DATA ITEM DESCRIPTION

TITLE: INTEGRATED MASTER SCHEDULE (IMS)
NUMBER: DI-MGMT-81650   **APPROVAL DATE:** 20050330
AMSC NUMBER: D7544   **LIMITATION:**
DTIC APPLICABLE: **GIDEP APPLICABLE:**
PREPARING ACTIVITY: OUSD(AT&L)ARA/AM(SO)

APPLICABLE FORMS: None

USE/RELATIONSHIP: The Integrated Master Schedule (IMS) is an integrated schedule containing the networked, detailed tasks necessary to ensure successful program execution. The IMS is vertically traceable to the Integrated Master Plan (IMP) (if applicable), the Contract Work Breakdown Structure (CWBS), and the Statement of Work (SOW). The IMS shall be used to verify attainability of contract objectives, to evaluate progress toward meeting program objectives, and to integrate the program schedule activities with all related components. This DID is applicable to development, major modification, and low rate initial production efforts; it is not typically applied to full rate production efforts.

a. This Data Item Description (DID) contains the format and content preparation instructions for the data product generated by the specific and discrete task requirement as delineated in the contract.

b. This DID shall be applied to contracts that require Earned Value Management (EVM) and other contracts based on the contract risk assessment. Refer to the Earned Value Management Implementation Guide (EVMIG) for guidance on tailoring reporting.

c. The prime contractor is required to include significant external interfaces and critical items from suppliers, teammates, or other detailed schedules that depict significant and/or critical elements and Government furnished equipment or information dependencies for the entire contractual effort in a single integrated network. The determination of significant and critical shall be agreed to by the Government and the contractor and shall be defined and documented in the Contract Data Requirements List (CDRL).

d. The IMS shall be statused according to the contractor's management control system and shall be submitted no less frequently than monthly. If a Contract Performance Report (CPR) is required, the IMS shall be statused and submitted to the procuring activity prior to or concurrently with CPR Formats 1-5 (as applicable). The IMS may reflect data either as of the end of the calendar month or as of the contractor's accounting period cutoff date, provided it is consistent and traceable to the CPR (if applicable). When subcontractor schedule data reflects a different status date than the prime contractor's schedule status date, these status dates shall be described in the analysis section of the IMS.

e. This DID shall be used in conjunction with the CWBS DID, DI-MGMT-81334A, and the CPR DID, DI-MGMT-81466. (Note: The IMS DID may be required when there is no EVM (CPR) requirement.)

REQUIREMENTS:

1. <u>Format</u>. The IMS shall be created using a network capable Commercially Off the Shelf (COTS) scheduling software application. Unless otherwise provided in the CDRL, the IMS shall be delivered electronically in the native digital format (i.e., an electronic file produced by the contractor's scheduling

tool). (Note: When the technology is available, the CDRL may be tailored, upon agreement between the prime contractor and the Government representative, to allow the American National Standards Institute (ANSI) X12 standard (806 transaction set), the United Nations Electronic Data Interchange for Administration, Commerce and Transport (UN/EDIFACT) standard (PROTAP message), or the XML equivalent to be used to submit data electronically to the procuring activity with on-line access to the data.)

2. Content. The schedule shall contain the contract milestones, accomplishments, and discrete tasks/activities (including planning packages where applicable) from contract award to the completion of the contract. The schedule shall be an integrated, logical network-based schedule that correlates to the CWBS, and is vertically and horizontally traceable to the cost/schedule reporting instrument used to address variances such as the CPR (if applicable). The schedule shall have a numbering system that provides traceability to the IMP (if applicable) and SOW. It shall contain contractual milestones and descriptions and display summary, intermediate, and detailed schedules, and periodic analysis of progress to date. It shall include fields and data that enable the user to access the information by product, process, or organizational lines.

2.1 Contract Milestones and Definitions. Key programmatic events, which define progress and completion for each CWBS element, along with the definition for successful completion of the milