrective action as necessary to address such indirect cost variances. Items to consider include: ☐ Processes documented for management of the indirect rates (e.g., cost pools and numerator/denominator, budget, charging, analysis and how the information is routinely provided to project controls) ☐ Current organizational chart with indirect account management identified ☐ Disclosure statement (e.g., Cost Accounting Standards (CAS)) and approval for responsibilities, relationships and structures ☐ Other *References:* NDIA EVMS EIA-748-D Intent Guide GL 4; DoD EVMSIG GL 4; DOE CAG GL 4; EIA748-D; NDIA PASEG; ANSI PMI 19-006-2019	**Not yet started.**	**Some documented processes exist addressing the management and control of indirect rates/costs. The CAS disclosure statement has not been submitted.** Documented processes for the management of indirect rates do not exist. An "ad hoc" indirect account organization structure for the management of indirect costs exists, with a number of significant gaps. Accounting documents such as the CAS Board disclosure statement identifying some indirect cost pools exist, but have not been submitted for stakeholder approval. Cost pools implemented are not consistent with the process or CAS Board disclosure statement. The organization has accounting documents such as the CAS Board disclosure statement that identify the treatment of indirect costs, but documents have not been submitted for approval.	**Most documented processes addressing the management and control of indirect rates/costs are in place. The CAS disclosure statement has been submitted but not approved.** Processes for the management of indirect rates are implemented, but not formally documented and approved. An indirect account organization structure for the management of indirect costs exists, with a few gaps that can be easily resolved. The accounting documents such as the CAS Board disclosure statement identifying each indirect cost pool have been submitted for approval by key stakeholders.	**The function responsible for indirect account management is in place. Documented processes addressing the management and control of indirect rates/costs are in place and approved. The CAS Board disclosure statement has been approved.** Processes for the management and control of indirect rates are documented, approved, consistently implemented, and aligned with the accounting calendar. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. An approved indirect account organization structure exists with those responsible for the management of indirect rates identified. The approved accounting documents such as the CAS Board disclosure statement identify each of the indirect cost pools used by the project/program.	**Comprehensive management and control of indirect rates/costs is proactively addressed on a continual basis. The CAS disclosure statement is regularly monitored.** Accounting documents such as the CAS disclosure statement, indirect rates, and budgets are proactively monitored on a monthly basis to ensure they are consistent with the indirect cost pools. Responsibility, assignment, and authority are clearly documented. The indirect account organization processes are consistently applied for resource assignment, budget establishment, and control of indirect costs. The indirect account organization structure is monitored to assess for management control as part of the EVMS health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of the indirect account organization structure are fully disclosed with all key stakeholders. The indirect account organization structure and indirect cost management processes are continuously improved.

SUB-PROCESS E: INDIRECT BUDGET AND COST MANAGEMENT	Maturity Level				
	LOW	MEDIUM			HIGH
E.2. Indirect Budget Management	**1**	**2**	**3**	**4**	**5**
Budgets for indirect costs are established and approved consistent with indirect processes. Indirect budgets are incorporated into the Performance Measurement Baseline (PMB) in accordance with documented processes and current rates (i.e., approved, provisional, proposed, recommended). Adjustments are generally made at the contract level with input from both contractor and customer. Items to consider include: □ Processes for establishment, management and incorporation of indirect budgets and rates □ Accounting procedures □ Indirect rate submission (e.g. approved, provisional, proposed, recommended) □ Official and/or disclosed forward pricing rates □ Accounting system and disclosure statement (e.g., Cost Accounting Standards/CAS) approvals, if applicable □ Frequency and/or timing for updating indirect rates □ Retroactive indirect changes to the baseline should be rare, and when they occur, are controlled □ Other Indirect Budget Management should be integrated with the Change Control and Analysis sub-process and the Management Reporting sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 13; DoD EVMSIG GL 13; DOE CAG GL 13; EIA748-D; NDIA PASEG; ANSI PMI 19-006-2019	**Not yet started.**	**Some indirect budgets are planned annually or consistent with approved pools. Indirect rates are not updated or consistently incorporated into the PMB.** Indirect budgets are inconsistently managed and allocated across the project/program. Indirect budgets are not projected into the future, and corresponding indirect rates are not adjusted annually. Forward pricing rates or rate forecasts are not available to the project/program resulting in a PMB that does not represent a realistic baseline plan for all authorized work.	**Most indirect budgets are consistent with approved pools and associated rates, but may be inconsistently implemented. Indirect rates are not adjusted after initial establishment each year.** Indirect budgets and indirect rates are established annually but management's forecasting focus is on the near term (e.g., one year) and little, if any, emphasis is placed on future years. Indirect budget performance reviews are conducted intermittently and thus there are no mid-year rate adjustments based on analysis of performance where applicable, potentially resulting in a PMB that does not represent a realistic baseline plan. Indirect Budget Management is coordinated with the Change Control and Analysis sub-process and the Management Reporting sub-process.	**Indirect budgets are established annually by cost element and consistent with pools. Indirect rates are adjusted at least once annually, if needed, such that the PMB represents a realistic baseline plan.** The project/program implements documented and approved processes defining the indirect budgeting process on a monthly basis. At the end of the accounting year, all indirect expenses are allocated. Indirect budgets and/or indirect rates are forecasted for the entire project/program period of performance ensuring the PMB represents a realistic baseline plan. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. Indirect budgets are managed by regular reviews ensuring each project/program receives its fair share of indirect costs. The most current indirect rates are used to develop and update the baseline (e.g., approved, provisional, proposed). Indirect Budget Management is fully integrated with the Change Control and Analysis sub-process and the Management Reporting sub-process.	**Indirect budgets are proactively established and managed. Indirect budgets are consistent with prior year experience, and rates are reviewed/changed more frequently, such as quarterly, to prevent large year-end adjustments.** A formal monthly business rhythm has been implemented by the contractor ensuring indirect budgets are effectively managed by comparing to actual indirect expenses. Indirect budget data are monitored and automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. The indirect budget process is robust and consistent with the disclosure statement. Routine reports and surveillance of budget status are provided monthly, and are fully disclosed with all key stakeholders, who maximize use of these results. Metrics are tracked allowing trends to be identified documenting over/under allocation of indirect expenses, disclosing issues immediately and providing real time information to the project/program. Monitoring and updating provisional/booking rates as warranted ensures the PMB reported to the customer each month contains the most current rates, represents a realistic baseline plan, and prevents large year-end adjustments.

SUB-PROCESS E: INDIRECT BUDGET AND COST MANAGEMENT	Maturity Level				
	LOW		MEDIUM		HIGH
E.3. Record/Allocate Indirect Costs	**1**	**2**	**3**	**4**	**5**
Indirect costs are for common activities that cannot be identified specifically with a particular project or activity and should typically be budgeted and controlled separately at the functional level or organization's managerial level. Indirect costs should be allocated to the project/program by applying rates that are consistent with indirect budgets. Indirect costs are charged to the appropriate indirect cost pools consistent with the established indirect budgets levels. It is important to have a documented process and organizations established specifically to manage and control indirect costs. Items to consider include: □ Cost collection account structure □ Cost element scope document reflecting indirect budget and disclosure statement □ Accounting documents such as the Cost Accounting Standards (CAS) disclosure statement □ Organization chart identifying management responsibility for controlling indirect costs □ Accounting system (general ledger) □ Incurred cost reports □ Other *References:* NDIA EVMS EIA-748-D Intent Guide GL 19; DoD EVMSIG GL 19; DOE CAG GL 19; EIA748-D; NDIA PASEG	**Not yet started.**	**Some documented processes are in place to ensure indirect costs are properly and correctly recorded and allocated to projects/ programs.** The project/program lacks the documented processes required to ensure indirect costs are properly and correctly recorded and allocated to projects/programs. The project/program is unable to verify whether indirect costs are charged to the appropriate indirect cost pool.	**Most processes are in place to ensure indirect costs are properly and correctly recorded and allocated to projects/programs, but they are not approved.** The project/program implements processes designed to ensure indirect costs are properly and correctly recorded and allocated to the project/program. However, the processes are not yet approved. Misapplied and unallocated indirect costs are identified and corrected periodically. This adversely impacts projections of project/program Estimate at Completion (EAC). Most indirect costs are charged to the appropriate indirect cost pool. Indirect cost reports documenting the current year's indirect budget by cost element, indirect charge numbers, and cost collection account structure. This results in indirect costs not being properly aligned with indirect budgets.	**All processes are designed, documented and approved to ensure indirect costs are properly recorded and correctly allocated to projects/programs.** The project/program implements documented and approved processes designed to ensure indirect costs are properly and correctly recorded and allocated to the project/program. Management responsibility and authority are clearly defined in the processes. Misapplied and unallocated indirect costs are identified, tracked and corrected immediately, no later than the following accounting period, providing management with insight to make timely decisions. All indirect costs are charged to the appropriate indirect cost pool and correctly allocated to the applicable project/program. Indirect costs are monitored each month ensuring they are consistent with the budgets. Any mischarges corrected immediately, no later than the following month. This allows accurate variance analysis and EAC projections.	**Indirect costs are accurately recorded and allocated. This allows management to effectively and proactively control indirect costs.** The project/program proactively monitors indirect costs each month to ensure they are accurately recorded and allocated. This allows the project/program to immediately disclose issues and provide the customer with real time information. A formal monthly business rhythm ensures incurred indirect costs are consistent with the budgets and promotes variance analysis resulting in successful cause/impact/corrective action. Metrics are collected and documented automatically ensuring trends are immediately identified, disclosed to the customer, and corrected allowing the project/program to achieve and maintain cost targets. Indirect cost allocation is continuously optimized such that the project/program does not experience significant year-end adjustments.

SUB-PROCESS E: INDIRECT BUDGET AND COST MANAGEMENT	Maturity Level				
	LOW		MEDIUM		HIGH
E.4. Indirect Variance Analysis	1	2	3	4	5
Actual indirect costs are regularly compared to indirect budgets to identify, analyze, and report variances and corrective actions. Ongoing indirect variance analysis provides visibility into potential indirect cost overruns or underruns and the opportunity to develop and implement management action plans to meet project objectives. Indirect costs represent a significant part of a project/program's total cost and variances associated with indirect budgets must be understood, monitored, analyzed, controlled, and integrated into planning, reporting, forecasting, and decision-making. Generally, Control Account Managers (CAMs) have little or no direct responsibility and/or control associated with analysis of indirect budgets and actual indirect costs. Commonly, it is the role and responsibility of management assigned to oversee indirect budgets and actual costs, to engage in recurring analysis and communicating the results of indirect variance analysis to the appropriate project/program personnel. Project managers, CAMs, and others are responsible for knowing and integrating the results of indirect variance analysis into project/program planning, control, and decision-making. Items to consider include: □ Documented processes establish indirect thresholds and indirect cost variance analysis □ Indirect cost management corrective actions resulting from indirect variances, when applicable □ Accounting disclosure statement (e.g., Cost Accounting Standards (CAS)), as applicable □ Other The Indirect Variance Analysis should be integrated with the Analysis and Management Reporting sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 24; DoD EVMSIG GL 24; DOE CAG GL 24; EIA748-D	**Not yet started.**	**Some documented processes are in place to address the establishment of thresholds and performance of indirect variance analysis.** The project/program lacks the documented processes required to ensure thresholds are established and indirect variance analysis is conducted. Indirect variance analysis results, if conducted, are infrequently used to inform project/program Estimates at Completion (EACs), and seldom result in corrective actions or adjustments to rates. Some indirect thresholds and/or indirect cost variances and associated corrective actions are identified and reviewed for insight into their impact on overall project cost performance. Typically, indirect variance analysis and/or corrective actions are only developed when performance significantly deviates from the indirect plans and decisions regarding rate adjustments and rate forecasts must be made impacting the EAC.	**Most of the processes are in place to address the establishment of indirect variance thresholds and performance of indirect variance analysis.** The project/program implements documented processes to ensure thresholds are established and indirect variance analysis and corrective actions conducted, but the processes are not yet approved. Most of the indirect cost thresholds and variances are identified, documented and reviewed for insight into their impact on overall project cost performance. Some corrective actions to include rate adjustments are implemented to address identified issues. However, not all indirect cost variances are identified or reviewed which limits management's ability to forecast future indirect cost performance as well as develop corrective action plans intended to regain project/program objectives. The impact of indirect variances is sometimes addressed at the project/program level within analyses and EACs. The Indirect Variance Analysis is coordinated with the Analysis and Management Reporting sub-process.	**All processes addressing the establishment of thresholds and performance of indirect variance analysis are implemented. All indirect cost variances are identified and analyzed regularly to inform project/ program EAC.** The project/program has documented and approved processes to ensure thresholds are established and indirect variance analysis and corrective actions are developed regularly. Indirect organization provides pending rate changes on a quarterly basis. All of the indirect cost thresholds are reviewed regularly by indirect category, and variances and corrective actions identified and reviewed for insight into their root-cause and impact on overall cost performance. This facilitates management's ability to forecast future indirect cost performance as well as develop corrective action plans intended to regain project/program objectives. Indirect corrective action plans, which may include rate adjustments, are implemented, tracked, and resolved expeditiously. The impact of indirect variances is identified and addressed at the project/program level and within control account variance analyses and EACs. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. The Indirect Variance Analysis is fully integrated with the Analysis and Management Reporting sub-process.	**Indirect variances are managed proactively to implement corrective actions and mitigate the impacts of identified issues, where practical.** Indirect variance data are routinely monitored and used for management control and are automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Indirect organization provides pending rate changes on a monthly basis. Routine surveillance results of indirect variance are fully disclosed with all key stakeholders, including senior management and the customer, who maximize use of these results. Senior management is actively engaged in the ongoing indirect cost analysis, which enhances their ability to forecast future indirect cost performance. Management also monitors corrective action plans at the organizational indirect cost center levels in order to regain or mitigate impacts to project/program objectives. Indirect rate analysis is integrated with risks and the EAC update process and is able to monitor the overall impact to the project EAC. The indirect variance process is continuously improved and optimized.

SUB-PROCESS F: ANALYSIS AND MANAGEMENT REPORTING

Analysis and Management Reporting is the sub-process for calculating, analyzing, and reporting the cost and schedule variances, along with providing reasons for significant variances, implementing corrective actions, and calculating new Estimates at Completion.

SUB-PROCESS F: ANALYSIS AND MANAGEMENT REPORTING	Maturity Level				
	LOW		MEDIUM		HIGH
F.1. Calculating Variances	**1**	**2**	**3**	**4**	**5**
Earned Value Management System (EVMS) formulas are used to produce visibility into project performance, planning, analysis, and decision-making. Proper application of EVMS formulas provides the project/program manager and others with analysis needed to focus resources on areas in need of attention. Formulas to calculate Cost Variance (CV), Schedule Variance (SV), and Variance at Completion (VAC) must be consistent with data produced by the accounting system and include budget, earned value, and actual costs that are reconcilable with the earned value management and accounting systems. As work is progressed based on Earned Value (EV) techniques, the corresponding budget value is "earned" and is represented as the Budgeted Cost for Work Performed (BCWP). BCWP is the primary data element for which Budgeted Cost for Work Scheduled (BCWS) and Actual Cost of Work Performed (ACWP) are compared to determine schedule and cost performance status. The resulting variance will provide early insight into cost and schedule status for improved visibility of program performance. EVMS performance data is available and used in these formulas to produce timely, accurate, reliable, and auditable analysis of project/program performance. Formulas are used to generate the following information at the control account and other levels as necessary for management control using actual cost data from, or reconcilable with, the accounting system: • Comparison of the amount of planned budget and the amount of budget earned for work accomplished. This comparison provides SV. • Comparison of the amount of the budget earned and the actual costs (where appropriate) for the same work. This comparison provides CV. Items to consider include: • Budget, earned value, and actual costs (reconcilable with the accounting system) • Monthly performance reports (CV, SV, VAC) • Use of generally accepted EVMS formula • Proper application of EV techniques • External reports, such as Integrated Program Management Report (IPMR) or Integrated Program Management Data and Analysis Report (IPMDAR) • Other Calculation of variances should be integrated with the Budgeting and Work Authorization sub-process. *Comments: To calculate VAC, one must have the updated EAC values (See F5).* *References:* NDIA EVMS EIA-748-D Intent Guide GL 22; DoD EVMSIG GL22; DOE CAG GL22; EIA748-D; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**The documented processes do not include the formulas for CV and SV and/or lack requirements for the accuracy and traceability of source data used to calculate the variance.** Documentation of the EVMS formulas used to calculate CV and SV do not link with data produced by the accounting system. For incomplete discrete work packages, Budgeted Cost for Work Performed (BCWP) reported in the current period is inconsistent with the method used to plan and resource the associated work (i.e., BCWS).	**The documented processes include formulas for correctly calculating CV and SV, but lack requirements for accuracy and traceability of source data used to calculate the variances.** EVMS formulas are consistent with data produced by the accounting system and are used to calculate CV and SV. However, it is difficult to ensure the source data is accurate, traceable and reconcilable. EV calculations are consistent with external reports and project/program requirements. For most incomplete discrete work packages, BCWP in the current period is consistent with the method used to plan and resource the associated work (i.e., BCWS). Calculation of variances is coordinated with the Budgeting and Work Authorization sub-process.	**The formulas for CV and SV are correctly documented, calculated, traceable and reconcilable with source inputs from the EVMS and the accounting system.** The process of CV and SV calculation requires accurate, traceable and reconcilable source inputs from EVMS and accounting system into control account level cost and schedule variance calculations, resulting in timely and reliable information. EVMS formulas are consistent with data produced by the accounting system. In conjunctions with updated EACs, VAC calculations are provided to support reports in terms of trends and the overall impact on cost to the project/program. For incomplete discrete work packages, BCWP is consistent with the method used to plan and resource the associated work (i.e., BCWS). Calculation of variances is fully integrated with the Budgeting and Work Authorization sub-process.	**Project/Program leadership proactively uses timely and reliable CV and SV to inform management decision-making and action. CVs and SVs are true indicators of schedule and cost performance.** Project/program management is actively engaged in the ongoing processes to provide realistic plans and budgets in order to provide and monitor realistic calculations of CV and SV. CV and SV are automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Use of automated tools to support the calculations have clear traceability to ensure source data is accurate and reconcilable as this provides output that is trusted and valued for making project/program decisions. Routine surveillance (i.e., internal, external, or joint) of CV and SV are fully disclosed with all key stakeholders, who maximize use of these results. The CV and SV process is continuously improved and optimized by incorporating lessons learned from specific projects/programs.

SUB-PROCESS F: ANALYSIS AND MANAGEMENT REPORTING	Maturity Level				
	LOW		MEDIUM		HIGH
F.2. Variances to Control Accounts (CAs)	**1**	**2**	**3**	**4**	**5**
Significant variances that have an impact on the execution of the project should be analyzed in detail at the Control Account (CA) level and reported as required. Cost and schedule, variances to each CA should be discussed and documented, including technical reasons. Project/program procedures defining thresholds are used to identify significant variances that require reporting of root cause analysis, corrective actions, and impacts to the project/program. Deviations from the established plan are analyzed, permitting management to rapidly and effectively forecast future performance and implement corrective actions to support project/program objectives. Items to consider include: ☐ Variance assessments at lower levels (e.g., Work Package (WP), activity/task) ☐ Internal monthly cost and schedule performance/variance reports ☐ External reports, such as Integrated Program Management Report (IPMR) ☐ Management reports from cost tool ☐ Integrated Master Schedule (IMS) ☐ CA plans ☐ Variance analyses (budget-based schedule variances and cost variances) reports ☐ Management action plans ☐ Updated schedule task completion and Estimate at Completion (EAC) forecasts ☐ Project/program schedules and schedule analysis outputs ☐ Variance analysis information in support of management needs ☐ Analysis of the schedules, e.g., the IMS, correlating to Schedule Variance (SV) analysis information and earned schedule information, if used ☐ Updates to both cost and schedule forecasts ☐ Historical documentation of variance analysis ☐ Clear decision-making expectations of the CAM and project controls personnel ☐ Other *Comments: Discussion and documentation of significant variances are addressed in documented sub-processes which are consistent with related sub-processes e.g., Planning and Scheduling sub-process, Subcontract Management sub-process and Risk Management sub-process.* *References:* NDIA EVMS EIA-748-D Intent Guide GL 23; DoD EVMSIG GL 23; DOE CAG GL 23; EIA748-D; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some documented processes are in place to consistently analyze variances at the CA level. Variance analysis thresholds are not set.** The processes needed to identify cost and schedule variances have been started but they are not documented. The variance analysis report does not identify causal factors (e.g., efficiency, rate, timing, etc.) and potential impacts to the project/program. Timely analysis of cost and schedule variance is not available to support resource decisions. Corrective actions/mitigation processes are not performed.	**Most documented processes are in place to consistently analyze significant variances at the CA level. Variance analysis thresholds are set, with some gaps.** The processes needed to identify cost and schedule variances have been documented, with some exceptions. The variance analysis report identifies causal factors (e.g., efficiency, rate, timing, etc.) and potential impacts to the project/program. Schedule variance analysis is supplemented with IMS analysis and assesses the impact to future activities on the critical path. Timely analysis of cost and schedule variance is mostly available to support resource decisions. Most of the corrective actions/mitigation plans processes are developed. Variance analysis generally identifies the problem, its cause(s), planned or possible corrective actions, and impacts to the project/program (cost, schedule, and technical).	**All processes are documented to consistently analyze significant variances at the CA level. Variance analysis thresholds are set and used for decision-making.** The processes needed to identify cost and schedule variances have been documented and approved. The variance analysis report identifies root causes influencing variance along with corrective actions and potential impacts to the project/program. Labor cost variance analysis is substantiated from source records evaluating rate and quantity variances. Material cost variance analysis is substantiated from source records evaluating price and usage variances. Variance thresholds are established and used to define the meaning of "significant", consistent with project/program procedures. Timely analysis of cost and schedule variances is available to support resource decisions. The cost and schedule variances are linked back to the baseline, as well as to IMS activities and any resulting impacts to the critical path, near-critical paths, and driving paths. The monthly corrective action management process is a closed-loop process. Corrective actions/mitigation plans are all identified. Variance analysis correctly identifies the problem, its cause(s), planned or possible corrective actions, and impacts to the project/program (cost, schedule, and technical).	**Significant variances at the CA level are proactively used by management to inform decision-making. Corrective actions are initiated as soon as issues are identified.** Variance thresholds established and used to define the meaning of "significant," are strictly followed by the project/program at all levels. CA Managers (CAMs) are routinely engaged in reviewing thresholds and making decisions. Variance thresholds are monitored automatically and tested. Compensatory measures are understood and initiated immediately. Necessary corrective actions are implemented, completed, and recurring issues resolved. Significant variances are addressed, documented, and integrated consistently with related processes (e.g., Planning and Scheduling sub-process, Subcontract Management sub-process and Risk Management sub-process). Routine surveillance results of variance thresholds are fully disclosed with all key stakeholders, who maximize use of these results. Variance thresholds are continuously improved and optimized. Significant cost, schedule, and technical impacts to the CA are identified, discussed and reported monthly at the appropriate levels.

SUB-PROCESS F: ANALYSIS AND MANAGEMENT REPORTING	Maturity Level				
	LOW		MEDIUM		HIGH
F.3. Performance Measurement Information	**1**	**2**	**3**	**4**	**5**
Understanding the relationship among scope, cost, schedule, and risk is critical to successful project/program execution. Performance measurement information includes Budgeted Cost for Work Scheduled (BCWS), Budgeted Cost for Work Performed (BCWP), Actual Cost of Work Performed (ACWP), Budget at Completion (BAC), and Estimate at Completion (EAC). This information is used to identify problem areas at all levels of the organization and project scope of work (i.e., Organization Breakdown Structure (OBS) and Work Breakdown Structure (WBS)). Performance measurement information is summarized from the Control Account (CA) to the project/program level through the WBS and OBS for management analysis needs and customer reporting. It is used to analyze project/program performance, as the basis for decision-making, and in both internal and external communications. Performance measurement information is critical to calculating and using variances used by project managers, customers, and others to provide insight and understanding of project/program performance, status, and forecasts. Items to consider include: ☐ Variance assessments at lower levels (e.g., Work Package (WP), activity/task) ☐ Internal performance reports at the summary level highlight significant variances ☐ Measurement aligns with earned value techniques and, where applicable, quantifiable back-up data ☐ Comprehensive analysis of problems that may span multiple program areas ☐ Reports are in the contractually specified format ☐ Management action plans ☐ Schedule and cost performance reports with updated progress and forecasts ☐ Risk and opportunity management plans (identification, analysis, and handling) ☐ Other *References:* NDIA EVMS EIA-748-D Intent Guide GL 25; DoD EVMSIG GL 25; DOE CAG GL 25; EIA748-D; NDIA PASEG; ISO 21508:2018(E)	**Not yet started.**	**Some of the processes to summarize performance measurement information are in place. Only a few elements of performance measurement information are summarized from the CA level to the WBS and OBS level.** Few performance data elements (BCWS, BCWP, ACWP, BAC, and EAC) are calculated at or below the CA level and summarized from the CA level up through the WBS and across the OBS to the total project/program level. The calculation and summarization processes are lacking and may not promote accurate management insight, or enable budget integrity, reconciliation and customer reporting.	**Most of the processes to summarize performance measurement information are in place. Most of the elements of performance measurement information are summarized from the CA level to the WBS and OBS level.** Most of the performance data elements (BCWS, BCWP, ACWP, BAC, and EAC) are calculated at or below the CA level and summarized from the CA level up through the WBS and across the OBS to the total project/program level. The calculation and summarization processes have open items; therefore, it may not always promote accurate management insight, or enable budget integrity, reconciliation and customer reporting.	**All processes to summarize performance measurement information are in place. All elements of performance measurement information are summarized from the CA level to the WBS and OBS level, and support management needs and customer reporting.** All of the performance data elements (BCWS, BCWP, ACWP, BAC, and EAC) are calculated at or below the CA level and summarized from the CA level up through the WBS and across the OBS to the total project/program level. The calculation and summarization processes provide accurate management insight, and enables budget integrity, reconciliation, and customer reporting, in accordance with the business rhythm. This evaluation provides management with continuing insight into root causes and effective closed-loop corrective actions. Summarized analysis and management reporting information reported to the customer(s) is from the same source as used by internal contractor management. The data elements reconcile between internal and external reports. Performance data correctly represents the current condition of the project/program.	**Performance measurement information outputs, products, and results are integrated into project/program planning, control, and decision-making. They are proactively used by leadership and stakeholders at all levels to actively manage the project/program.** Composite analysis of detail-level problems supports management actions across OBS and WBS elements. Variance analyses, internal/external reporting thresholds, narrative analysis providing root cause, variance impact, and corrective action are used to actively manage the project/program on a monthly basis, and recurring issues resolved. Performance measurement information is monitored and automatically tested to assess system health and integrity. Corrective action/mitigation plans, tasks, milestones, exit criteria, and schedules are established. Routine surveillance results are fully disclosed with all key stakeholders, who maximize use of these results. Summarized performance measurement data and variances allow management to focus on potential and/or realized problem areas. Performance measurement is continuously improved and optimized.

SUB-PROCESS F: ANALYSIS AND MANAGEMENT REPORTING	Maturity Level				
	LOW		MEDIUM		HIGH
F.4. Management Analysis and Corrective Actions	**1**	**2**	**3**	**4**	**5**
Management analyzes Earned Value (EV) information as a part of their responsibility for implementing corrective actions and decision-making. All levels of management should utilize performance measurement data to promote effective project/program execution. Current data produced by the Earned Value Management System (EVMS) must be available to managers and reported (internally and externally) on a timely basis. Data analysis and management reporting must be of sufficient quality to ensure effective integrated project/program management practices are followed and decisions made. Management analyzes reports using EVMS information to implement corrective action, track progress, minimize impacts, and make decisions. For effective management control, corrective actions should be identified at the appropriate level and tracked to resolution and closure. Control Account Managers (CAMs) should have sufficient authority and control over the resources to effectively implement corrective actions. A formalized approach to preparing problem analysis, establishing corrective action plans, and tracking their resolution ensures management's insight into project/program execution on a continuous basis. Early identification of problems permits management to react in a timely fashion and assign additional resources as needed. Timely, current, and accurate data and analysis improve management decision-making. Risk management is the identification, evaluation, and prioritization of risks (or the effect of uncertainty on objectives) followed by coordinated and application of resources to minimize, monitor, and control the probability or impact of unfavorable events to maximize the realization of opportunities. Items to consider include: □ Variance analysis reports □ To-Complete Performance Index (TCPI) □ Independent completion estimates □ Corrective action logs □ Corrective action plans responding to variance analysis □ Identification of new risk items and risk mitigation plans □ Risk and opportunity management plans (identification, analysis, and handling) □ Clear decision-making expectations of the CAM and project controls personnel □ Other Management Analysis and Corrective Actions should be integrated with the Organizing sub-process, the Planning and Scheduling sub-process, and the Risk Management sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 26; DoD EVMSIG GL 26; DOE CAG GL 26; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**The process to analyze EV information and identify and implement corrective actions has started but is not documented.** Some documented processes are in place to analyze EV information and implement managerial actions.	**Most processes for management analysis and corrective actions are established and documented, with some gaps.** Management analysis provides insight into the effectiveness of corrective actions. The project/program manager has a plan to track problem resolution to completion, but it has not been implemented consistently. Management Analysis and Corrective Actions are coordinated with the Organizing sub-process, the Planning and Scheduling sub-process, and the Risk Management sub-process.	**All processes for management analysis and corrective actions are documented, approved and used on a monthly basis. Managerial actions are commensurate with risk identified on the project/program.** Monthly management analysis is in place with continuing insight into corrective actions and the ability to adjust in a timely fashion through closure. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. Strategies and plans are in place to manage threats (uncertainties with negative consequences) and opportunities (uncertain future states with benefits) to the project/program. Management Analysis and Corrective Actions are fully integrated with the Organizing sub-process, the Planning and Scheduling sub-process, and the Risk Management sub-process.	**A comprehensive, end-to-end and closed-loop approach is used for proactively identifying, tracking, and implementing corrective actions on a monthly basis or more often.** Management analysis, corrective actions, and predictive metrics are monitored and used for management control, and are automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Problems and recovery are tracked through completion with realized internal management benefit, with little or no wasted effort. Routine surveillance results of management analysis and corrective actions are fully disclosed with all key stakeholders, who maximize use of these results Management analysis is continuously improved and optimized.

SUB-PROCESS F: ANALYSIS AND MANAGEMENT REPORTING	Maturity Level				
	LOW		MEDIUM		HIGH
F.5. Estimates at Completion (EAC)	**1**	**2**	**3**	**4**	**5**
A properly established, maintained and reported Estimate at Completion (EAC), which is timely, comprehensive, accurate, reliable, and auditable, enhances management's visibility into resource requirements (e.g., budget, labor resources, facilities, etc.) to complete the authorized work scope; mitigate technical/scope, schedule and cost issues; address risks and opportunities; make quantitative-based decisions; and effectively plan for project/program success. There are three components to an EAC process: the monthly Control Account (CA) EAC developed by the Control Account Manager (CAM); the monthly project/program level EACs developed by the Project/Program Manager (PM); and the annual Comprehensive EAC (CEAC) developed by the PM and project/program team. CA EACs and project/program level EACs, must be realistic, based on performance to date, material commitment, actual cost to date, knowledgeable projections of future performance, estimates of the cost of contract work remaining (including known risks and opportunities), and direct and indirect rates. They should not be constrained by funding availability, but should be compared with respective Budgets at Completion (BAC) to identify Variances at Completion (VAC) to ensure continuing visibility into the reasonableness of the CAM's original plan (baseline) and reporting to internal management and customers. The CA EAC is based on evaluating resource requirements by Element of Cost (EOC) for remaining effort and generating an Estimate to Complete (ETC) at the Work Package (WP)/Planning Package (PP) level. The sum of each CA's WP and PP ETCs are added to the CA actual cost to develop the CA EAC (sometimes referred to as the Latest Revised Estimate (LRE)). CA EACs are summarized through the Work Breakdown Structure (WBS) and Organizational Breakdown Structure (OBS) to the project/program level. The project/program level EAC is expressed in three justifiable final cost outcome positions based on risks and opportunities: Best Case, Worst Case, and Most Likely. The Best Case EAC reflects the lowest potential cost based on the most favorable set of circumstances. The Worst Case EAC reflects the highest expected cost based on the least favorable set of circumstances. The Most Likely EAC reflects the value that the PM believes is the most probable and achievable outcome. Differences between these monthly EACs should be reconcilable, and the Most Likely EAC should be compared with current funding statements. Updated EAC values are used to calculate VAC, as given in attribute F1. At least annually (or more frequently if performance indicates the current estimate is invalid) an assessment of the project/program level EAC is required. The CEAC, also known as a bottom-up EAC, encompasses a greater degree of formality and examination than monthly CA EACs and project/program level EACs. The CEAC involves the collective efforts of the entire project/program team under the direction of the PM. Items to consider include: □ Documented process for developing EACs, including subcontractor EAC integration □ CA plan □ Updated CA EACs and Performance Measurement Baseline (PMB) project/program level EACs on a monthly basis □ Modified funding profiles based on the updated EAC □ Updated schedule task completion and EAC forecasts □ Bill of material, material and subcontractor performance data □ Earned value and operational metrics □ Risk register □ Risk management plans □ Updated CEACs on an annual basis (or as needed), including assumptions □ Other The EACs should be integrated with the Planning and Scheduling sub-process, Accounting Considerations sub-process, Indirect Budget and Cost Management sub-process, Risk Management sub-process and Subcontract Management sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 27; DoD EVMSIG GL 27; DOE CAG GL 27; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some processes are in place to develop, update and report an EAC.** Some EACs are established. Management has little ability to gain visibility into resource requirements to make quantitative-based decisions. Monthly EACs are not realistic and not based on performance to date, material commitment, actual cost to date, etc.	**Most processes are in place to develop, update and report EACs at the CA and project/program levels.** EACs are based on performance to date and estimated performance for the duration of the remaining authorized work. EACs are communicated to the customer via internal reports and established contract requirements. EACs consider project/program progress as well as impacts associated with scope and schedule changes. This includes assessments of the effort required for completing all WPs and PPs in the CA plan. The process reflects the impact of material price and usage analysis, labor rate and volume analysis, and analysis of indirect rates. Most subcontractor estimates are incorporated into the prime contractor's EACs. Direct rates to value ETC resources are based on rate tables. The EACs are coordinated with the Planning and Scheduling, Accounting Considerations, Indirect Budget and Cost Management, Risk Management and Subcontract Management sub-processes.	**All processes to develop, update, and report EACs are documented and approved. CA EACs and project/program level EACs are generated monthly. CEAC is developed annually. EACs are used to manage and support project/program decision-making. EACs are commensurate with risk identified on the project/program.** EACs are evaluated monthly and adjusted to reflect actual project/program progress and performance, scope and schedule changes and the cost of completing all remaining authorized work. EACs are integrated with the project/program risk register and based on identified and emerging risks and opportunities. The PM explains differences between the most likely EACs and the CAM's EACs. EAC realism is assessed based on comparisons between the Cost Performance Index (CPI) and To Complete Performance Index (TCPI), and comparison to generated Independent EACs (IEAC). EACs are reconciled with funding, inform funding profile changes, and are communicated to the customer in internal reports and funding documents. EACs include accurate and timely incorporation of subcontractor estimates. Direct/indirect rates are up-to-date and used to value ETC resources based on updated rate tables. Problems are identified, logged, tracked, mitigated, corrected and closed. A CEAC is conducted annually and is fully documented and justified. The EACs are fully integrated with the Planning and Scheduling, Accounting Considerations, Indirect Budget and Cost Management, Risk Management and Subcontract Management sub-processes.	**EAC generation is optimized and compared automatically to formulae- generated IEACs.** EACs are proactively and continuously reviewed, monitored automatically and updated to reflect physical progress as well as scope and schedule changes. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of EACs are fully disclosed with all key stakeholders, who maximize use of these results. The CEAC generated annually, or more frequently if performance indicates the current estimate is invalid, is assessed by management as it is produced. Accepted standard formulas are used to generate IEACs which are used to compare with and substantiate the project/program generated EACs. The EAC process is continuously improved and optimized.

SUB-PROCESS G: CHANGE CONTROL

Change Control is the sub-process for systematically controlling, analyzing, communicating, and recording the changes to the project/program baseline (e.g., performance measurement baseline, management reserve, undistributed budget).

SUB-PROCESS G: CHANGE CONTROL	Maturity Level				
	LOW	MEDIUM			HIGH
G.1. Controlling Management Reserve (MR) and Undistributed Budget (UB)	**1**	**2**	**3**	**4**	**5**
The distribution of Management Reserve (MR) and Undistributed Budget (UB) should be accomplished through the use of a formal change control process. MR is controlled by limiting its use either to risk contained within a formal risk register or for in-scope unforeseen efforts not previously identified and budgeted in the Performance Measurement Baseline (PMB). MR is not to be used to offset poor performance (i.e., cost overruns) or cover costs that are out-of-scope to the contract. Conversely, it is to be used to accommodate unforeseen changes that are in-scope to the contract, budgetary changes to future work scope caused by rate adjustments, and other unknowns. To ensure that budgets for newly authorized work remain tied to the associated scope, UB is used to control the distribution of work using a holding account. Once the responsible organization(s) for the new scope has been identified, the budget is transferred from UB to the appropriate Control Account(s) (CAs). This ensures budget and scope will not be transferred independently. Changes to MR and UB budget are formally and separately controlled, tracked, and reported detailing monthly transactions and providing current budget values. A Contract Budget Base/Project Budget Base (CBB/PBB) log is used to track Performance Measurement Baseline (PMB), UB, and MR changes. The CBB/PBB log also serves to identify reporting period (monthly) end-values, reporting period changes to/from MR, PMB, and UB, and current MR and UB budget balances. Items to consider include: ☐ Documentation identifying both MR and UB values. This may include automated or manual records recording initial and, as the program progresses, revised amounts for MR and UB ☐ MR logs, UB logs, PMB logs, and/or CBB logs showing month-end values and changes, monthly sources and applications to/from CAs, and current values ☐ Management performance reports ☐ Other MR and UB changes should be integrated with the Analysis and Management Reporting sub-process. *Comments: This attribute refers to controlling changes to MR and UB. For more information on the identification of MR and UB, see attributes C10 and C11 respectively. PBB is sometimes used when multiple distinct projects make up one contract.* *References:* NDIA EVMS EIA-748-D Intent Guide GL 29; DoD EVMSIG GL 29; DOE CAG GL 29; EIA748-D; NDIA PASEG; ISO 21508:2018(E)	**Not yet started.**	**Some of the processes outlining the steps/actions needed to control MR and UB are in place. MR and UB logs do not exist.** MR and UB Logs do not exist. MR is being misapplied. It is being used to offset poor performance (i.e., cost overruns) or cover costs that are out-of-scope to the contract. UB cannot be identified with defined scope. A process to ensure for the timely clearing of budget and related scope in the UB account does not yet exist.	**Most of the processes outlining the steps/actions needed to control MR and UB are in place and documented. MR and UB logs exist, however are not fully maintained.** MR and UB use and changes are documented in logs, but individual transactions may not be separately reconcilable to internal monthly baseline changes. There may be a few misapplications of MR, including its use to offset poor performance (i.e., cost overruns) or cover costs that are out-of-scope to the contract. UB has defined scope and has been appropriately distributed to the PMB. With some exception, there is timely clearing of budget and related scope in the UB account. MR and UB changes are coordinated with the Analysis and Management Reporting sub-process.	**The documented processes outlining the steps/actions needed to control MR and UB are in place and approved. MR and UB Logs exist and are fully maintained.** All MR and UB changes are documented monthly in logs showing at a minimum the date and title of the change action, associated work package, CA, descriptive title, and reference numbers as needed for tracing back to the originating change documentation. Risk mitigation and/or realization activities are identified with all MR transactions. These transactions are coordinated with the risk management process for re-evaluation of residual risk. MR is used per contractual documentation. New contractual work scope is not budgeted with MR; but instead comes from contingency and is documented via the formal contract change modification process and approved accordingly. UB has defined scope and has been appropriately distributed to the PMB in a timely and effective manner. MR and UB changes are fully integrated with the Analysis and Management Reporting sub-process.	**MR and UB are proactively managed to inform decision-making.** All MR and UB changes are documented and reported in published logs. The control of MR and UB by the project/program manager is proactive and effective. MR and UB are monitored and automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Review of MR budget and its distribution is subject to, managed, and controlled by a Change Control Board (CCB) or equivalent. An accurate relationship between the budget amounts in the UB account and the scope of work authorized for each budget value is consistently maintained. Routine surveillance results of MR and UB are fully disclosed with all key stakeholders, who maximize use of these results. MR and UB changes are continuously reviewed and optimized.

SUB-PROCESS G: CHANGE CONTROL	Maturity Level				
	LOW	MEDIUM			HIGH
G.2. Incorporate Changes in a Timely Manner	**1**	**2**	**3**	**4**	**5**
Changes to the project/program must be integrated into the existing baseline documents (scope, schedule and budget) in a timely and appropriate manner to maintain the validity of the Contract Budget Base (CBB), Project Budget Base (PBB), and Performance Measurement Baseline (PMB). This in turn avoids the execution of new work scope without performance measurement budget providing continuous, accurate performance measurement information to management. There are two basic change control concepts as a result of change to the PMB and CBB/PBB. There are definitized changes from supplemental agreements or undefinitized changes from change orders or letter contracts. For unpriced change orders, contractors develop a best estimate of the cost of the new work scope. This estimate should not take into consideration constraints of authorized funding or Not to Exceed (NTE) values and is for planning and budgeting purposes to establish initial budgets in the PMB. Until contractual definitization, budgets may be established for near-term work only with the remaining budget held in Undistributed Budget (UB). Once definitization is complete all remaining budget in UB must be planned within CAs or Summary Level Planning Package (SLPP), as soon as practical. Incorporating changes must not arbitrarily eliminate existing cost and schedule variances. Effective implementation ensures control and auditability are established by the project/program in executing the authorized scope within the established schedule, enhancing internal and external management confidence in making project/program decisions. The PMB should always reflect the most current plan, including authorized changes, allowing baseline documentation to be properly modified to reflect the current plan. By ensuring that budget and schedule revisions and changes to the PMB are documented and traceable, the integrity of the PMB is maintained. This provides Control Accounts (CA) managers with valid CA plans against which to execute and measure performance. Items to consider include: ☐ Cost, schedule, and scope change documentation ☐ Updated work/budget authorization documents ☐ Contract change and change control logs (Management Reserve (MR), UB, PMB, and CBB/PBB) ☐ Contract modifications, authorization letter, and amended Statement of Work (SOW) / Statement of Objectives (SOO) ☐ Management performance reports and other management reports ☐ Contract change logs or modified baseline documentation ☐ Updated CA, work package, planning package plans ☐ Modified schedules (master, intermediate, and detail), as appropriate ☐ Corrected authorization documents: work scope changes, resource allocation adjustments, schedule revisions ☐ Work Breakdown Structure (WBS) and WBS dictionary ☐ Other Changes to the PMB should be integrated with the Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process and Analysis and Management Reporting sub-process. *Comments: This attribute refers to controlling changes to MR and UB. For more information on the identification of UB, see attribute C11.* *References:* NDIA EVMS EIA-748-D Intent Guide GL 28, 32; DoD EVMSIG GL 28, 32; DOE CAG GL 28, 32; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some of the processes to accurately incorporate and document authorized changes to the PMB in a timely manner are documented.** The processes needed to accurately incorporate authorized scope, schedule and budget changes to the PMB have been started but they are not yet documented. Scope, schedule and budget changes are poorly integrated into the project/program schedule. For unpriced change orders, detailed planning and budgeting for near-term work are not performed. Baseline change control documentation and approvals do not exist or are incomplete. The authorized scope, schedule and budget changes to the baseline are inadequately reflected in the change control practices and logs.	**Most of the processes to accurately incorporate and document authorized changes to the PMB in a timely manner are documented.** The processes needed to support authorized changes are incorporated in the PMB in a documented, disciplined, and timely manner are in place, with some exceptions. Most of the authorized budget, scope and schedule changes are integrated into the project/program schedule. For unpriced change orders, the process for detail planning and budgeting for near-term work are in place and followed. A few incorporated changes arbitrarily eliminate existing cost and schedule variances. Changes to the PMB are coordinated with the Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process and Analysis and Management Reporting sub-process.	**All processes to accurately incorporate and document authorized changes to the PMB in a timely manner are documented and approved.** All of the authorized scope, schedule and budget changes are integrated into the PMB in a documented, disciplined and timely manner. Change documents are updated in a timely and appropriate manner or as soon as practical, but no later than two accounting periods. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. For unpriced change orders, detailed planning and budgeting documents are maintained for near-term work. After definitization, any budget remaining in UB is planned and budgeted within CA, SLPP or MR. Changes to the PMB are fully integrated with the Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process and Analysis and Management Reporting sub-process.	**PMB updates are used to inform effective and proactive decision-making as directed changes occur.** Changes to the PMB are monitored, and automatically updated and tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Unpriced change orders are expeditiously planned, budgeted, documented and monitored. Distributed budget is updated continuously as changes are authorized. Routine surveillance results of changes to the PMB are fully disclosed with all key stakeholders, who maximize use of these results. The timely and accurate incorporation of contractual changes ensures that the information generated from the execution of the baseline plan provides an accurate picture of progress and facilitates correct management actions and decisions. The process of incorporating changes into the PMB is continuously improved and optimized.

SUB-PROCESS G: CHANGE CONTROL	Maturity Level				
	LOW	MEDIUM			HIGH
G.3 Baseline Changes Reconciliation	1	2	3	4	5
A properly maintained and documented Contract Budget Base (CBB) / Project Budget Base (PBB) and Performance Measurement Baseline (PMB) are crucial for effective project/program management. The timely and accurate incorporation of contractual changes ensures that the information generated from the execution of the baseline plan provides an accurate picture of progress and facilitates correct management actions and decisions. Current budgets should be reconciled with prior budgets for effective management control. The need for accurate visibility into performance measurement requires that the CBB/ PBB and the PMB maintain a level of accuracy and relationship to the contract. As changes are made to the contract, the CBB/PBB must be adjusted by the amount of change in order for the communication between the two parties to remain valid. The PMB value is adjusted to reflect the establishment of budget for the authorized work, with any difference becoming part of Management Reserve (MR). Effective implementation ensures control and auditability are established by the project/program in executing the authorized scope within the established schedule, enhancing internal and external management confidence in making project/program decisions. The PMB should always reflect the most current plan including authorized changes allowing baseline documentation to be properly modified to reflect the current plan. By ensuring that budget and schedule revisions and changes to the PMB are documented and traceable, the integrity of the PMB is maintained. This provides Control Accounts (CA) managers with valid CA plans against which to execute and measure performance. Changes made outside the authorized baseline control processes compromise the integrity of performance trend data and delay visibility into overall project variance from plan, thus reducing the alternatives available to managers for project redirection or revisions. Items to consider include: □ Contract change control documentation: logs and/or modified authorization documents (scope, schedule, and/or resources) □ Updated work/budget authorization documents □ Increased/decreased values for the MR and time phased PMB. □ Updated control account plans reflecting internal re-planning effects. □ Change control logs (e.g., MR, undistributed budget, PMB, and CBB/PBB) □ Other Reconciliation of baseline changes should be integrated with the Budgeting and Work Authorization sub-process, the Planning and Scheduling sub-process, and Analysis and Management Reporting sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 29, 32; DoD EVMSIG GL 29, 32; DOE CAG GL 29, 32; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some processes exist for reconciliation and traceability to the original value of the contract.** Some baseline changes are reconcilable to the prior baseline. Budget logs and baseline change documentation do not include all necessary approvals and information for effective control. Accurate adjustments to the CBB/PBB and the PMB are not possible. Contractual change documents that transmit and authorize the change or addition to work, schedule, and budget to the CBB do not exist. Change documentation (contract modifications, change control logs, change requests, authorization documents, scheduling documents, etc.) does not exist or is not updated. Few distributions of additional budgets are tracked in change control logs. The PMB has few activities controlled in the freeze period to prevent unnecessary adjustments.	**Most processes exist for reconciliation and traceability to the original value of the contract and include most necessary approvals and information for effective control.** Most baseline changes are reconcilable to the prior baseline through the use of budget logs and baseline change documentation. When making adjustments to the CBB/PBB and the PMB, traceability from original CA values to current values is generally possible via contract budget logs. Most contractual change documents that transmit and authorize the change or addition to work, schedule, and budget exist. Contractual change documents transmit and authorize most changes or addition of work, schedule, and budget to the CBB/PBB. Change control logs track the distribution of most of the additional budgets. The PMB has most activities controlled in the freeze period to prevent unnecessary adjustments. Reconciliation of baseline changes is coordinated with the Budgeting and Work Authorization sub-process, the Planning and Scheduling sub-process, and Analysis and Management Reporting sub-process.	**All processes to ensure elements are reconciled to the original value of the contract include all necessary approvals and information for effective control. The processes are defined, documented and approved.** All baseline changes are reconcilable to the CBB/PBB and the PMB through the use of budget logs and baseline change documentation. Work authorization documents exist for new work scope, schedule, budget. When adjusting the CBB/PBB and the PMB, traceability from original CA values to current values is possible. Budget authorizations accurately reflect the modified scope of work. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight. Contractual change documents transmit and authorize all changes or addition of work, schedule, and budget to the CBB/PBB. Change control logs track the distribution of all additional budgets. The PMB is controlled in the freeze period to prevent unnecessary adjustments, with few immaterial exceptions. Reconciliation of baseline changes is fully integrated with the Budgeting and Work Authorization sub-process, the Planning and Scheduling sub-process, and Analysis and Management Reporting sub-process.	**Processes are optimized to ensure adjustments to the CBB/PBB and the PMB are reconcilable and traceable via contract budget logs.** Reconciliation includes the use of budget logs and baseline change documentation including all necessary approvals and information for accurate and effective control. The PMB is effectively controlled in the freeze period to prevent unnecessary adjustments. Reconciliation of baseline changes and their integration with the Budgeting and Work Authorization sub-process and Analysis and Management Reporting process are automated, monitored, used for management control and automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of baseline change reconciliation are fully disclosed with all key stakeholders, who maximize use of these results. The process of baseline change reconciliation is continuously improved and optimized.

SUB-PROCESS G: CHANGE CONTROL	Maturity Level				
	LOW		MEDIUM		HIGH
G.4. Control of Retroactive Changes	1	2	3	4	5
Retroactive changes to the baseline may mask variance trends and prevent use of the performance data to project estimates of cost and schedule at completion, and should be controlled. Adjustments should be made only for correction of errors, routine accounting adjustments, effects of customer or management directed changes, or to improve the baseline integrity and accuracy of performance measurement data. Establishment of internal controls to identify and limit retroactive budget and performance adjustments will help maintain visibility of overall project/program variance from plan. Controlling retroactive changes to budgets or costs for completed work maintains the validity of historical Earned Value Management System (EVMS) cost and schedule variance trends and reflects true program performance. A stable baseline and performance information against that baseline are essential to both internal and external management if informed decisions are going to be made based on the analysis of the system-generated information. Uncontrolled changes to the Performance Measurement Baseline (PMB) limits the ability to conduct predictive analysis. Multiple, continuing adjustments to the PMB can limit the predictive nature of any analyses. Items to consider include: ☐ Budget change documentation at the Control Account (CA) level ☐ Baseline change documentation and change control logs ☐ Documentation of accounting adjustments affecting actual costs ☐ Modified internal performance reports, including trend data where appropriate ☐ Retroactive change control process including approval ☐ Management reports (e.g., Integrated Program Management Report (IPMR)) ☐ All processes are in accordance with the approved EVMS System Description (SD) ☐ Other Control of retroactive changes should be integrated with the Accounting Considerations sub-process, Indirect Budget and Cost Management sub-process and Analysis and Management Reporting sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 30; DoD EVMSIG GL 30; DOE CAG GL 30; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some processes to control retroactive changes are in place but are not documented.** The process to effectively implement change management and control to minimize retroactive change occurrences has not been clearly defined. There is no disciplined approach in place to manage and incorporate retroactive budget and performance adjustments to the PMB. There is little reconciliation between adjusted budget and performance data due to retroactive changes and previously reported data. There is little documentation of budget, earned value, and actual cost adjustments, due to retroactive changes.	**Most processes are documented to consistently control retroactive changes.** Most change control processes exist defining policy for retroactive changes. The policy includes conditions for use such as prohibitions, approvals, and justifications. Change control logs record most of the change activities. In most cases, a disciplined approach is in place to identify, manage and incorporate retroactive budget and performance adjustments to the PMB. The reconciliation between adjusted and previously reported data has minor gaps. There is documentation of budget, earned value, and actual cost adjustments in the logs and reporting data. Control of retroactive changes is coordinated with the Accounting Considerations sub-process, Indirect Budget and Cost Management sub-process and Analysis and Management Reporting sub-process.	**All processes to consistently identify and control retroactive changes are documented and followed.** Change control processes clearly and fully define policy regarding retroactive changes including conditions for use such as prohibitions, approvals, and justifications. Change control logs record all change activities. A disciplined approach is in place to identify, manage and incorporate retroactive budget and performance adjustments to the PMB. Adjusted and previously reported data is documented and reconciled. Budget, earned value, and actual cost adjustments are documented in a timely manner. Problems are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. Retroactive changes are limited to correction of errors, routine accounting adjustments, effects of customer or management directed changes, or to improve the baseline integrity and accuracy of performance measurement data. Control of retroactive changes is fully integrated with the Accounting Considerations sub-process, Indirect Budget and Cost Management sub-process and Analysis and Management Reporting sub-process.	**Retroactive changes are controlled, reviewed monthly and inform proactive decision-making.** Adjusted and previously reported data are accurately reconciled and documented on a monthly basis. This process is repeatable and regularly reviewed by management. Retroactive changes are monitored and automatically reviewed to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Change control logs record all change activities immediately. All adjustments to cost and schedule variances are routinely surveilled and documented with appropriate explanations. They are fully disclosed with all key stakeholders, who maximize use of these results. Stakeholders are able to make decisions using up-to-date information produced by the EVMS reflecting all retroactive changes with related explanations. Control of retroactive changes is continuously improved and optimized.

SUB-PROCESS G: CHANGE CONTROL	Maturity Level				
	LOW		MEDIUM		HIGH
G.5. Preventing Unauthorized Revisions to the Contract Budget Base (CBB) / Project Budget Base (PBB)	**1**	**2**	**3**	**4**	**5**
Project/program budget changes should be prevented unless for authorized changes. Disciplined baseline change control helps maintain the relationship between the Total Allocated Budget (TAB) and the contract value. The information that flows from the execution of the plan represented by the project/program budget, also known as the Contract Budget Base (CBB)/Project Budget Base (PBB), should accurately represent progress in the completion of the authorized scope against the contractual schedule. Items to consider include: □ Contract logs or modified baseline documentation (schedule or budget) reconciling existing plans to contract value □ Reconciliation of internal baseline data to amounts contained in external government reports □ Change control logs (management reserve, undistributed budget, performance measurement baseline, and CBB/PBB) □ Control account/work package/planning package plans □ Updated master schedules, intermediate schedules (if any), and detailed schedules □ Management performance or other management reports □ Statement of Work (SOW)/Statement of Objectives (SOO), Work Breakdown Structure (WBS) and WBS dictionary □ Work authorization documents □ Control Account Plans (CAPs) □ Other The Preventing Unauthorized Revisions process should be integrated with the Budgeting and Work Authorization sub-process and Analysis and Management Reporting sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 31; DoD EVMSIG GL 31; DOE CAG GL 31; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**The process to control changes to the CBB/PBB and TAB has started but is not documented.** There is little disciplined management of CBB/PBB and TAB. Change control logs are incomplete.	**Most documented processes to control changes to the CBB and TAB are in place.** The CBB/PBB and TAB relationship is being managed in a disciplined manner. The CBB/PBB to contract value relationship is mostly maintained. There is a process in place to control contract changes. Change control logs reflect most of the changes to the PMB and CBB/PBB. The Preventing Unauthorized Revisions to the CBB/PBB process is coordinated with the Budgeting and Work Authorization sub-process and Analysis and Management Reporting sub-process.	**All processes to control changes to the CBB/PBB and TAB are documented, reviewed, and approved.** The CBB/PBB to contract value relationship is continuously monitored. Change control logs reflect all changes to the PMB and CBB/PBB and fully reconcile. Problems related to the CBB/PBB and TAB are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. The Preventing Unauthorized Revisions to the CBB/PBB process is fully integrated with the Budgeting and Work Authorization sub-process and Analysis and Management Reporting sub-process.	**Changes to the CBB/PBB and TAB are proactively integrated into the project/program control management decision processes.** Stakeholders are able to make timely decisions using up-to-date information produced by the EVMS reflecting all revisions. Unauthorized revisions to the CBB/PBB are monitored, and automatically identified using a data driven approach including test metrics. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of CBB/PBB and TAB are fully disclosed with all key stakeholders, who maximize use of these results. Process and operations are optimized. Fewer hours are being used to execute the process/operation; processes/operations are more intuitive and therefore more broadly accepted; and data are being generated timelier with greater accuracy.

SUB-PROCESS G: CHANGE CONTROL	Maturity Level				
	LOW	MEDIUM			HIGH
G.6. Over-Target Baseline (OTB) / Over Target Schedule (OTS) Authorization	1	2	3	4	5
When the performance budget or schedule objectives significantly exceed the project plan and are recognized in the Performance Measurement Baseline (PMB), it may be identified as an Over Target Baseline (OTB) and/or Over Target Schedule (OTS). Note that consideration should be given to the project maturity, percent complete, remaining duration, and the significance of the excess, with an overarching goal of improving the performance reporting and estimating. Prior coordination between the contractor and the customer of an OTB, including customer approval, reinforces this mutual management of the project/program. The decision to establish an OTB may entail establishing schedule dates beyond contractual delivery dates, commonly referred to as an OTS, as a result of planning future work, planning in-process work, and/or adjusting variances (cost, schedule, or both). When properly implemented, the OTB allows the project/program to increase the amount of budget (referred to as an "Above-Target Budget" (ATB)) for the remaining work to a more realistic amount to adequately provide for reasonable budget objectives, work control, and performance measurement. This data allows for both the contractor and the customer to make effective management decisions to the mutual benefit of the project/program. The timely and effective management of OTS and OTB results in stability for cost and schedule performance. OTB and OTS will reflect increases to the Total Allocated Budget (TAB) value and the resources planned to perform the authorized work scope. Prior customer authorization is needed when it exceeds the Contract Budget Base (CBB). Items to consider include: □ Modified project/program documents supporting OTB/OTS implementation □ OTB/OTS notification document and/or customer approval document □ Use of Earned Value Management System (EVMS) budgeting tool □ Control Account/Work Package grouping in Integrated Master Schedule (IMS) □ Impact on IMS □ Impact on availability of funding □ Changes to the Statement of Work (SOW) / Statement of Objectives (SOO) □ Other OTB/OTS Authorization should be integrated with the Budgeting and Work Authorization sub-process, the Planning and Scheduling sub-process, and the Analysis and Management Reporting sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 8, 31; DoD EVMSIG GL 8, 31; DOE CAG GL 8, 31; EIA748-D; NDIA PASEG; DoD OTB/OTS Guide NDIA IBR Guide; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**OTB/OTS is performed without customer notification and is not reflected in TAB, CBB, and PMB** OTB/OTS implementation results in a discrepancy between TAB, CBB/PBB and PMB. There is little coordination between customer and contractor towards a mutual agreement of OTB/OTS.	**OTB/OTS is performed with customer notification.** Coordination between customer and contractor towards a mutual agreement of OTB/OTS is occurring with some gaps. TAB, CBB and PMB values are not appropriately updated with OTB/OTS implementation. OTB Authorization is coordinated with the Budgeting and Work Authorization sub-process, the Planning and Scheduling sub-process, and the Analysis and Management Reporting sub-process.	**OTB/OTS is performed with prior customer notification and approval (if required).** Prior approval (if required) of OTB/OTS is occurring between the customer and contractor. The TAB, CBB/PBB and PMB are updated to reflect OTB/OTS. Problems related to the OTB/OTS process implementation, and their root causes, are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. OTB/OTS Authorization is fully integrated with the Budgeting and Work Authorization sub-process, the Planning and Scheduling sub-process, and the Analysis and Management Reporting sub-process.	**OTB/OTS scope is proactively addressed with customer notification, coordination, and approval (if required), after thorough analysis.** After a thorough analysis of the budget variance, a solution is developed between parties with realistic goals and mutual agreement (written approval if required). The PMB reflects OTB/OTS and is integrated across the EVMS. Management addresses OTB and OTS in a timely, cooperative, and effective manner resulting in stability for cost and schedule performance. OTB/OTS data are monitored and used for management control and are automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved, leading to continuous improvement. Routine surveillance results of OTB/OTS are fully disclosed with all key stakeholders, who maximize use of these results. The project/program has successfully completed an external review, such as an Integrated Baseline Review (IBR).

SUB-PROCESS H: MATERIAL MANAGEMENT

Material Management is the sub-process for planning, controlling, and cost accounting for the acquisition, disbursements, and disposition of material.

SUB-PROCESS H: MATERIAL MANAGEMENT	Maturity Level				
	LOW		MEDIUM		HIGH
H.1. Recording Actual Material Costs	**1**	**2**	**3**	**4**	**5**
Material costs are collected in the accounting system and transferred to the Earned Value Management System (EVMS) allowing an accurate comparison to material budgets and the cost of material received and/or utilized. Material costs must be accurately charged to contract Control Accounts (CAs) using recognized, acceptable costing techniques. Actual Cost of Work Performed (ACWP) for materials are recorded on the same basis in which Budgeted Cost for Work Scheduled (BCWS) for materials are planned and Budgeted Cost for Work Performed (BCWP) for materials are claimed. But when progress payments are made based on proof of physical/technical accomplishment, then they form the basis for earned value. When necessary and significant, and when material actuals are not yet available, the use of estimated ACWP is required to ensure accurate performance measurement. Items to consider include: ☐ Processes are documented for planning, charging and taking material performance ☐ EVMS budgeting tool reports ☐ Accounting system (general ledger) ☐ Material control account plans, system and records ☐ Estimated ACWP log ☐ Vendor negotiation documentation ☐ Defined and documented categories of material ☐ Variance analysis reports ☐ Bill of Materials (BOM)/Priced Bill of Materials (PBOM)/indenture parts list for material ☐ Material commitment reports, inventory reports, purchase orders, and payment records ☐ Other Recording Actual Material Costs should be integrated with the Accounting Considerations sub-process and Analysis and Management Reporting sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 21; DoD EVMSIG GL 21; DOE CAG GL 21; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some documented processes exist ensuring material ACWP is recorded on the same basis as material BCWS is planned and material BCWP is claimed. Material is reconciled between the EVMS and accounting system annually or at contract completion.** Material anomalies identified during reconciliation are documented but may not be corrected and could recur. Incurred cost reports comparing the EVMS material ACWP to the accounting system (general ledger) are not available and the project/program is unable to demonstrate the EVMS material ACWP is consistent with the way material was budgeted and performance claimed. The project/program is also unable to determine whether material actuals/performance differences are due to timing (estimated actuals), or whether the cost variance and associated performance management is accurate.	**Most documented processes exist ensuring material ACWP is recorded on the same basis as its BCWS and BCWP, with a few gaps. Material ACWP is reconciled between the EVMS and accounting system quarterly and anomalies are corrected periodically.** Incurred cost reports comparing the EVMS material ACWP to the accounting system (general ledger) are available on a quarterly basis. This allows the project/program to determine quarterly whether material actuals/performance differences are due to timing (estimated ACWP) or errors. Issues identified during reconciliation are documented and corrected within the quarter, but this lag adversely impacts the material cost variance, Estimate at Completion (EAC), and associated performance measurement reported to the customer each month. Recording Actual Material Costs is coordinated with the Accounting Considerations sub-process and Analysis and Management Reporting sub-process.	**All processes are documented and approved ensuring material ACWP is recorded on the same basis as its BCWS and BCWP. Material ACWP is reconciled between the EVMS and accounting system each month and errors are documented and corrected typically within two accounting periods.** Incurred cost reports comparing the EVMS material ACWP to the accounting system (general ledger) are available each month. Estimated ACWP or accounting accruals are used, if needed. This allows the project/program to determine whether material actuals/performance differences are due to timing (estimated ACWP) or errors. Issues identified during reconciliation are documented, tracked to closure, accurately reported, and corrected expeditiously, typically within two accounting periods. Recording Actual Material Costs is fully integrated with the Accounting Considerations sub-process and Analysis and Management Reporting sub-process.	**The project/program proactively ensures material ACWP is consistent with the corresponding material budget and performance. Metrics are documented and maintained each month. Corrections are monitored to completion, typically within one accounting period.** A formal process has been implemented ensuring EVMS material ACWP is reconcilable to material budgets in the accounting system, on a monthly basis. Any anomalies identified during reconciliation are documented, tracked to closure, and corrected in the following accounting period. This ensures that the impact to material cost variances, EAC, and associated performance measurement are minimized, and the material data reported to the customer each month represents actual performance. Material costs are monitored and used for management control and are automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of material costs are fully disclosed with all key stakeholders. The recording of material costs is continuously improved and optimized.

SUB-PROCESS H: MATERIAL MANAGEMENT	Maturity Level				
	LOW		MEDIUM		HIGH
H.2. Material Performance	**1**	**2**	**3**	**4**	**5**
Reliable performance measurement suitable to the material category is key to evaluating cost variances and projecting Estimates at Completion (EAC). Although material dollar value is important, there are Critical Items (CI) that may or may not be High Dollar Value (HDV). Any material considered high risk that could impact the critical path should be separately tracked and monitored each month. Budgeted Cost for Work Performed (BCWP) for material (e.g., categories of material, HDV/low Dollar value, CI material, etc.) is recorded in one of the following ways: 1) upon receipt of the material by the project/program, but no earlier, 2) as the material is issued from inventory for execution, 3) when the material is consumed, or 4) based on the schedule of values in accordance with the Purchase Order (PO) or contract requirements. Items to consider include: ☐ Processes are documented for claiming material BCWP ☐ Processes are documented for identifying and claiming HDV/CI material BCWP when applicable ☐ Earned Value Management System (EVMS) budgeting tool reports ☐ Material control account plans, system and records ☐ Vendor negotiation documentation ☐ Defined and documented categories of material ☐ Variance analysis reports ☐ Bill of Materials (BOM)/Priced Bill of Materials (PBOM)/indentured parts list for material ☐ Material commitment reports, inventory reports, purchase orders, and payment records ☐ Estimated Actual Cost of Work Performed (ACWP) log ☐ Other Material Performance should be integrated with the Planning and Scheduling sub-process and Budgeting and Work Authorization sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 21; DoD EVMSIG GL 21; DOE CAG GL 21; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some documented processes exist identifying how and when material BCWP is recorded, including HDV and/or CI material if applicable.**	**Most processes specifying how and when material BCWP is recorded, including HDV and/or CI material if applicable, are documented, however they are not approved. Material BCWP is reviewed quarterly and any identified issues are corrected periodically.**	**All processes are documented and approved specifying how and when material BCWP is recorded, including HDV and/or CI material if applicable. Material BCWP is reviewed each month and corrected within the accounting period.**	**The project/program proactively reviews material BCWP, including HDV and/or CI material, to ensure it is accurately recorded. Future material requirements are routinely evaluated to assess the potential impact to the project/program, if any.**
		The project/program lacks the documented processes required to identify, segregate, plan, or track material performance. The project/program is unable to verify regular material BCWP reported in the EVMS is based on receipt, inspection, and acceptance. HDV/CI material EVMS reconciliation with vendor negotiations is conducted annually or at contract completion. Any material BCWP anomalies identified during reconciliation are documented and corrected at that time, but they could reoccur.	The project/program implements processes specifying how material, and if applicable HDV and/or CI material, is identified, segregated, planned, and performance measured. However, these processes are not formally documented. All material BCWP, including HDV and/or CI material if applicable, is reconciled quarterly. HDV/CI material is also reconciled with vendor negotiations on a quarterly basis. The project/program has the ability to identify material BCWP differences, including HDV and/or CI material if applicable. These differences are identified, documented and corrected periodically, but the time lag for corrections adversely impacts the material cost variance, EAC, and associated performance measurement reported quarterly as required. Material Performance is coordinated with the Planning and Scheduling sub-process and Budgeting and Work Authorization sub-process.	The project/program has documented, and approved processes designed to ensure how material, and if applicable HDV and/or CI material, is identified, segregated, planned, and performance is measured and implements those processes on a monthly basis. The EVMS material BCWP, including HDV and/or CI material if applicable, is not recorded prior to delivery, issuance from inventory, or consumption. Material BCWP differences are tracked to closure end-to-end, and corrected expeditiously, typically within two accounting periods. The impact to material cost variances, EAC, and associated performance measurement is minimized and limited to one accounting period. Material Performance is fully integrated with the Planning and Scheduling sub-process and Budgeting and Work Authorization sub-process.	The project/program has established a formal monthly business rhythm to ensure material BCWP is correctly claimed each month. The project/program conducts a "look ahead" designed to monitor material on the critical path in the next two months. Any potential material impact is forecasted and included in the IMS, to ensure that impacts to material cost variances, EAC, and associated performance measurement are minimized, and the material data reported each month represents actual performance. Material performance data are monitored and used for management control and are automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. Routine surveillance results of material performance data are fully disclosed with all key stakeholders, who maximize use of these results. Material performance is continuously improved and optimized.

SUB-PROCESS H: MATERIAL MANAGEMENT	Maturity Level				
	LOW		MEDIUM		HIGH
H.3. Residual Material	**1**	**2**	**3**	**4**	**5**
The material accounting system will provide for full accountability of all material purchased for the project/program including the residual inventory. Residual inventory represents procured material that becomes excess at project/program completion. Residual inventory provides visibility into excess material available for replacement of failures in the current project/program, minimum purchase quantities, or future projects/programs having similar deliverables. Processes are in place documenting the identification of any residual material remaining on a project/program that can be returned or used on another program. This requires residual material credits to be applied each month updating the Actual Cost of Work Performed (ACWP) and Budgeted Cost for Work Performed (BCWP). This also requires evaluation of the impact to the contractor project/program manager's most likely Estimate at Completion (EAC) and/or the Control Account Managers' (CAMs') EAC. The establishment of accurate cost accumulation, performance measurement, and identification of residual inventory is essential since material may comprise a large portion of a project/program's costs and directly impact the customer funding requirements. Items to consider include: □ Processes are documented for residual material □ Residual material on hand or projected at completion □ Defined and documented categories of material □ Variance analysis reports (e.g., that provide insight into usage variance(s) and any corrective actions that may pertain to residual material considerations) □ Earned Value Management System (EVMS) budgeting tool reports □ Material control system and records □ Bill of Materials (BOM)/Priced Bill of Materials (PBOM)/indenture parts list for material □ Control account plans □ Material commitment reports, inventory reports, purchase orders, and payment records (for entire project/program) □ Spares list assumptions (e.g., documented assumptions how the spares in the BOM relates to residual material) □ Residual material list (e.g., including all assumptions regarding potential adjustments and forecasts to Work Package (WP) ACWP, BCWP, ETC, and most likely EAC) □ Other Residual Material should be integrated with the Accounting Considerations sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 21; DoD EVMSIG GL 21; DOE CAG GL 21; EIA748-D; NDIA PASEG	**Not yet started.**	**The material control system contains some processes addressing residual material. The project/ program is unable to identify residual material.** The project/program material control system lacks the documented processes required to identify, track, and dispose of the residual material that is placed in inventory. Accordingly, the EVMS sub-processes do not address how residual material impacts the project/program EAC. A comparison between the EVMS and the material control system is conducted annually or at project/ program completion to identify residual material. Residual material identified during this comparison are documented but may not be corrected and this situation could reoccur. Accordingly, this could adversely impact the EAC.	**The material control system contains most processes addressing accountability of residual material. Residual material is evaluated quarterly and identified issues are corrected periodically.** Both the project/program material control system and EVMS implement sub-processes required to identify, track, and dispose of the residual material that is placed in inventory, with some gaps. Residual material is reconciled between the EVMS and the material control system on a quarterly basis. Potential residual material is identified and documented periodically. This time lag may adversely impact the material cost variance, EAC, funding requirements, and associated performance measurement reported to the customer since the true material cost is unknown. Residual Material is coordinated with the Accounting Considerations sub-process.	**The material control system contains all processes addressing accountability of residual material. All processes are documented and approved. Residual material is evaluated on a monthly basis or upon availability.** The project/program material control system and EVMS have documented and approved processes designed to ensure how residual material is identified, costs established, tracked, and dispositioned. Opportunities for other uses of residual material are identified expeditiously; this could result in impacts to the EAC and funding requirements. Residual material is reconciled between the EVMS and the material control system each month. Potential residual material is identified and documented monthly. Since the true material cost is known each month, the impact to material cost variances, EAC, funding requirements, and associated performance measurement is minimized, providing management and the customer real-time data enhancing decision-making. Problems with residual material tracking are identified and logged. Residual Material is fully integrated with the Accounting Considerations sub-process.	**Residual material is reviewed and evaluated continuously. The project/program proactively manages residual material based on expected future performance.** Identifying, tracking, and dispositioning of residual material is fully integrated and automated between the EVMS and material control system. This forms the basis for a monthly business rhythm that is in place and fully coordinates assumptions for identifying residual material, predicting performance, and proactive transfer of residual material to other program(s), or disposition. This also fosters a proactive and collaborative risk-reduced sparing analysis for timely and continuous identification of residual material. This continuous analysis effectively realizes project/ program savings and alternative best use of material for this or other projects/programs. Routine surveillance results of residual material are fully disclosed with all key stakeholders, who maximize use of these results. The residual material process is continuously improved and optimized.

SUB-PROCESS H: MATERIAL MANAGEMENT	Maturity Level				
	LOW		MEDIUM		HIGH
H.4. Material Price/Usage Variance	1	2	3	4	5
Direct costs for material items must be assigned to a project/program consistent with the corresponding budgets for that material. Deviations from the established plans for material are analyzed to enable management decision-making and corrective action. Assigning actual incurred direct material costs consistent with the corresponding budgets and performance provides the basis for a realistic evaluation of cost variances and ultimately facilitates Estimate at Completion (EAC) and funding projections. Material cost variances are analyzed and evaluated in terms of both price and usage variances. Usage variance is sometimes known as quantity variance. Understanding whether material cost variances are driven by price or usage assists management in focusing attention on those ordering material (price variance) or those responsible for controlling the quantity of materials (quantity variance). Items to consider include: □ Processes are documented material variance analysis □ Earned Value Management System (EVMS) budgeting tool reports □ Material control system and records □ Defined and documented categories of material □ Variance analysis reports □ Bill of Materials (BOM)/Priced Bill of Materials (PBOM)/indenture parts list for material □ Control account plans □ Material commitment reports, inventory reports, purchase orders, and payment records □ Estimated actuals log □ Other Material price/usage variance analysis should be integrated with the Analysis and Management Reporting sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 21, 23; DoD EVMSIG GL 21, 23; DOE CAG GL 21, 23; EIA748-D; NDIA PASEG; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some documented processes for material variance analysis are in place. The project/program is unable to provide material variance analysis.** The project/program lacks documented processes needed to define the requirements for material variance analysis. Material price/usage variance analysis is conducted annually or at project/program completion. Issues identified during the variance analysis are documented but impacts to the EAC are not reported and corrective actions may not be implemented.	**Most processes addressing material variance analysis are in place, but not all of them are formally documented. Material variance analysis is conducted at least quarterly and identified issues are corrected periodically.** The project/program implements processes required to conduct material price/usage variance analysis, but they are not formally documented. The EVMS has the capability to identify material as an Element of Cost (EOC) when required. A Bill of Material (BOM) is available documenting the material baseline. This allows data from the EVMS and material control system to be compared to current conditions. Material price/usage variance analysis is conducted on a quarterly basis. The cause and impact of variances are evaluated, and corrective action implemented. However, time lag may adversely impact the EAC reported to the customer. Material price/usage variance analysis is coordinated with the Analysis and Management Reporting sub-process.	**All processes addressing material variance analysis are documented and approved. Material price/usage variance analysis is conducted on a monthly basis and corrective action implemented expeditiously.** The project/program uses material price/usage analysis to predict future performance. The EAC reported to the customer is updated each month reflecting corrective actions. Material price/usage problems are identified, logged, tracked, mitigated, corrected and closed. The accounting system and EVMS consistently identify material as an EOC. A BOM is available in the material control system documenting the material baseline and is integrated with the EVMS. Each month, the BOM is compared to current conditions to conduct material price/usage variance analysis. The project/program can determine if material variances are driven by price or usage. The cause and impact of variances are evaluated monthly and corrective action implemented expeditiously. Material price/usage variance analysis is fully integrated with the Analysis and Management Reporting sub-process.	**Information resulting from material price/usage analysis is proactively shared and managed. The contractor evaluates future material requirements and any changes in quantity or price are addressed immediately to mitigate any future impact.** The project/program implements a monthly business rhythm designed to evaluate and correct material cost variances. Data from the EVMS and material control system are automatically compared, and validated, allowing material price/usage variance analysis to be conducted on a monthly basis. The cause and impact of material price/usage variances are evaluated, and corrective action implemented immediately to mitigate future performance issues. The material Estimate to Complete (ETC) and EAC are automatically updated to ensure the data reported each month to the customer is representative of actual performance. Routine surveillance results of material price/usage variances are fully disclosed with all key stakeholders, who maximize use of these results. The material price/usage variance analysis process is continuously improved and optimized by reviewing prior corrective actions.

SUB-PROCESS H: MATERIAL MANAGEMENT	Maturity Level				
	LOW	MEDIUM			HIGH
H.5. Identification of Unit Costs and Lot Costs	**1**	**2**	**3**	**4**	**5**
When applicable (e.g., in a production or manufacturing environment), the accounting system should have the capability to identify unit costs, equivalent unit, lot costs, recurring costs (e.g., production), and nonrecurring costs (e.g., testing, development, travel, and nonrecurring expenses) by Element of Cost (EOC) (e.g., labor, material, other direct costs, and indirect costs) as required by the project/program's contract. Also, when applicable, the Manufacturing/Enterprise Resource Planning (M/ERP) system should be capable of isolating unit, lot costs, recurring, and nonrecurring costs in a production environment allowing flexibility to plan, measure performance, and forecast in a more efficient way. This is especially important when there are multiple projects/programs in the same production line, and is done for cost reporting purposes providing visibility into the factors driving project/program cost growth. Items to consider include: □ Documented processes for developing and reporting unit costs, equivalent unit, lot costs, recurring, and nonrecurring costs □ Differentiation of work in progress □ Charge number structure □ Manufacturing planning system □ Disclosure statement (e.g., Cost Accounting Standards (CAS) disclosure statement) □ Other The Unit Costs and Recurring/Nonrecurring Costs should be integrated with the Accounting Considerations sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 20; DoD EVMSIG GL 20; DOE CAG GL 20; EIA748-D; NDIA PASEG	**Not yet started.**	**Some documented processes exist addressing unit costs, equivalent unit, lot costs, recurring, and nonrecurring costs by Element of Cost (EOC). Some unit costs and recurring/nonrecurring costs are identified in the current accounting system and M/ERP, with significant gaps.** The project/program lacks documented processes for the classification of direct costs and credits. The project/program's accounting system and M/ERP can separately identify some unit costs, equivalent unit, lot costs, recurring, and nonrecurring costs by EOC. But there is a lack of integration between the accounting system and M/ERP.	**Most processes are documented providing for the identification and isolation of unit costs, equivalent unit, lot costs, recurring and nonrecurring costs by EOC. Most unit costs and recurring/nonrecurring costs can be identified in the accounting system and M/ERP, with a few gaps.** The project/program implements processes designed to ensure unit costs, equivalent unit, lot costs, recurring, and nonrecurring costs are identified and provided by EOC. Not all processes are formally documented and approved. The project/program's accounting system and M/ERP can identify and provide most unit costs, equivalent unit, lot costs, recurring, and nonrecurring costs by EOC. There is some integration between the accounting system and M/ERP, but gaps may exist. Most unit cost and recurring/nonrecurring cost anomalies are identified, but the project/program has difficulty making corrections. The Unit Costs and Recurring/ Nonrecurring Costs are coordinated with the Accounting Considerations sub-process.	**All processes to identify and isolate unit costs, equivalent unit, lot costs, recurring, and nonrecurring costs by EOC are documented, approved, and implemented on a monthly basis. All unit costs and recurring/ nonrecurring costs can be identified in the accounting system and M/ERP.** The project/program's accounting system and M/ERP system are integrated and can identify unit costs, equivalent unit, lot costs, recurring, and nonrecurring costs by EOC. Accounting system or M/ERP system anomalies are identified and corrected, typically within two accounting periods. Although visibility into the factors driving project/ program cost growth is provided to management, customer notification may be delayed. Problems with unit costs and recurring/nonrecurring costs are identified, logged, tracked, mitigated, corrected and closed, providing management with insight to make timely decisions. The Unit Costs and Recurring/Nonrecurring Costs are fully integrated with the Accounting Considerations sub-process.	**The accounting system and M/ERP are fully integrated, automatically monitored, and any errors corrected immediately, typically within the next accounting period.** The project/program monitors all unit costs, equivalent unit, lot costs, recurring, and nonrecurring costs by EOC on a monthly basis. Management and the customer gain real- time visibility into the factors driving cost growth through a formal business rhythm. Accounting system or M/ERP system anomalies are typically closed the following accounting month. Project/program management has the flexibility to plan, measure performance, and forecast in a more efficient way when there are multiple projects/programs in the production line. Routine surveillance results of unit costs and recurring/ nonrecurring reports are fully disclosed with all key stakeholders providing visibility into how the project/program is managing cost and schedule, ensuring sufficient funding is available. The unit costs and recurring/ nonrecurring costs data are continuously optimized.

SUB-PROCESS I: SUBCONTRACT MANAGEMENT

Subcontract Management is the sub-process for determining the flow down of EVMS requirements to subcontractors, integrating subcontractor data into the prime contractor's EVMS, and surveilling the subcontractor(s).

SUB-PROCESS I: SUBCONTRACT MANAGEMENT	Maturity Level				
	LOW		MEDIUM		HIGH
I.1. Subcontract Identification and Requirements Flow Down	1	2	3	4	5
The prime contractor remains responsible for authorized work that is subcontracted to include subcontract identification, categorization, organization, management and control, and reporting, The prime contractor is responsible for the flow down of appropriate Earned Value Management System (EVMS) contract requirements to subcontractors for work scope considered by the prime contractor to be "major". Major subcontractors deliver critical, high risk, or high dollar items to the project/program. (Note a critical item may or may not be considered high dollar, but if not tracked, could impact the critical path). Identification of work scope considered by the prime contractor to be major may be the function of a make/buy strategy or some other criteria as described in the prime contractor's approved subcontractor management processes. Based on customer and prime contractor project/program management approach for subcontract management, EVMS flow down to major subcontractors includes applicable EVMS provisions, clauses, and/or data reporting requirements. Minor subcontractors are not considered by the prime contractor to include critical, high risk, or high dollar work scope, however, the prime contractor is responsible to ensure the integrity of minor subcontractor management processes and performance data. This attribute also includes inter-divisional work within an organization that is considered subcontract-like. Prime contractor flow down of EVMS requirements to subcontractors should be consistent with project/program risk, size, and complexity. EVMS flow down establishes enforceable requirements that enable the prime contractor to receive EVMS performance data from the subcontractor in order to engage in analysis and evaluation of subcontractor performance. Flow down of appropriate EVMS requirements by the prime contractor to the subcontractor ensures the implementation of sound management practices and processes, including the identification and allocation of subcontractor resources, authorization and planning of budgets, and reporting of cost, schedule, and technical performance, and assists the prime contractor decision-making providing effective forecasting submitted to the customer each month. Items to consider include: □ Prime contract requirements and prime make/buy documents □ Processes, instructions, and related command media for subcontractor flow down requirements □ Data reporting requirements, such as Subcontract Data Requirements Lists (SDRL) □ Appropriate subcontract EVMS clauses (i.e., Federal Acquisition Regulations (FARs), Defense Federal Acquisition Regulation Supplement (DFARS)) □ Cost/schedule/technical risks with subcontractor data included □ EVMS reports (prime and subcontract) □ Charge number structure □ Subcontracts and purchase orders □ Other The Subcontract Identification and EVMS Flow Down Requirements should be integrated with the Organizing sub-process, Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process, Analysis and Management Reporting sub-process, Change Control sub-process, and Risk Management sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide All GLs; DoD EVMSIG All GLs; DOE CAG All GLs; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some prime contractor processes defining the EVMS flow down and/or data reporting requirements for major and minor subcontractors exist.** Major and/or minor subcontractor EVMS flow down requirements are not separately identified. The prime contractor manages subcontractor work scope using high-level milestones and summary bars. The prime contractor does not distinguish between major and minor subcontractor work scope when requesting performance data.	**Most prime contractor processes defining the EVMS flow down and/or data reporting requirements for major and minor subcontractors are documented; however, they may not be approved and routinely enforced.** The prime contractor has identified all subcontractor work scope. EVMS flow down and/or data reporting requirements are applied to most major subcontractors. Subcontract Identification and EVMS Flow Down Requirements are coordinated with the other EVMS sub-processes.	**All prime contractor processes addressing the EVMS flow down and/or data reporting requirements to subcontractors are documented, approved, and enforced. Subcontractor EVMS flow down requirements and monthly data reporting requirements are consistent with project/program risk, size, and complexity.** The prime contractor has identified all major and minor subcontract work scope, and has applied appropriate EVMS flow down and data reporting requirements. The prime contractor remains responsible for EVMS data for management and reporting of minor subcontractors. A feedback or communication loop has been established by the prime contractor to notify subcontractors to address any issues (scope, schedule, budget, etc.). Major subcontractors have a documented plan to resolve EVMS flow down requirement issues which are identified, tracked, and corrected, and closed upon successful implementation of the EVMS. In the interim, the prime contractor remains responsible for EVMS data needed for management and reporting. Subcontract Identification and EVMS Flow Down Requirements are fully integrated with the other EVMS sub-processes.	**Prime contractor EVMS flow down and/or monthly data reporting requirements are consistently applied to subcontractors, and proactively monitored to improve subcontract requirements and performance.** A feedback or communication loop is proactively used by the prime contractor, facilitating subcontractors' ability to immediately address any issues (scope, schedule, budget, etc.). Subcontract identification and flow down requirements are routinely monitored, surveilled, and shared with stakeholders. Necessary corrective actions are implemented, completed, and recurring issues resolved. Subcontract identification and flow down requirement practices are continuously improved and optimized.

SUB-PROCESS I: SUBCONTRACT MANAGEMENT	Maturity Level				
	LOW	MEDIUM			HIGH
I.2. Subcontract Integration and Analysis	1	2	3	4	5
Subcontract integration and analysis allows the prime contractor to ensure the subcontractor's monthly cost and schedule performance data reported are timely, current, accurate, complete, repeatable, auditable, verified and at the right level of detail which facilitates management analysis and corrective actions. All subcontract work scope must be fully integrated into the prime contractor's Earned Value Management System (EVMS) to enable the prime contractor to effectively manage the total project/program work scope. Fully integrating subcontractor effort into the prime contractor's EVMS ensures the planning, scheduling, budgeting, work authorization, cost accumulation, estimating/forecasting, and risk processes accurately depict and report project/program performance, and provides the customer the most current and accurate information available each month. Subcontracted work scope and performance integration with the prime contractor's EVMS is achieved through a coding structure that uses unique Identifications (IDs). This allows for subcontract work scope to be separately identified and clearly recognizable, evaluated, and reported. The prime contractor engages in end-to-end analysis of subcontract performance data to facilitate complete and accurate integration with prime contractor reporting. End-to-end analysis provides a comprehensive understanding of subcontract performance and supports the ability to develop reasonable estimates of future costs, schedule, and technical performance. Analysis of subcontract performance from the established baseline plan permits management at all levels to rapidly and effectively implement corrective actions to regain project/program objectives. Without visibility into and the understanding of baseline plan deviations, the success of the project is jeopardized. Items to consider include: □ Prime contract requirements □ Subcontracting processes, instructions, and related command media □ Data reporting requirements, such as Subcontract Data Requirements Lists (SDRL) □ Documented processes for integration of subcontractors □ Cost/schedule/technical risks with subcontractor data included □ EVMS reports (prime and subcontract) □ Charge number structure □ Subcontracts and purchase orders □ Other Subcontractor Integration and Analysis should be integrated with the Organizing sub-process, Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process, Analysis and Management Reporting sub-process, Change Control sub-process, and Risk Management sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide GL 1, 2, 3, 6, 8, 9, 10, 16, 21, 23, 27, 31; DoD EVMSIG GL 1, 2, 3, 6, 8, 9, 10, 16, 21, 23, 27, 31; DOE CAG GL 1, 2, 3, 6, 8, 9, 10, 16, 21, 23, 27, 31; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some documented processes exist addressing integration and analysis of subcontract work scope with the prime contractor's EVMS.** Subcontractors are not separately identified with unique IDs and their work scopes are not integrated within the EVMS. The prime contractor is unable to analyze the subcontractor performance data. The subcontractor's monthly cost and schedule performance data may not be current, accurate, complete, repeatable, auditable and reflective of the actual conditions of performance and progress to date.	**Most prime contractor processes detailing the integration and analysis of subcontract work scope with the prime contractor's EVMS are documented but not approved and enforced.** Only high-risk subcontractor work scope is integrated with the prime contractor's EVMS using a common coding structure. The prime contractor only analyzes high-risk subcontractor performance data. Remaining subcontract work scope is not analyzed. Therefore, the prime contractor may not be able to verify whether subcontractors will deliver the product or service on time or within budget. Subcontractor Integration and Analysis are coordinated with the Organizing sub-process, Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process, Analysis and Management Reporting sub-process, Change Control sub-process, and Risk Management sub-process.	**All prime contractor processes addressing subcontractor integration with the prime contractor's EVMS are documented, approved, and enforced. All subcontractor work scope is integrated with the prime contractor's EVMS and regularly analyzed and reported to the customer at the appropriate levels.** The prime contractor integrates subcontractor work scope at the level needed to support development and maintenance of the critical path. All subcontractor work scope, schedule, and budget data are fully integrated within the prime contractor's Performance Measurement Baseline (PMB) at the appropriate levels. The prime contractor conducts monthly end-to-end analysis of subcontractor cost and schedule performance data and variances to verify they are current, accurate, complete, repeatable, auditable and consistent with actual conditions of performance and progress, and whether the subcontractor is deviating from the baseline plan. Any needed corrective actions to achieve objectives are implemented. Management Reserve (MR) and Undistributed Budget (UB) belonging to a subcontractor are incorporated with the prime contractor's EVMS and traceable to the subcontractor's reported MR/UB values. Subcontractor Integration and Analysis are fully integrated with the Organizing sub-process, Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process, Analysis and Management Reporting sub-process, Change Control sub-process, and Risk Management sub-process.	**All subcontractor performance data is submitted, reviewed, and incorporated as part of the prime contractor's performance at the appropriate levels. This occurs in the same month it is reported to the customer, enhancing decision-making.** Monthly changes to the subcontractor's work scope and baseline plan are coordinated with the prime contractor. Changes are effectively controlled to maintain the integrity of the prime contractor's performance data. Routine surveillance, monitoring, and automated testing of subcontractor data are conducted to assess system health and integrity, and identify data anomalies and performance issues. Necessary corrective actions are implemented, completed, and recurring issues resolved. The prime contractor and subcontractor accounting calendars are aligned for timely data integration and early visibility into issues. The prime contractor and subcontractor have open communications and a collaborative working relationship. The prime contractor coordinates any Over Target Baseline (OTB)/Over Target Schedule (OTS) with the customer and subcontractor to properly manage its implementation. Subcontract integration and analysis practices are continuously improved and optimized.

SUB-PROCESS I: SUBCONTRACT MANAGEMENT	Maturity Level				
	LOW	MEDIUM			HIGH
I.3. Subcontract Oversight	1	2	3	4	5
The prime contractor's oversight of the subcontractor's management processes, and in some instances a subcontractor's Earned Value Management System (EVMS) reliability, includes at a minimum meeting EVMS project/program contract requirements, subcontractor internal policies, procedures, operating instructions, and other. The prime contractor's oversight of the subcontract's management processes and, in some instances, its EVMS, may be performed with or without customer involvement, as required. Continuous oversight includes assessment of timeliness, reliability, and accuracy of subcontractor products, actions, and decisions. When the prime contractor identifies subcontractor EVMS implementation deficiencies as part of its oversight responsibilities, it should provide immediate feedback and instructions to the subcontractor for the timely resolution of the issue(s) identified. In these cases, the subcontractor working with the prime contractor is expected to develop and implement a documented corrective action plan. Implementation of corrective actions should be timely, adequate and complete. Subcontractor oversight reports should be appropriately shared with the subcontractor and stakeholders to communicate strengths and challenges associated with EVMS implementation. Items to consider include: □ Subcontracting policies, procedures, operating instructions, and other □ Subcontracts and purchase orders □ Data reporting requirements, such as Subcontract Data Requirements Lists (SDRL) □ Prime contract requirements □ Prime contractor surveillance plan, evaluation framework and methods, interpretive sources and guidance □ Prime contractor internal and external EVMS surveillance reports (prime and subcontract) □ Prime contractor's reports on Subcontractor EVM system corrective action plan(s), status, results, and EVMS implementation risks □ Prime contractor processes for integration of subcontractors □ Prime contractor cost/schedule/technical risks with subcontractor data included □ Internal and external EVMS surveillance reports (prime and subcontract) □ Other Subcontract Oversight contract requirements should be fully integrated with the Organizing sub-process, Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process, Analysis and Management Reporting sub-process, Change Control sub-process, and Risk Management sub-process. *References:* NDIA EVMS EIA-748-D Intent Guide All GLs; DoD EVMSIG All GLs; DOE CAG All GLs; NDIA IBR Guide; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**The prime contractor has documented some processes for oversight of the subcontractor's management processes and EVMS.** Some subcontracts requiring EVMS oversight are identified. The prime contractor lacks a formal strategy and plan for subcontractor oversight.	**The prime contractor has documented most processes for oversight of the subcontractor's management processes and EVMS. However, implementation of the processes is inconsistent.** Subcontracts requiring EVMS oversight are mostly identified. However, surveillance of the subcontractor's EVMS and analysis of subcontractor's management processes are inconsistent. Subcontract Oversight contract requirements are coordinated with the Organizing sub-process, Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process, Analysis and Management Reporting sub-process, Change Control sub-process, and Risk Management sub-process.	**The prime contractor applies and enforces documented processes for oversight of the subcontractor's management processes and EVMS.** The prime contractor conducts regular surveillance of the subcontractor's management processes and EVMS to ensure that timely, reliable and accurate data are produced. These data are reflective of actual conditions for subcontract cost, schedule and technical performance. Necessary corrective actions are implemented, completed, and recurring issues tracked to resolution. Results from subcontract oversight are fully integrated with the prime contractor's decision-making process. Subcontract Oversight contract requirements are fully integrated with the Organizing sub-process, Planning and Scheduling sub-process, Budgeting and Work Authorization sub-process, Analysis and Management Reporting sub-process, Change Control sub-process, and Risk Management sub-process.	**The prime contractor's oversight of the subcontractor management processes is proactive, integrating EVMS as part of the monthly project/program business rhythm.** Data and analysis reports resulting from subcontract oversight are routinely monitored and automatically tested to assess system health and integrity. Routine surveillance identifies ineffective/inefficient subcontractor management processes and are fully disclosed with all key stakeholders, who maximize use of these results. The prime contractor has a documented management and surveillance plan (e.g., Subcontractor Management Plan) that outlines the prime's approach to managing subcontractor requirements and responsibilities for completing specified work scope assignments and for the delivery of products and services. Where appropriate, the prime contractor conducts an independent review (e.g., Independent Baseline Review (IBR)) on the subcontractor's baselines. Subcontract oversight practices are continuously improved and optimized.

SUB-PROCESS J: RISK MANAGEMENT

Risk Management is the sub-process for identification of risks and opportunities, analysis and mitigation of risks, and integration of risks into the EVMS.

SUB-PROCESS J: RISK MANAGEMENT	Maturity Level				
	LOW		MEDIUM		HIGH
J.1. Identify and Analyze Risk	**1**	**2**	**3**	**4**	**5**
Management of risks (both threats with negative consequences and opportunities with positive benefits) over the life cycle of a project/program is an integral part of Earned Value Management (EVM), with touchpoints to each guideline. This supports establishing the basis for appropriate risk reserves, such as, contractor's Management Reserve (MR), Schedule Margin (SM), and customer's cost and schedule contingency and estimates of cost at completion (EAC), and schedule forecasts. It allows for the execution of the project/program within expectation of key stakeholders and project/program management. A well-executed SRA process can provide the essential strategies for recognizing, reducing and/or eliminating possible risks, with the specific emphasis on project schedule risks. The project/program's risk register is a common repository to document risks and their relationship to the amount of MR budget, SM in the project schedule, and range of EACs. The use of risk conferences (i.e. risk reviews), a risk mitigation plan, identification of "who owns risk" and clear communication of risks provide the opportunity for the project/program to finish within expectations. Risk management should consider the master schedule which must agree with the project/program objectives, reflect a logical sequence of events, and take into account identified cost and schedule risk threats and opportunities. The project/program should track each risk event through a process that clearly identifies both the likelihood and consequence of a risk occurring, mitigation steps possible or acceptance, and disposition of the risk once mitigated. The risk management process should identify how the project/program team should track risks and how risks are retired. If a risk is transferred, the new owner of the risk must agree and take actions to either accept or mitigate and to manage. A risk tracking system is developed to manage risks effectively. One example is a risk register, which is a document detailing all identified risks, including description, cause, probability of occurrence, impact(s) on objectives, proposed responses, risk owners, and current status. Risks occur in both planning and execution. Risks (both cost and schedule) are most often considered at the activity/task level and when realized, the impacts are rolled into both schedule and cost estimates to reflect the impacts to the project/program. Mitigation steps should also be captured in the schedule to include resources applied. Items to consider include: □ Periodic Schedule Risk Assessments (SRAs) are conducted □ Period Estimates at Completion (EACs) are conducted □ The schedule and cost risk assessment processes should identify risk mitigation activities and resources, as appropriate □ Risk register □ Risk management plan □ Risk assessment and opportunity report □ Risk informed management reserve documents □ Risk committee meeting minutes □ Site-specific historical data informs the risk management process □ Other *Comments: Risk is not fully documented in EIA748-D, but there are ties with each guideline. NDIA EVMS EIA-748-D Intent Guide Figure 1 identifies ties with several guidelines. Risk owner is defined as the party which owns the risk under the contract requirements. In this attribute, the words "activity" and "task" are used synonymously.* *References:* NDIA EVMS EIA-748-D Intent Guide All GLs; GAO-20-195G; OMB M-07-24; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some of the processes to incorporate risk planning are in place. Clear ties between risks are not yet in place to support the execution plan.** The risk management plan is under development. Risk owners may not be documented, mitigation steps have not been identified, and surveillance plans are not in place. The corresponding activities are not identified in the schedule or cost estimates at this point. Ties between project/program activities and contingency such as MR, SM and customer contingency are not clearly identified.	**The process to incorporate risk planning is in place, with some gaps. The risk management plan is in place. Some project/ program activities have ties to contingency.** The risk management plan is developed and in use, with minor issues. The risk owners are partially identified and documented, and mitigation steps have been identified, but not executed. The mitigation steps are incorporated into the schedule and cost as appropriate. Most ties are clearly identified between appropriate project/program activities and contingency, such as MR, SM, and customer contingency. Risk tools are updated to maintain a current understanding of the risks and risk impacts. This includes schedule risk assessments, review of critical elements, review of resource availability impacting critical activities, impacts of updated budget constraints and the impacts of re-planning as they affect future activities.	**The risk planning process is documented and approved. A risk management plan and an actively maintained risk register are used. Appropriate project/program activities have clear ties to risk reserves and forecasts, as observed in the risk register.** The risk management plan is developed, documented, and in use. A risk register is actively used. Periodic meetings of the risk committee or project/program team members occur and are documented to update risks and ensure teams work to take advantage of opportunities and to avoid threats. A risk manager has been identified for the project/program. Risk owners are identified and documented; and actively follow through on mitigation actions. Surveillance occurs as part of the risk management plan to look for the realization of risks at the appropriate times, and to encourage realization of opportunities. An SRA is used as an integral part of the overall risk process. The SRA validates the sufficiency of schedule margin duration and MR budget. The range of EACs and schedule forecasts are informed by the risk register and SRA. Both schedule and cost reflect risk mitigation activities identifiable to the risk register, as appropriate, and with few immaterial exceptions.	**A risk register is actively used and surveilled. Routine surveillance results of the risk register are fully disclosed with all key stakeholders to inform decisions and proactively control the project/program.** Regular meetings of the risk committee or project/program team members occur, including the customer as needed. Risk owners actively work to avoid a threat or encourage an opportunity. Risk data are monitored and automatically tested to assess system health and integrity. Necessary corrective actions are implemented, completed, and recurring issues resolved. All of the project/program activities with identified risk have clear ties to risk reserves, active surveillance, ongoing planning and management. The risk management process is continuously improved and optimized.

SUB-PROCESS J: RISK MANAGEMENT	Maturity Level				
	LOW		MEDIUM		HIGH
J.2. Risk Integration	1	2	3	4	5
Throughout execution of work for a project/program, risks (both threats with negative consequences and opportunities with positive benefits) are identified, monitored and managed as a process to support successful completion. Integrating risk into the Earned Value Management System (EVMS) ensures the technical, schedule, and budget/cost data submitted to the customer each month for both initial establishment and change control of the performance measurement baseline (PMB) and development of estimates at completion (EAC) are accurate and complete. Having a risk committee/team which follows a risk management plan is critical to the early detection of risks. The risk committee/team should have both customer and contractor representation capturing risk events in a risk tracking tool or register. The realization of a threat or opportunity should be addressed with a deliberate action that is planned, monitored, and integrated into the project/program to support and encourage an opportunity, or to minimize the impact of a threat, ensuring cost and schedule tools are updated to support forecasts. As the project/program progresses, this integration allows project/program to monitor risks at the time they are most likely to occur. Robust communication within the risk committee/team to the PM and customer supports the analysis and use of risk reserves (e.g., Management Reserve (MR), Schedule Margin (SM), as well as customer cost and schedule contingency) to apply the right resources to manage the threat and/or capture the most benefit from an opportunity. Risk events are tracked, with actions and impacts captured in logs to support auditable integration into the EVMS including the identification of risks in the schedule and budget baselines. When risk reserves are used, they should be identified in baseline and status schedules. Risk reserves use is tracked when budget is expended for an associated risk response or action. Risks that have been retired should be traceable to schedule and baseline budget plan revisions and may result in updates to the ETC and/or Budget at Completion. Items to consider include: □ Schedule Risk Assessment (SRA) and schedule forecasting □ Cost risk assessments and ETC/EAC forecasting □ Contractual requirements (e.g., Contract Data Requirements List (CDRL)) □ Risk register or risk tracking system □ Risk trigger metrics and surveillance plan □ Risk mitigation activities tracked in schedule and cost tools, as appropriate □ Risk mitigation plan □ Risk informed contingency documents □ MR and SM logs □ Customer contingency log □ Customer schedule contingency log □ Risk committee meeting minutes where actions are clearly traceable to all logs and in the schedule and cost systems □ Other *References:* NDIA EVMS EIA-748-D Intent Guide GL 3, 6, 8, 14, 22, 23, 24, 26, 27; OMB M-07-24; DOE Guide 413.3-7A, change 1, Risk Management Guide, Oct 22, 2015; ISO 21508:2018(E); ANSI PMI 19-006-2019	**Not yet started.**	**Some processes to incorporate risk management in the project/program are in place.** The processes in the risk management plan are under development and starting to be used by the project/program to exercise control of risks. Resources needed to address the risk management process are not in place.	**Most of the processes to incorporate risk management in the project/program are in use, with some gaps.** The processes in the risk management plan are mostly developed and in use, including the process by which the project/program will exercise control of risks. The process includes a surveillance plan that targets who is looking for the risk, when they should look (what time window or project/program phase), and who they should alert. The risk management updates address retirement of risks as well as updates to active risks, as needed. Implications of changed or retired risk is integrated and evident throughout all EVMS sub-processes. Resources needed to address the risk management process are mostly in place.	**All processes to incorporate the risk management process are documented and in use. Ties between all risks and risk reserves used, are logical and clear.** The processes in the risk management plan are in use to exercise day-to-day control of risks. Risk management is auditable and transparent with mitigation plans. Realized risk impacts are integrated into the EVMS to include the schedule and budget implications during establishment and maintenance of the PMB, EACs and schedule forecasts. Owners of specific risks are identified in plans and are actively managing these risks with mitigation steps identified where appropriate. Mitigation steps are executed and communicated. Threats and opportunities are continually evaluated, updated, and tracked throughout the entire project/program lifecycle. This covers both known and emerging risks. A surveillance plan is in place and active monitoring of risks is evident during appropriate time windows. Necessary corrective actions are implemented, completed, and recurring issues resolved. Retirement of risks as recommended by the risk committee/team is to the Project Manager (PM) and customer. These recommendations are acted upon and documented when the retirement is approved.	**The risk management process is proactive and forward-looking to enhance management decision-making ability. The project/ program team is working to address threats and realize opportunities.** The risk management process includes routine meetings with both contractor and customer representatives on an appropriate time basis to inform, evaluate and react to threats and opportunities. These meetings are documented, and actions are clearly traceable to all logs and auditable in their integration into the EVMS, including the identification of risks in the schedule and budget baselines. Risk data are monitored, used for management control and automatically tested to assess system health and integrity. Routine surveillance results of risks are fully disclosed with all key stakeholders. They are informed of the risks and actions to keep the project/program moving towards a successful outcome in terms of technical scope, schedule, and cost. The project/program team is working to encourage and develop opportunities identified in the risk management plan to improve performance. A commitment to threat and opportunity management is clearly part of the corporate culture. The risk management process is continuously improved and optimized.

Appendix D: Unweighted IP2M Environment Scoresheet

This appendix presents the EVMS environment scoresheets. There are four categories of environment factors. The research results showed that each of these factors is important. Under each category, the factors are organized in order of importance from high to low.

The following rating levels are used to assess each environment factor on the project/program.

Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing
Rating a factor Not Acceptable indicates that the factor's criteria are consistently below expectations and current performance is unacceptable. The ability to effectively manage the project/program cannot be achieved in this current state and actions are required to improve.	Rating a factor Needs Improvement indicates that the factor's criteria are not consistent in meeting project/ program expectations and without improvement, the ability to effectively manage the project/program is at risk. Substantial action is required to meet expectations.	Rating a factor Meets Some indicates that the factor's criteria are partially met and without improvement, the ability to effectively manage the project/program could be in jeopardy.	Rating a factor Meets Most indicates that the factor's criteria are consistently met and understood, with minor gaps, leading to effective management of project/program.	Rating a factor High Performing indicates the factor's criteria are fully met within the context of their respective category (e.g., culture, people, practices, or resources).

1. **Culture:** the culture category addresses those issues that impact the project/program culture. Culture is, by definition, the display of behaviors. Organizational culture is a system of common assumptions, values and beliefs (or the lack thereof) that governs how people behave in organizations. Organizational values and beliefs should align with the development and outcomes of a successful EVMS. The project/program culture can enable or hinder the effectiveness of the EVMS.					
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing
1a. The **contractor organization is supportive and committed** to EVMS implementation, including making the necessary investments for regular maintenance and self-governance.					
1b. The project/program **culture fosters trust, honesty, transparency, communication, and shared values** across functions.					
1c. The **customer organization is supportive and committed** to the implementation and use of EVMS.					
1d. Project/program leaders make **timely and transparent decisions** informed by the EVMS.					
1e. The project/program **leadership effectively manages and controls change** using EVMS, including corrective actions and continuous improvement.					
1f. **Effective teamwork exists,** and team members are working synergistically toward common project/program goals.					
1g. **Alignment and cohesion exist among key team members** who implement and execute EVMS, including common objectives and priorities.					
Column Frequencies					

2. **People:** the people category addresses the individuals who represent the interests of their respective stakeholders (e.g., project business manager, project control analyst, project schedule analyst, acquisitions/subcontracts, control account manager, Integrated Project/Program Team (IPT) or line/resource management) and are adept in the relevant subject matter, in order to contribute to the process that leads to favorable project control outcomes.					
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing
2a. The **contractor team is experienced and qualified** in implementing and executing the EVMS.					
2b. The **customer team is experienced** in understanding and using EVM results to inform decision-making.					
2c. Project/program **leadership is defined, effective, and accountable**.					
2d. **Project/program stakeholder interests are appropriately represented** in the implementation and execution of the EVMS**.**					
2e. **Professional learning and education** of key individuals responsible for EVMS implementation and execution, **is appropriate** to meet project/program requirements.					
2f. **Team members** responsible for the EVMS implementation and execution phases **are co-located and/or accessible**.					
Column Frequencies					

3. **Practices:** the practices category addresses internal and external procedures and processes that can positively or negatively influence the outcome of a project or program. Internal business practices and methods are specific to a given organization, including internal standards, requirements and best practices. External business practices, regulations, requirements, procedures and methods are across organizational boundaries (e.g., government to contractor, software provider to contractor, subcontractor to prime, and so forth).					
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing
3a. The project/program **promotes and follows standard practices** to implement and execute an EVMS.					
3b. **EVMS requirements definition is in place, and agreement exists** among key stakeholders and customer.					
3c. **Roles and responsibilities are defined**, **documented and well-understood** for implementing and executing EVMS.					
3d. **Communication is open and effective**, including consistent terminology, metrics, and reports.					
3e. **Effective oversight is in place and used**, including internal and external surveillance and independent reviews.					
3f. **Contractual terms and conditions** that impact the effectiveness of EVMS **are known and have been addressed**.					
3g. Appropriate **Subject Matter Expert (SME)** input is adequate and timely.					
3h. **Coordination exists** between the key disciplines involved in implementing and executing the EVMS.					
Column Frequencies					

4. **Resources:** the resources category addresses the availability of key tools, data, funding, time, personnel, and technology/ software to support the EVMS sub-processes.					
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing
4a. **Adequate technology/software and tools are integrated and used** for the EVMS.					
4b. **Sufficient funding is committed** and available **for implementing and executing the EVMS**.					
4c. The team that implements and executes the EVMS for the project/program is adequate in **size and composition**.					
4d. **Sufficient calendar time and workhours are committed and available** for implementing and executing the EVMS.					
4e. **Data are readily available** to populate EVMS tools supporting analyses for decision-making.					
4f. The **project/program utilizes an appropriate periodic cycle** for executing the EVMS effectively and efficiently.					
Column Frequencies					

Appendix E: Weighted IP2M Environment Score Sheet

The following tables are the same as the previous EVMS environment score sheets; however, these tables contain the weights for each environment factor.

1. **Culture:** the culture category addresses those issues that impact the project/program culture. Culture is, by definition, the display of behaviors. Organizational culture is a system of common assumptions, values and beliefs (or the lack thereof) that governs how people behave in organizations. Organizational values and beliefs should align with the development and outcomes of a successful EVMS. The project/program culture can enable or hinder the effectiveness of the EVMS.							
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing	Score	Comments
1a. The **contractor organization is supportive and committed** to EVMS implementation, including making the necessary investments for regular maintenance and self-governance.	0	19	39	58	78		
1b. The project/program **culture fosters trust, honesty, transparency, communication, and shared values** across functions.	0	15	30	45	60		
1c. The **customer organization is supportive and committed** to the implementation and use of EVMS.	0	14	27	41	54		
1d. Project/program leaders make **timely and transparent decisions** informed by the EVMS.	0	12	24	36	48		
1e. The project/program **leadership effectively manages and controls change** using EVMS, including corrective actions and continuous improvement.	0	8	16	24	32		
1f. **Effective teamwork exists,** and team members are working synergistically toward common project/program goals.	0	5	11	16	22		
1g. **Alignment and cohesion exist among key team members** who implement and execute EVMS, including common objectives and priorities.	0	5	9	14	19		
Column Totals	**0**	**78**	**156**	**234**	**313**		

2. **People:** the people category addresses the individuals who represent the interests of their respective stakeholders (e.g., project business manager, project control analyst, project schedule analyst, acquisitions/subcontracts, control account manager, Integrated Project/Program Team (IPT) or line/resource management) and are adept in the relevant subject matter, in order to contribute to the process that leads to favorable project control outcomes.							
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing	Score	Comments
2a. The **contractor team is experienced and qualified** in implementing and executing the EVMS.	0	17	34	50	67		
2b. The **customer team is experienced** in understanding and using EVM results to inform decision-making.	0	13	27	40	54		
2c. Project/program **leadership is defined, effective, and accountable**.	0	12	25	37	49		
2d. **Project/program stakeholder interests are appropriately represented** in the implementation and execution of the EVMS**.**	0	8	17	25	34		
2e. **Professional learning and education** of key individuals responsible for EVMS implementation and execution, **is appropriate** to meet project/program requirements.	0	6	13	19	25		
2f. **Team members** responsible for the EVMS implementation and execution phases **are co-located and/or accessible**.	0	2	5	7	9		
Column Totals	**0**	**58**	**121**	**178**	**238**		

3. **Practices:** the practices category addresses internal and external procedures and processes that can positively or negatively influence the outcome of a project or program. Internal business practices and methods are specific to a given organization, including internal standards, requirements and best practices. External business practices, regulations, requirements, procedures and methods are across organizational boundaries (e.g., government to contractor, software provider to contractor, subcontractor to prime, and so forth).							
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing	Score	Comments
3a. The project/program **promotes and follows standard practices** to implement and execute an EVMS.	0	11	22	33	44		
3b. **EVMS requirements definition is in place, and agreement exists** among key stakeholders and customer.	0	11	22	33	44		
3c. **Roles and responsibilities are defined**, **documented and well-understood** for implementing and executing EVMS.	0	9	18	27	35		
3d. **Communication is open and effective**, including consistent terminology, metrics, and reports.	0	8	16	24	31		
3e. **Effective oversight is in place and used**, including internal and external surveillance and independent reviews.	0	7	15	22	30		
3f. **Contractual terms and conditions** that impact the effectiveness of EVMS **are known and have been addressed**.	0	7	15	22	30		
3g. Appropriate **Subject Matter Expert (SME)** input is adequate and timely.	0	3	6	9	12		
3h. **Coordination exists** between the key disciplines involved in implementing and executing the EVMS.	0	2	4	7	9		
Column Totals	**0**	**58**	**118**	**177**	**235**		

4. **Resources:** the resources category addresses the availability of key tools, data, funding, time, personnel, and technology/ software to support the EVMS sub-processes.							
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing	Score	Comments
4a. **Adequate technology/software and tools are integrated and used** for the EVMS.	0	12	23	35	47		
4b. **Sufficient funding is committed** and available **for implementing and executing the EVMS**.	0	9	18	28	37		
4c. The team that implements and executes the EVMS for the project/program is adequate in **size and composition**.	0	9	18	26	35		
4d. **Sufficient calendar time and workhours are committed and available** for implementing and executing the EVMS.	0	8	17	25	34		
4e. **Data are readily available** to populate EVMS tools supporting analyses for decision-making.	0	8	17	25	34		
4f. The **project/program utilizes an appropriate periodic cycle** for executing the EVMS effectively and efficiently.	0	7	14	20	27		
Column Totals	**0**	**53**	**107**	**159**	**214**		

IP2M ENVIRONMENT TOTAL SCORE

(Maximum Score = 1000)

This score represents the environment score between 0 and 1000, with 1000 having the most ideal environment.

Appendix F: IP2M Environment Factor Descriptions

The following environment factor descriptions help generate a clear understanding of the terms used in the project/program score sheet. Factor descriptions include multiple items to consider, clarifying concepts and facilitating ideas to make the assessment of each factor easier. Note that these descriptions are not all-inclusive, and that the user may supplement them when necessary.

The factor descriptions follow the order in which they are presented in the project/program score sheet; they are organized in a hierarchy by category then factor. Users assess and rate the level of each environment factor by evaluating their project/program against the factor's description.

1. Culture (7 factors)

The culture category addresses those issues that impact the project/program culture. Culture is, by definition, the display of behaviors. Organizational culture is a system of common assumptions, values and beliefs (or the lack thereof) that governs how people behave in organizations. Organizational values and beliefs should align with the development and outcomes of a successful EVMS. The project/program culture can enable or hinder the effectiveness of the EVMS.

1. Culture		
Factor	**Title**	**Description**
1a.	The **contractor organization is supportive and committed** to EVMS implementation, including making the necessary investments for regular maintenance and self-governance.	The contractor's integrated project/program team (IPT) is in place (i.e., corporate leadership, execution/operations, oversight, and support staff), and has a demonstrated belief in the value and disciplined use of the EVMS. The project/program follows an integrated project management strategy to identify and manage risks using the EVMS that would otherwise negatively impact a well-formed baseline plan. It has committed resources, including funding, to ensure that effective implementation of the EVMS is a priority, assuring continuous improvement and accountability at every level of the contractor organization. This commitment ensures the availability and protected time of key individuals who contribute to implementing and executing EVMS in a substantive and measurable way. Typically, this also includes the availability/commitment of other personnel with specialized skills/knowledge, who may or may not be "dedicated" to the project/program. Leadership's and team members' attitude and discipline, both at the corporate office level and the project/program level, leads to the correct use, application, and acceptance of EVMS as an integrated project/program management tool (ranging from the definition of work scope to planning and scheduling to budgeting and work authorization, to analysis and reporting to forecasting and risk management). Leadership actively revisits the most effective ways to evaluate EVMS metrics that support decision-making. The organization's policies provide incentives and education to foster support and commitment. The contractor's team does not choose convenience over following the EVMS regulations and procedures applicable to the project/program. Project/program decision-making, which ultimately drives project results, is collaborative, and effectively relies on EVMS generated data and metrics. Governance is enforced and effective at dealing with the challenges of the project/program. *Comments: Self-governance refers to the capacity of a contractor to govern autonomously and, as such, is an important approach in overseeing the effective implementation of the EVMS. When a contractor instills integrated project/program management principles using the EVMS in a way that benefits all levels of the organization, the results can guide management decisions, lead to improved project/program execution, and optimize performance of the project/program team.*

1. Culture		
Factor	**Title**	**Description**
1b.	The project/program **culture fosters trust, honesty, transparency, communication, and shared values** across functions.	The project/program culture fosters trust, honesty, and shared values, including realistic portrayal of performance and acceptance of data transparency through open communication. Project/program culture is a system of common assumptions, values, and beliefs, which governs how people behave in teams or groups. Values and beliefs displayed in the project/program should align with the implementation of the EVMS and project/program outcomes. Project/program leadership develops a team culture of trust and honesty where members can maintain open, synergistic relationships. A shared EVMS implementation plan helps develop a common understanding between the customer and contractor, fostering a culture of trust by laying out how things should work. This culture may also be supported by appropriate rewards or incentives for implementation of EVMS and use of EVM data for proactive management; rewards or incentives are tied to meeting project/program goals, as well as performance thresholds. Leaders are visible and accessible. The project/program culture is heavily influenced by the supporting organizational cultures that interact with it. If these cultures are aligned, establishing a team culture is much easier. However, if not aligned, creating shared values may require additional effort. For example, the contractor & customer PM can develop bilateral Rules of Engagement (ROEs) to set expectations upfront. In any case, project/program leadership, and specifically project managers, must ensure that trust and honesty are fostered within the project/program culture, which helps integrate technical information across functional areas. This includes sharing accurate data, both positive and negative, both within and across customer and contractor organizations, with little fear of retribution. Realistic status/ Estimates at Completion (EACs) are communicated at all levels and externally.

1. Culture		
Factor	**Title**	**Description**
1c.	The **customer organization is supportive and committed** to the implementation and use of EVMS.	The customer organization and its project/program team have a singular view and demonstrated belief in the value and disciplined use of EVM. They support the project/program and establish EVMS expectations as an effective tool to control the project/program, tailored to the size and complexity of the project/program. The customer has committed resources, including funding, to ensure that the effective implementation and execution of EVMS at the customer level is a priority. Customer commitment ensures an appropriate level of guidance, advocacy and accountability at the project/program level by the project/program manager and engineering leadership; this commitment includes a willingness to remove roadblocks that would hinder the implementation of the EVMS and the actual performance of work. Leadership's and team members' EVMS knowledge, attitude, and discipline, at both the customer program office and customer oversight organization, lead to the correct use, application, and acceptance of the EVMS as a management tool, including forecasting and risk management. Leadership actively revisits the most effective ways to evaluate EVMS metrics that support decision-making and system corrective actions and improvements. Customer leadership does not choose convenience or preference over following EVMS regulations and procedures and must balance the need to produce a product with the requirements to maintain due diligence using EVM. The organization's policies provide incentives and education to foster support and commitment. Formal and timely examination, assessment, and acceptance of EVMS generated data, metrics, and reports provides the project/program with the potential of initiating change, where and when needed. If the project/program has multiple customers and/or sponsors, then they are consistent in their assessment of the contractor's EVMS. Customer commitment ensures consistent use and management action resultant from EVMS data.

1. Culture		
Factor	**Title**	**Description**
1d.	Project/program leaders make **timely and transparent decisions** informed by the EVMS.	Timely and transparent decisions, by both the contractor and customer, are critical to project/program success. Project/Program leadership and team members have situational awareness of the progress made on programmatic objectives that lead to timely, effective decisions. The project/program places adequate emphasis on the importance of the EVMS as the means used to develop and integrate scope, schedules, and budgets, as well as understanding risk and uncertainty. The project/program uses EVMS to predict and positively influence schedule and cost outcomes using generated data, metrics, and reports in formats that assist effective management and decision-making. Sufficient communication platforms exist, and disseminated information is available to enable effective decisions. Team members responsible for implementing and executing the EVMS are supported by timely decisions and input from the sponsors and have corporate support when needed. Decisions are shared transparently (e.g., scope changes are shared across key stakeholders) and are consistent.

1. Culture		
Factor	**Title**	**Description**
1e.	The project/ program **leadership effectively manages and controls change** using EVMS, including corrective actions and continuous improvement.	The project/program leadership (including contractor and customer leadership teams) has the authority to manage and respond to changes, implement corrective actions, and employ continuous improvement practices. Changes will occur on every project/program. These include, but are not limited to, scope changes, forecasts, personnel changes, funding changes, external environmental changes, EVMS tool changes and so on. Regardless of the change, project/program leadership and the team acknowledge and are tolerant that change is a normal part of the project/program and are proactive in their response to change. The customer and contractor foster an environment that is actionable and innovates fast enough to operate in a rapidly changing environment using the EVMS. The EVMS provides a solution-based approach to addressing complex project/program problems. The customer and contractor need to remove obstacles to processing contract and baseline change management. The baseline is proactively managed to ensure that it is realistic and preserves the integrity of related metrics. Project/program leadership are diligent to ensure that the team follows a closed-loop procedure when responding to change. Project/program leadership handles changes with a positive attitude. Changes are handled proactively, resulting in positive stakeholder attitudes and outcomes leading to effective implementation and continuous improvement of EVMS.

1. Culture		
Factor	**Title**	**Description**
1f.	**Effective teamwork exists** and team members are working synergistically toward common project/program goals.	EVMS stakeholders (including customer and contractor) are working synergistically together toward common project/program goals using effective teamwork. There is a mutual commitment to work together. The project/program overcomes functional silos through effective teamwork and is able to organize effectively for integrated project/program management activities. Effective teamwork promotes and welcomes a diversity of ideas and perspectives which can be beneficial to the EVMS. It is important that teamwork be developed through formal and informal team building programs as early in the project/program timeline as possible or feasible. Team building contributes to alignment by helping a group evolve from a collection of individuals into a true team. Team building seeks to resolve differences, remove roadblocks, and build and develop trust and commitment, a common mission statement, shared goals, interdependence, accountability among team members, and problem-solving skills. Team building within both the customer and contractor teams is important. Team building between customer and contractor is equally important but should ensure customer independence and meeting of applicable regulations. Team building takes into account the current stage of team development (i.e., forming, storming, norming, and performing). Effective teamwork may be impacted by team members and their organizations having a history of working together on past efforts using the EVMS. In addition, excessive turnover of team members may hinder effective teamwork because of lack of continuity. Turnover requires the team to address team building activities again to minimize associated impacts.

1. Culture		
Factor	**Title**	**Description**
1g.	**Alignment and cohesion exist among key team members** who implement and execute EVMS, including common objectives and priorities.	Alignment and cohesion among key EVMS stakeholders, including agreement around common objectives and current priorities, provides the team with the ability to effectively move forward together on the project/program using EVMS. Alignment is the condition where appropriate participants are working within acceptable tolerances to develop and meet a uniformly defined and understood set of project/program objectives. Effective alignment provides direction and the ability to respond to change as needed. Lack of alignment, conversely, will lead to project/program team pursuing conflicting objectives and goals. Alignment must effectively incorporate a diversity of ideas and perspectives which can be beneficial to the EVMS. Both customer and contractor work cohesively and collectively to implement the EVMS, including working with designated project controls personnel assigned to EVMS implementation. EVMS implementation and execution includes individuals from the entire project/program (e.g., corporate EVMS oversight, consultants, customer, contracts, finance and procurement offices, and so forth). EVMS alone cannot ensure alignment but it does provide mechanism for understanding lack of alignment. In the project/program environment, alignment exists in three dimensions. The first dimension is vertical and involves top-to-bottom alignment within an organization. Executives, business managers, project managers, and functional specialists within each stakeholder organization must be well-aligned. The second, horizontal, involves the cross-organizational alignment between functional groups within the organizations represented on the project/program. Different organizations (e.g., customer, prime contractor, subcontractors, external stakeholders) with a stake in the project/program must also be well-aligned. Any disconnects are understood and addressed to foster alignment. If the project/program has multiple customers and/or sponsors, then they must be taken into consideration for alignment and cohesion. The third dimension, longitudinal, involves alignment of objectives throughout the project/program lifecycle. Alignment ensures that clear lines of responsibility and authority are in place across all dimensions. *In the context of this tool, the EVMS implementation phase includes sub-processes such as organizing, planning and scheduling, and budgeting and work authorization. The EVMS execution phase includes change control, accounting, material management, indirect budget and cost management, analysis and management reporting. Risk management and subcontract management occur in both phases (EIA 748-D Intent Guide).*

2. People (6 factors)

The people category addresses the individuals who represent the interests of their respective stakeholders (e.g., project business manager, project control analyst, project schedule analyst, acquisitions/subcontracts, control account manager, Integrated Project/Program Team (IPT) or line/resource management) and are adept in the relevant subject matter, in order to contribute to the process that leads to favorable project control outcomes.

2. People		
Factor	**Title**	**Description**
2a.	The **contractor team is experienced and qualified** in implementing and executing the EVMS.	The contractor leadership team (e.g., executive management, functional organizational manager, project/program manager, contracts manager) and the contractor's project/program team (e.g., project/program manager, project controls managers, control account managers) are experienced in implementing and executing the EVMS to inform decision-making on a project/program of similar size, scope, and/or location. They are also qualified to effectively implement and execute the EVMS based on relevant training, education, certification or past experience given the nature of the project/program, its level of risk, local conditions, schedule constraints and so on. Experience and qualification may differ for implementation versus execution of the EVMS. The contractor team should have the right mixture experienced to make sure that the outcomes are successful throughout the project/program. Previous experience increases the contractor leadership team's familiarity with the project/program planning, design, and execution sub-processes. Relevant experience is important because repetition plays a major role in both organizational learning (e.g., lessons learned, mentoring, continuous improvement) and in creating routines and capabilities in general. Realizing that everyone is inexperienced at some point, there should be a structured method for mentoring and professional development to bring these individuals up to the right level of technical knowledge and skills, given the nature of this specific project/program.

2. People		
Factor	**Title**	**Description**
2b.	The **customer team is experienced** in understanding and using EVM results to inform decision-making.	The customer is the organization that sponsors the project/program's funding and ultimately takes over the operation of the completed project/program. The customer leadership team (e.g., sponsor representative, contracting officer) and customer project/program team (e.g., project manager, budget officer, contracting official, project controls managers, engineering lead) have previous experience using the EVM results to inform decision-making on a project/program of similar size, scope, and/or location. The customer should have the right mixture of experienced personnel to make sure that EVM is used effectively to inform decision-making. Previous experience with projects/programs of similar size and complexity increases the familiarity and understanding of the customer leadership team and project/program team with the project/program planning, design, and execution sub-processes. Relevant experience is important because repetition plays a major role in both organizational learning (e.g., lessons learned, mentoring, continuous improvement) and in creating routines and capabilities in general. Realizing that everyone is inexperienced at some point, there should be a structured method for mentoring and professional development to bring new individuals up to the right level of technical knowledge and skills, given the nature of this specific project/program.

2. People		
Factor	**Title**	**Description**
2c.	Project/program **leadership is defined, effective, and accountable**.	Project/program leadership, for both the customer and the contractor, is defined, effective, and accountable, which leads to better implementation and execution of EVMS. Project/program leadership roles will vary across organizations and typically include a project/program sponsor, project director, customer representative, project/program manager, construction manager, operation manager and others. Organizational structure typically follows the hierarchy of executive steering committee, project/program leadership team and execution team. Furthermore, the sponsor and senior leadership can affect the environment of the project/program. These individuals are responsible for the project/program, have decision-making authority, and ultimately will be held accountable for project/program success; as stewards of the project/program, their influence will positively or negatively affect the use of EVM. Components of good leadership in the context of a project/program typically include: • Good general knowledge of contracting strategy, project/program phases, and delivery systems • Good understanding of related business critical success factors • Capacity to determine and align the needs of the key stakeholders • Adequate understanding of manufacturing and/or construction, start-up, operations • Good understanding of assessing and managing uncertainties and risks Components of good leadership in the context of EVMS typically include: • A demonstrated belief in the value and disciplined use of EVMS • Clear support of EVMS as an effective tool to control the project/program • Swift action if the EVMS maturity or environment needs improvement, including system certification if needed • Implementation of a governance plan that includes EVMS • An understanding of the relationships and integration between EVMS and other systems' metrics (e.g., accounting, risk management, quality, safety, Material Requirements Planning System (MRPS), etc.) • Striving for more than minimum expectations

2. People		
Factor	**Title**	**Description**
2d.	**Project/program stakeholder interests are appropriately represented** in the implementation and execution of the EVMS**.**	Project/program internal and external stakeholder interests are appropriately represented to provide the right input at the right time during EVMS implementation and execution. A stakeholder is an individual (or entity) who can influence the project/program or is influenced by the project/program. Appropriate internal stakeholders may include individuals representing the contractor, operations and maintenance, key design/technical leads, control account managers, project/program management, procurement, accounting, material management, quality management, sponsor, end-user and manufacturing. External stakeholders may include regulators, Indigenous peoples, local communities, state or provincial government, other government agencies and so forth. Stakeholders effectively communicate expectations and may assist with key decisions. Appropriate stakeholder input helps improve team alignment by providing a sound foundation for a successful EVMS. Proper stakeholder input also provides the leadership team and project/program management team with diverse expertise that covers both the technical and management areas of the project/program. For example, EVMS stakeholders (e.g., control account managers, project/program management) are represented on the project/program leadership team and appropriately engaged, providing a diversity of ideas. Another example would be that stakeholders are appropriately represented on the EVMS implementation team to ensure understanding of the project/program scope. This diverse expertise facilitates better solutions and sound judgments to the problems faced by the team.

2. People		
Factor	**Title**	**Description**
2e.	**Professional learning and education** of key individuals responsible for EVMS implementation and execution, **is appropriate** to meet project/program requirements.	Professional learning and education of key individuals responsible for EVMS implementation and execution supports meeting project/program requirements. It allows key individuals to adequately apply earned value knowledge, offer professional input and thought leadership, and inform decision-making based on best practices and recognizable standards. Implementing and executing the EVMS requires individuals with the necessary technical background, training, EV tools knowledge, qualifications and certification in the relevant subject matter. Effective training on project/program management practices, procedures, and processes clearly communicates expectations and teaches how to implement the EVMS in the actual operation of work, and supplements experience. A rigorous and tailored professional development program is maintained as the project/program progresses, including development of technical capabilities, exposure to current practices, sharing of lessons learned among project/program managers, and relevant internal and external training/certification of key EVMS stakeholders as part of lifelong learning principles. A proactive, formalized learning and development framework should consider succession planning, cross-disciplinary training, team depth, recurring refresh training and integration across cost and schedule expertise, leading to professional growth and career advancement.

2. People		
Factor	**Title**	**Description**
2f.	**Team members** responsible for the EVMS implementation and execution phases **are co-located and/or accessible**.	Project/program leadership and team members responsible for the EVMS implementation and execution phases of the project/program are co-located and/or accessible, which provides an opportunity for closer coordination and interaction. Team members who are co-located and/or accessible tend to develop shared goals, purpose, and culture. If the team is co-located for the general day-to-day execution of the project/program, by default those responsible for implementing the EVMS, both technical and project controls, are co-located. Co-location facilitates the development of a positive team climate, independent team processes, maturation of team members and the team itself. Team members being accessible (e.g., using video conferencing technologies and so on) can provide some of the same benefits of physical co-location. Ideally, co-location makes for more effective collaboration, but the key is to have modes that allow for the team to regularly and easily meet, converse, and share ideas, issues, and solutions. Lack of co-location and/or accessibility may be affected by time-zones and language barriers and may necessitate using additional communication techniques and technology to effectively support the project/program.

3. Practices (8 factors)

The practices category addresses internal and external procedures and processes that can positively or negatively influence the outcome of a project or program. Internal business practices and methods are specific to a given organization, including internal standards, requirements and best practices. External business practices, regulations, requirements, procedures and methods are across organizational boundaries (e.g., government to contractor, software provider to contractor, subcontractor to prime, and so forth).

3. Practices		
Factor	**Title**	**Description**
3a.	The project/program **promotes and follows standard practices** to implement and execute an EVMS.	Project/program management documents containing effective practices, procedures, processes and tools focused on the implementation and execution of the EVMS have been developed, and are consistently used and tailored to the size and complexity of the project/program. These documents are often referred to as the EVM System Description and define a uniform, consistent and realistic approach to EVMS implementation and execution. The project/program promotes and follows these standard practices. Moreover, standard practices need to include proper, realistic and up-front EVMS planning. EVMS standard practices govern the organization's project/program management system that integrates a defined set of associated work scopes, schedules and budgets for effective planning, performance, and management control. Any variation from the organization's standard procedures for a given contract must be made clear to all stakeholders to ensure alignment. Standard practices also facilitate training of all team members including less experienced members.

3. Practices		
Factor	**Title**	**Description**
3b.	**EVMS requirements definition is in place, and agreement exists** among key stakeholders and customer.	EVMS requirements definition is in place, and agreement exists among key stakeholders and the customer, helping stakeholders have common expectations on the importance of EVMS. EVMS project/program objectives are clear and scaled to the size and complexity of the project/program. Customer work scope requirements including the requirement to implement the EVMS are clearly communicated and defined in writing before work begins. EVMS requirements support contractual requirements, other memoranda of understanding, scope definition, decision-making, risk management, plan optimization, negotiating project/program changes, and integrated change control, leading to more uniform and better-informed decisions.
3. Practices		

Factor	Title	Description
3c.	**Roles and responsibilities are defined**, **documented and well-understood** for implementing and executing EVMS.	Practices, procedures, and processes clearly define and document the roles, responsibilities, accountability, and authority of internal and external stakeholders for both contractor and customer. Clear definition is essential for alignment toward shared goals and effective implementation and execution of the EVMS. The project/program's roles, responsibilities and authorities are well understood, consistent with the contract, followed, and updated as needed, so that the EVMS can run efficiently with no gaps. Roles and responsibilities should take into consideration the contractual inconsistencies and gaps that may exist with multi-mission or multi-stakeholder settings. Typically, roles, responsibilities and authorities are documented in a Responsibility Assignment Matrix. Roles and responsibilities that are clear make implementation and execution of EVMS much smoother, helping to meet project/program expectations.

3. Practices		
Factor	**Title**	**Description**
3d.	**Communication is open and effective**, including consistent terminology, metrics, and reports.	Open and effective communication channels exist at all times to transfer EVMS information in an efficient and expedient manner. Communication is important for building and maintaining a productive interface between the project/program and EVMS stakeholders including consistent terminology. A communication plan with stakeholders is identified, including clear milestones for involving specific stakeholders as needed. The availability of metrics and reports allows management, both customer and contractor, visibility into the project/program's current state. For example, realistic status / Estimates at Completion (EACs) are communicated at all levels internally and externally. As required by the contract, the project/program clearly identifies and communicates required metrics and reports for the EVMS in meaningful language and terms understandable by all parties. These metrics and reports are produced in a timely manner to communicate any existing significant variances and anomalies to support effective management decision-making. Moreover, conflict resolution practices and procedures are in place and actively utilized.

3. Practices		
Factor	**Title**	**Description**
3e.	**Effective oversight is in place and used**, including internal and external surveillance and independent reviews.	Practices are in place and used for effective oversight of the EVMS by an independent entity throughout the project/program lifecycle to ensure that the project/program moves in the right direction. Evaluations of EVMS practices and sub-processes including those used to assess EVMS implementation efficacy and/or compliance to standards are regularly performed and trends evaluated. These practices include adequate resources and management commitment to support both internal and external data-driven surveillance and independent reviews. Oversight is many times driven by contract requirements and agreements in place between customer and contractor. One type of independent assessment is having an internal, administratively independent oversight team or organization (e.g., audit, financial, project/program controls) provide this input. Conversely, an organization external to the program may be tasked to perform this type of oversight to provide the opportunity to impact change. Independent, external assessment and evaluation are important because they help remove conflicts of interest and identify other issues that may not be evident to the project/program team. Effective oversight and surveillance practices help ensure that the project/program maintains self-governance and leads to corrective action and continuous improvement.

3. Practices		
Factor	**Title**	**Description**
3f.	**Contractual terms and conditions** that impact the effectiveness of EVMS **are known and have been addressed**.	Contractual terms and conditions (e.g., contract type and associated risk, use of agile, fast-tracking, large number of changes, and late requirements to use an EVMS) are known, and those that are not appropriate or conflicting with EVMS have been addressed as early as possible. In some cases, contract terms and conditions can limit the effectiveness of EVMS application. For instance, the contractual terms and conditions for EVM may not be appropriate for the contract scope (e.g., the contractor is required to implement a full EVMS on a relatively small, simple maintenance program). The contract award fee or incentives are based on the acceptable implementation and use of the EVMS and current, accurate, and complete performance data for proactive management, in addition to meeting target milestones or deliverables. Contract award fee or incentives are not tied solely to performance thresholds. This factor also considers the extent to which terms and conditions are actively enforced and strictly interpreted. Contractual terms and conditions are identified, including the responsibility for implementation and maintenance of EVMS, and the project/program is proactively addressing any limitations within the EVMS structure (e.g., overlap of responsibilities, mismatch of business rhythm versus capability, contract time is not conducive to project objectives and so forth). Contract modifications are reviewed to ensure that their impact on EVMS is addressed, especially changes made late in the project/program's life.

3. Practices		
Factor	**Title**	**Description**
3g.	Appropriate **Subject Matter Expert (SME) input** is adequate and timely.	Appropriate SME input is utilized in a timely, effective and efficient manner, supporting the project/program execution team's needs. SMEs are typically external to the project/program and have experience and expertise in certain domains of knowledge critical for EVMS success. They can be used for independent assessment or reviews (e.g., Non-Advocate Reviews (NARs)) or as a "time-shared" resource split between two or more projects/programs. Individual SMEs may cover one or more functional areas, as needed. With the significant input of appropriate SME knowledge, lessons learned are leveraged and obstacles that typically hinder the use of EVMS are identified well in advance to facilitate timely and consistent use of data, enhancing management decision-making.

3. Practices		
Factor	**Title**	**Description**
3h.	**Coordination exists** between the key disciplines involved in implementing and executing the EVMS.	A formal structure of interaction between the key disciplines involved in implementing and executing the EVMS enables them to coordinate and integrate EVMS effectively with other project/program management activities. Key disciplines could include accounting, engineering, project management, procurement, supply chain integration, and others. Specifically, a cross-discipline coordination and collaboration plan exists and is followed, to assist discipline leads, compliance reporting, audits, etc. This plan, along with a responsibility matrix, is used to coordinate efforts between the customer, contractor, and external stakeholders. Typically, the coordination and collaboration plan is part of the project/program execution plan and must be updated as changes occur.

4. Resources (6 factors)

The resources category addresses the availability of key tools, data, funding, time, personnel, and technology/ software to support the EVMS sub-processes.

4. Resources		
Factor	**Title**	**Description**
4a.	**Adequate technology/software and tools are integrated and used** for the EVMS.	Technology/software and tools are available, accessible, current, and used appropriately as part of the integrated EVMS. Appropriate investments are made in technology and infrastructure including investments in EVMS tools to assist in the actual operation of work, making decision-making and data-sharing more effective. The necessary expertise (e.g., programmers, systems analysts, etc.) is available to integrate the technology and processes and setup the interfaces between the various tools to ensure smooth integration and minimize the need for major change. Technology and processes are periodically assessed both for adequacy and potential solutions available in the marketplace. Software products can be "homegrown" internally or a commercial system provided by a vendor with adequate support. Technology/software is affected by the extent to which the tools are automated versus needing manual data input. The technology/software allow the project/program to completely integrate its EVMS sub-processes with its other digital infrastructure systems, creating a meta-system of connected processes and tools that communicate with each other, preferably automatically. Software and tools are in place to generate all of the necessary reports, charts, and data from the summary, total program and project levels down through the Work Breakdown Structure (WBS) and Organization Breakdown Structure (OBS) and down to the Work Package (WP)/task level. Essentially, it provides the ability to drill down through the data and summarize data up to the portfolio level.

4. Resources		
Factor	**Title**	**Description**
4b.	**Sufficient funding is committed** and available **for implementing and executing the EVMS**.	Sufficient funds are allocated and available to appropriately support the EVMS process for all directly involved in the project/program from initiation until the final EVMS deliverables. In some cases, the project/program is sufficiently funded however the EVMS is not funded sufficiently for implementation and execution. In other cases, though not generally acceptable, the project/program is not sufficiently funded at initiation to meet the project/program baseline requirements. In some situations, funding is provided on a year-to-year basis which can cause continuity concerns. In any of these cases, the EVMS effort may be severely affected. Sufficient funding requires up-front organizational allocation and commitment to accomplish EVMS requirements; funding is applied strategically and efficiently, using industry benchmarks or standards where appropriate for comparison. Funding is also available for non-project/program-specific external resources to allow the project/program to support internal and external surveillance, training, lessons learned, corrective action plans, and other needs. External resources outside of the project/program can flexibly provide surge capacity, independent assessment, or specialized knowledge on an as-needed basis either in implementing or executing an efficient and effective EVMS.

4. Resources		
Factor	**Title**	**Description**
4c.	The team that implements and executes the EVMS for the project/program is adequate in **size and composition**.	The team that implements and executes the EVMS for the project/program is adequate in size and composition to efficiently support the project/program, adjusted as needed. The customer and contractor organizations have committed time and resources to efficiently and effectively use EVM results, ensuring that decision-making is timely and informed. Customer and contractor organizational staffing levels are in place and adequate to execute scope and workflow successfully, including staffing levels to effectively implement the EVMS. This includes individuals from the project/program, corporate EVMS oversight, consultants, customer, project controls, contracts, finance and procurement offices, and so forth. It has the appropriate expertise, authority, and experience, with size and composition comparable to industry benchmarks where appropriate.

4. Resources		
Factor	**Title**	**Description**
4d.	**Sufficient calendar time and workhours are committed and available** for implementing and executing the EVMS.	Sufficient working days and workhours are committed and available for all directly and indirectly involved in appropriately implementing and executing the project/program's EVMS. The magnitude of effort to perform the EVMS function is known and resources to perform the effort is available when needed. This allocation of time and workhours allows adequate effort based on the size and complexity of the project/program. It requires organizational prioritization and commitment of resources to accomplish EVMS requirements, as well as sufficient notification to assign the resources. For example, this requires the commitment of functional managers and program specific managers to have individuals available for the effort and dedicate key personnel's time to support the EVMS.

4. Resources		
Factor	**Title**	**Description**
4e.	**Data are readily available** to populate EVMS tools supporting analyses for decision-making.	Data are readily available and accessible in a consistent and timely manner according to the business rhythm. It should be shared effectively and efficiently, and support analyses to properly manage the project/program. These data are current, accurate, complete, repeatable, auditable, and contextualized to aid understanding which leads to effective, timely, and informed decision-making at all levels. Data also meet applicable EVM reporting requirements, such as file type, format, and so on.

4. Resources		
Factor	**Title**	**Description**
4f.	The **project/program utilizes an appropriate periodic cycle** for executing the EVMS effectively and efficiently.	The EVMS is executed in a cycle time that is appropriate to control the project/program effectively and efficiently, according to the business rhythm calendar per the contract requirements. The appropriate periodic cycle is used to assess and prioritize workflow, ensuring demand is balanced against the capacity of the EVMS, which helps effectively plan, forecast, and allocate resources. This allows EVMS personnel and management to proactively address any issues that may occur. The same periodic cycle is followed by subcontractors, accounting, procurement, contracting and others, as required.

Appendix G: Facilitation Instructions

Use of a facilitator external to the project (i.e., a person who is not directly involved with the project/program and thus independent) to help the team assess their project/program has proven to be an essential ingredient in ensuring that the IP2M METRR assessment session is effective. The facilitator, who may be internal to the organization or an outside consultant, should be experienced in EVMS and have excellent facilitation skills. The following issues should be addressed by the facilitator to prepare for and conduct the IP2M METRR assessment.

Pre-meeting Activities

The facilitator should establish a meeting with the project/program manager, or leadership, to receive a briefing on the nature and current status of the project/program to be evaluated as well as its prior EVMS surveillance review and performance regarding corrective actions. The objective of this initial meeting is to learn enough about the project/program, so that the facilitator can later ask intelligent/probing questions of the project/program team members while conducting the session. Many times, the "open ended" discussions concerning key attributes and factors provides the most value when conducting an IP2M METRR assessment. Therefore, it is the responsibility of the facilitator to ask the types of questions that will result in an open discussion. Gaining some insight prior to the assessment helps in this regard.

This meeting also serves as a good time to preview the IP2M METRR maturity attributes to see if some of them do not apply to the project/program at hand. In some cases, it is obvious that some of the attributes do not apply, and these can be removed in advance to save the team some time during the assessment.

The facilitator should inform the project/program manager that this is their opportunity to listen to the team members to see how well they understand gaps in the EVMS. The project/program manager should work with the facilitator to probe the leadership team and the customer to ensure a clear two-way understanding of EVMS implementation requirements and expectations. If the project/program manager dominates the discussion, and subsequent scoring, the rest of the EVMS team may quickly "clam up" and fall in line, resulting in an assessment that reflects the understanding of the project/program manager, not the team members, and therefore should be avoided.

The facilitator should remind the project/program manager that the IP2M METRR assessment session is an opportunity to team-build and align the team members on the critical requirements for the project/program. Experience has shown that, if an in-person assessment is possible, serving food (perhaps lunch or breakfast) can help to increase participation as well as interaction between team members.

The facilitator and project/program manager should discuss the key stakeholders who should attend the session and ensure that all key stakeholders are in attendance. Reducing the number of attendees may make the session go more efficiently, but it also may compromise the ability to identify key issues during the

IP2M assessment. Work with the project/program manager to send out meeting notices in time for the major stakeholders to be able to attend.

Once the depth and breadth of the assessment has been determined, preparatory training should be held by the facilitator (or designee) to introduce the project/program team to EVMS maturity attributes and environmental factors. This will act to prepare the project/program team for the execution of the IP2M METRR assessment.

Logistics

In the case of an in-person assessment, the facilitator should ensure that the meeting room is large enough to accommodate the key project/program stakeholders in comfort. The seating arrangements should be set up so that participants are facing one another if possible. The most common method of assessment is to utilize a computer projector to keep score as assessment progresses. Therefore, a room with a screen, computer, and projector would be needed. The IP2M METRR assessment can be conducted manually as well. When conducting manually, each participant will require a copy of the score sheets, attribute descriptions, and factor descriptions, so they can follow along. Recently, assessment sessions have also been conducted virtually through video conferencing and have the tool as well as the descriptions shown on a shared screen by the facilitator and/or scribe.

Depending on the complexity of the project/program and familiarity of the participants with the process, a maturity assessment session can take approximately three to five hours, while an environment assessment session can take approximately two to three hours per project/program. It is advised to conduct these two sessions on separate days to maintain participants' full focus. An inexperienced team, or a very complex project/program, may well take the full time allotted. As teams within an organization get accustomed to the IP2M METRR sessions, the time will decrease. However, it is the discussion occurring during the assessment session that is perhaps its most important benefit. Do not allow an artificial time limit to restrain the open communications between team members.

Some organizations conduct the sessions over an extended lunch period. In these situations, it is best to start with a short lunch period as an ice breaker, then conduct the session. For in-person assessments, the facilitator should ensure that the room is set up in advance. Below are some tips based on prior experience:

- Make sure the computer, projector, and programs are functioning.
- Make sure a flip chart is available.
- Set up the notes and Action Items pages.
- Make sure all participants have the proper handouts.

- When using the automated IP2M METRR scoring programs, make sure the operator is skilled. Lack of computer skills and preparation can lead to ineffectiveness.
- Ensure the programs are loaded and working prior to the session.
- Identify a scribe to capture actions on a flip chart as the session progresses.

In some cases, assessment sessions may be conducted virtually via videoconferencing platforms. Many of the same implementation recommendations apply. The main point is making sure everyone has access to videoconferencing and the IP2M METRR software, and that the facilitator makes sure everyone is participating. More details about remote sessions are provided in Gibson et al. 2022 (Report 7).

Participants

Suggested participants in the assessment session may include:

- Business Operations Manager
- Central Planning Manager
- Change and Claims Manager
- Compliance Manager
- Consultant
- Contractor
- Control Accounts Manager
- Corporate Supervisor
- Director for Earned Value Management
- Engineer and Systems Engineer
- Executive or Senior Manager
- EVMS Manager
- Finance Manager
- Logistics Manager
- Planning, Performance, and Quality Manager
- Planning, Scheduling, and Controls Manager
- Project/Program Analyst
- Project/Program Controls Manager
- Project/Program Integrations Manager
- Project/Program Manager
- Project/Program Management Functional Risk Lead Manager
- Project/Program Support Services Manager

- Risk Manager
- Schedule Manager
- Senior Financial Analyst
- Staff Manager of Surveillance for EVMS
- Subcontracts Manager

Participants should come prepared to actively engage in the assessment. Typically, this can be facilitated by sending out the IP2M METRR assessment sheets and attribute and factor descriptions ahead of time with a pre-reading assignment. Expectations of participants include:

- All should be prepared to discuss their understanding and concerns of the attributes and factors that apply to them.
- Customer representatives should voice their expectations and question the IP2M team to ensure understanding.

Roles and responsibilities during the assessment session should include the project/program manager assisting the facilitator to probe the team members for answers and insight. The facilitator will ensure that everyone has an opportunity to voice their opinions and concerns. While conducting the session, the following practices are recommended:

- The facilitator should provide the team members with a short overview of the IP2M METRR.
- The facilitator or project/program manager should define the purpose of the assessment session.
- The project/program manager should give a quick update of the project/program and its status, including EVMS validation progress supporting the surveillance and corrective actions.
- The facilitator should explain the scoring mechanism and explain that the evaluation is not a democratic exercise, rather it is a consensus activity for maturity, and usually an anonymous individual activity for environment. The facilitator should guide the assessment team in reaching consensus, and when in doubt always push towards the more conservative assessment of the attribute or factor, and capture gaps that were identified.
- The facilitator should explain that certain attributes and/or factors may apply more to certain team members or stakeholders as part of preparatory training. For these

attributes or factors, make sure that these key stakeholders have the greatest say in deciding on the level of maturity and/or environment.

- The facilitator should keep the session moving and not allow the participants to "bog down." Many times, the participants want to "solve the problem" during the assessment session. Do not allow this to happen. Remember, the session is to perform a detailed assessment only, so that gaps can be uncovered; corrective actions can be performed later.
- The facilitator should always challenge assumptions and continue to ask the question, "Is the material in writing?" to ensure that adequate documentation exists to back up the answers.
- The facilitator should work with the team to establish ground rules and assumptions prior to starting the assessment.

The six main objectives of an assessment session are as follow:

1. Capture the maturity level for each attribute.
2. Capture the level of each environment factor.
3. Capture significant comments from open discussions.
4. Capture gaps and action items.
5. Ensure that the team understands the status and agrees with the path forward.
6. Create alignment among the session attendees.

Post-session activities and responsibilities/expectations after the session has concluded include the facilitator ensuring that the IP2M METRR notes, action items, and scorecard are published within two weeks of the sessions; the ideal target is 1 week. The facilitator should stay engaged with the team if possible, to ensure that all action items are completed as required to support the EVMS validation process. The project/program manager should ensure that the actions indeed have been addressed, and may request a follow-up session after a certain period (for instance, 6 months) to measure improvements.

Appendix H: Instructions for Using the IP2M METRR Software

This appendix has been replaced by a full stand-alone annex to this report that details the instructions for using the software, organized by instructions for (1) users, (2) facilitators, and (3) administrators. The document has been named *Report 6 Annex C: IP2M METRR Software User's Guide* and will be posted on the same website.

Appendix I: Example Action List

This appendix first provides a blank template for an action list that is typically developed as part of the IP2M METRR assessment, then provides an example that describes gaps identified by the participants of the project/program discussed in Appendix J.

Low IP2M Maturity Attributes			
Attribute	**Attribute title**	**Maturity level**	**Gaps**
Sub-process *x. Sub-process title*			
And so on….			

Poor IP2M Environment Factors			
Factor	**Title**	**Factor level**	**Gaps**
And so on….			

This example action list describes gaps identified by the participants of the example project discussed in Appendix J.

Low Maturity IP2M Attributes			
Attribute	**Attribute title**	**Maturity level**	**Gaps**
Sub-process A. Organizing attributes			
A3	Organizational Breakdown Structure (OBS)	Level 3	• There are some gaps in connecting the OBS and related information to everyone.
A4	Integrated System with Common Structures	Level 2	• There are some issues regarding the integration of the system.
Sub-process C. Budgeting and Work Authorization attributes			
C1	Scope, Schedule, and Budget Alignment	Level 2	• Some alignment issues at the CA level; budgets not aligned; integration is an issue.
And so on….			

Poor Environment IP2M Factors			
Factor	**Title**	**Factor level**	**Gaps**
1d	Project/program leaders make timely and transparent decisions informed by the EVMS.	Needs improvement	• Project decisions are not always timely from customer to contractor to subcontractor and back. Critical baseline changes are not timely.
1e	The project/program leadership effectively manages and controls change using EVMS, including corrective actions and continuous improvement.	Meets some	• Project understanding, organization, and communication are lacking impacting effective teamwork.
And so on….			

Appendix J: Sample of a Completed IP2M METRR Assessment

Example Project: Construction Project

Project Type:	Construction
Project:	Demolition and infrastructure
Scope:	Demolition, water tank and infrastructure, core facilities, lodging, and vehicle equipment operations
IP2M Raw Maturity Score: **IP2M Adjusted Maturity Score:**	654 687
IP2M Environment Score:	539
Budget:	$410 million
Project Duration: years to complete	Project started in 2019 and expected to take up to 10
Date Scored:	June 2021
Objectives of the Assessment:	Use IP2M METRR on our project to assess IP2M maturity and environment and identify gaps for improvement.
Methodology:	The project team evaluated each maturity attribute and environment factor and scored the project accordingly. Consensus was reached for Maturity scores. Individual inputs were collected for Environment scores and analyzed by the facilitator anonymously.
Project Status:	5% complete
Performance Data:	N/A.
Major Findings/Areas for Further Study:	Integration and customer constraints should be addressed. Resources need more work.

Example Project: Aerospace Project

Completed IP2M METRR Maturity Assessment

SUB-PROCESS A: ORGANIZING								
Attribute	**Maturity Level**						**Score**	**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**		
A.1. Product-Oriented Work Breakdown Structure (WBS)		0	5	11	(16)	22	16	
A.2. Work Breakdown Structure (WBS) Hierarchy		0	5	10	(14)	19	14	
A.3. Organizational Breakdown Structure (OBS)		0	4	(7)	11	14	7	
A.4. Integrated System with Common Structures		0	(6)	11	17	23	6	
A.5. Control Account (CA) to Organizational Element		0	4	(9)	13	18	9	
Maximum Column Totals		**0**	**24**	**48**	**71**	**96**	**52**	

SUB-PROCESS B: PLANNING AND SCHEDULING								
Attribute	**Maturity Level**						**Score**	**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**		
B.1. Authorized, Time-Phased Work Scope		0	6	11	(17)	22	17	
B.2. Schedule Provides Current Status		0	6	11	(17)	22	17	
B.3. Horizontal Integration		0	5	(10)	15	21	10	
B.4. Vertical Integration		0	5	10	(14)	19	14	
B.5. Integrated Master Schedule (IMS) Resources		0	(4)	9	13	17	4	
B.6. Schedule Detail		0	5	(9)	14	18	9	
B.7. Critical Path and Float		0	7	(13)	20	27	13	
B.8. Schedule Margin (SM)		0	2	(5)	7	10	5	
B.9. Progress Measures and Indicators		0	5	(11)	16	21	11	
B.10. Time-Phased Performance Measurement Baseline (PMB)		0	6	(13)	19	25	13	
Maximum Column Totals		**0**	**51**	**102**	**152**	**202**	**113**	

SUB-PROCESS C: BUDGETING AND WORK AUTHORIZATION								
Attribute	**Maturity Level**						**Score**	**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**		
C.1. Scope, Schedule and Budget Alignment		0	(5)	11	16	22	5	
C.2. Summary Level Planning Packages (SLPPs)		0	2	3	5	(6)	6	
C.3. Work Authorization Documents (WADs)		0	4	8	(13)	17	13	
C.4. Work Authorization Prior to Performance		0	3	6	9	(12)	12	
C.5. Budgeting by Elements of Cost (EOC)		0	4	8	12	(16)	16	
C.6. Work Package Planning, Distinguishability, and Duration		0	4	(8)	12	16	8	
C.7. Measurable Units and Budget Substantiation		0	4	(7)	11	15	7	
C.8. Appropriate Assignment of Earned Value Techniques (EVTs)		0	5	10	15	(20)	20	
C.9. Identify and Control Level of Effort (LOE) Work Scope		0	3	7	(10)	13	10	
C.10. Identify Management Reserve (MR) Budget		0	4	8	(12)	17	12	
C.11. Undistributed Budget (UB)		0	3	6	(8)	11	8	
C.12. Reconcile to Target Cost Goal		0	3	7	(10)	13	10	
Maximum Column Totals		**0**	**44**	**89**	**133**	**178**	**127**	

SUB-PROCESS D: ACCOUNTING CONSIDERATIONS								
Attribute	**Maturity Level**						**Score**	**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**		
D.1. Direct Costs		0	4	9	(13)	17	13	
D.2. Actual Cost Reconciliation		0	5	9	(14)	18	14	
D.3. Recording Direct Costs to Control Accounts (CAs) and/or Work Packages (WPs)		0	5	(9)	14	18	9	
D.4. Direct Cost Breakdown Summary		0	3	6	9	(12)	12	
Maximum Column Totals		**0**	**17**	**33**	**50**	**65**	**48**	

SUB-PROCESS E: INDIRECT BUDGET AND COST MANAGEMENT								
Attribute	**Maturity Level**						**Score**	**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**		
E.1. Indirect Account Organization Structure		0	3	6	9	(12)	12	
E.2. Indirect Budget Management		0	4	8	12	(16)	16	
E.3. Record/Allocate Indirect Costs		0	3	7	10	(14)	14	
E.4. Indirect Variance Analysis		0	3	7	10	(13)	13	
Maximum Column Totals		**0**	**13**	**28**	**41**	**55**	**55**	

SUB-PROCESS F: ANALYSIS AND MANAGEMENT REPORTING								
Attribute	**Maturity Level**						**Score**	**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**		
F.1. Calculating Variances		0	4	8	12	(17)	17	
F.2. Variances to Control Accounts (CAs)		0	5	10	(15)	19	15	
F.3. Performance Measurement Information		0	5	10	(16)	21	16	
F.4. Management Analysis and Corrective Actions		0	7	(13)	20	26	13	
F.5. Estimates at Completion (EAC)		0	6	(13)	19	26	13	
Maximum Column Totals		**0**	**27**	**54**	**82**	**109**	**74**	

SUB-PROCESS G: CHANGE CONTROL								
Attribute	Maturity Level						Score	Comments
	N/A	1	2	3	4	5		
G.1. Controlling Management Reserve (MR) and Undistributed Budget (UB)		0	5	11	16	(21)	21	
G.2. Incorporate Changes in a Timely Manner		0	6	(11)	17	23	11	
G.3. Baseline Changes Reconciliation		0	5	(10)	15	20	10	
G.4. Control of Retroactive Changes	X	0	5	9	14	19	N/A	
G.5. Preventing Unauthorized Revisions to the Contract Budget Base (CBB)/Project Budget Base (PBB)	X	0	5	10	16	21	N/A	
G.6. Over Target Baseline (OTB)/Over Target Schedule (OTS) Authorization		0	3	6	9	(12)	12	
Maximum Column Totals		**0**	**29**	**57**	**87**	**116**	**54**	

SUB-PROCESS H: MATERIAL MANAGEMENT								
Attribute	Maturity Level						Score	Comments
	N/A	1	2	3	4	5		
H.1. Recording Actual Material Costs		0	4	8	12	(15)	15	
H.2. Material Performance		0	4	8	11	(15)	15	
H.3. Residual Material		0	(2)	5	7	9	2	
H.4. Material Price/Usage Variance		0	3	6	(9)	12	9	
H.5. Identification of Unit Costs and Lot Costs	X	0	2	4	6	8	N/A	
Maximum Column Totals		**0**	**15**	**31**	**45**	**59**	**41**	

SUB-PROCESS I: SUBCONTRACT MANAGEMENT								
Attribute	**Maturity Level**						**Score**	**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**		
I.1. Subcontract Identification and Requirements Flow Down		0	5	9	(14)	19	14	
I.2. Subcontractor Integration and Analysis		0	6	11	(17)	22	17	
I.3. Subcontract Oversight		0	5	9	(14)	19	14	
Maximum Column Totals		**0**	**16**	**29**	**45**	**60**	**45**	

SUB-PROCESS J: RISK MANAGEMENT								
Attribute	**Maturity Level**						**Score**	**Comments**
	N/A	**1**	**2**	**3**	**4**	**5**		
J.1. Identify and Analyze Risk		0	8	16	(24)	32	24	
J.2. Risk Integration		0	7	14	(21)	28	21	
Maximum Column Totals		**0**	**15**	**30**	**45**	**60**	**45**	

IP2M Maturity raw score is transformed to IP2M maturity adjusted score by the following formula:

$$\frac{\text{IP2M maturity raw score}}{1000 - \sum \text{maturity level 5 scores of the attributes assessed as "N/A"}} \times 1000 = \frac{654}{1000 - (19 + 21 + 8)} \times 1000 = 687$$

IP2M MATURITY TOTAL SCORE **687**

(Maximum Score = 1000)

Example Project: Aerospace Project

Completed IP2M METRR Environment Assessment

1. **Culture:** the culture category addresses those issues that impact the project/program culture. Culture is, by definition, the display of behaviors. Organizational culture is a system of common assumptions, values and beliefs (or the lack thereof) that governs how people behave in organizations. Organizational values and beliefs should align with the development and outcomes of a successful EVMS. The project/program culture can enable or hinder the effectiveness of the EVMS.							
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing	Score	Comments
1a. The **contractor organization is supportive and committed** to EVMS implementation, including making the necessary investments for regular maintenance and self-governance.	0	19	(39)	58	78	39	
1b. The project/program **culture fosters trust, honesty, transparency, communication, and shared values** across functions.	0	15	(30)	45	60	30	
1c. The **customer organization is supportive and committed** to the implementation and use of EVMS.	0	14	(27)	41	54	27	
1d. Project/program leaders make **timely and transparent decisions** informed by the EVMS.	0	(12)	24	36	48	12	
1e. The project/program **leadership effectively manages and controls change** using EVMS, including corrective actions and continuous improvement.	0	8	(16)	24	32	8	
1f. **Effective teamwork exists,** and team members are working synergistically toward common project/program goals.	0	5	11	(16)	22	16	
1g. **Alignment and cohesion exist among key team members** who implement and execute EVMS, including common objectives and priorities.	0	5	(9)	14	19	9	
Maximum Column Totals	**0**	**78**	**156**	**234**	**313**	**141**	

2. **People:** the people category addresses the individuals who represent the interests of their respective stakeholders (e.g., project business manager, project control analyst, project schedule analyst, acquisitions/subcontracts, control account manager, Integrated Project/Program Team (IPT) or line/resource management) and are adept in the relevant subject matter, in order to contribute to the process that leads to favorable project control outcomes.							
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing	Score	Comments
2a. The **contractor team is experienced and qualified** in implementing and executing the EVMS.	0	17	(34)	50	67	34	
2b. The **customer team is experienced** in understanding and using EVM results to inform decision-making.	0	13	(27)	40	54	27	
2c. Project/program **leadership is defined, effective, and accountable**.	0	12	25	(37)	49	37	
2d. **Project/program stakeholder interests are appropriately represented** in the implementation and execution of the EVMS**.**	0	8	(17)	25	34	17	
2e. **Professional learning and education** of key individuals responsible for EVMS implementation and execution, **is appropriate** to meet project/program requirements.	0	(6)	13	19	25	6	
2f. **Team members** responsible for the EVMS implementation and execution phases **are co-located and/or accessible**.	0	2	5	(7)	9	7	
Maximum Column Totals	**0**	**58**	**121**	**178**	**238**	**128**	

3. **Practices:** the practices category addresses internal and external procedures and processes that can positively or negatively influence the outcome of a project or program. Internal business practices and methods are specific to a given organization, including internal standards, requirements and best practices. External business practices, regulations, requirements, procedures and methods are across organizational boundaries (e.g., government to contractor, software provider to contractor, subcontractor to prime, and so forth).							
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing	Score	Comments
3a. The project/program **promotes and follows standard practices** to implement and execute an EVMS.	0	11	(22)	33	44	22	
3b. **EVMS requirements definition is in place, and agreement exists** among key stakeholders and customer.	0	11	(22)	33	44	22	
3c. **Roles and responsibilities are defined**, **documented and well-understood** for implementing and executing EVMS.	0	9	18	27	(35)	35	
3d. **Communication is open and effective**, including consistent terminology, metrics, and reports.	0	8	(16)	24	31	16	
3e. **Effective oversight is in place and used**, including internal and external surveillance and independent reviews.	0	7	15	(22)	30	22	
3f. **Contractual terms and conditions** that impact the effectiveness of EVMS **are known and have been addressed**.	0	7	(15)	22	30	15	
3g. Appropriate **Subject Matter Expert (SME)** input is adequate and timely.	0	3	(6)	9	12	6	
3h. **Coordination exists** between the key disciplines involved in implementing and executing the EVMS.	0	2	(4)	7	9	4	
Maximum Column Totals	**0**	**58**	**118**	**177**	**235**	**142**	

4. **Resources:** the resources category addresses the availability of key tools, data, funding, time, personnel, and technology/ software to support the EVMS sub-processes.							
Factors for Review	Not Acceptable	Needs Improvement	Meets Some	Meets Most	High Performing	Score	Comments
4a. **Adequate technology/software and tools are integrated and used** for the EVMS.	0	12	(23)	35	47	23	
4b. **Sufficient funding is committed** and available **for implementing and executing the EVMS**.	0	9	(18)	28	37	18	
4c. The team that implements and executes the EVMS for the project/program is adequate in **size and composition**.	0	9	(18)	26	35	18	
4d. **Sufficient calendar time and workhours are committed and available** for implementing and executing the EVMS.	0	8	17	(25)	34	25	
4e. **Data are readily available** to populate EVMS tools supporting analyses for decision-making.	0	8	(17)	25	34	17	
4f. The **project/program utilizes an appropriate periodic cycle** for executing the EVMS effectively and efficiently.	0	7	14	20	(27)	27	
Maximum Column Totals	**0**	**53**	**107**	**159**	**214**	**128**	

IP2M ENVIRONMENT TOTAL SCORE **539**

(Maximum Score = 1000)

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Related Documents

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Report 2: Aramali, V., G. E. Gibson Jr, M. El Asmar, and N. Cho. 2021. "Earned value management system state of practice: Identifying critical subprocesses, challenges, and environment factors of a high-performing EVMS." *J. Manage. Eng.* 37 (4): 04021031. https://doi.org/10.1061/(ASCE)ME.1943-5479.0000925.

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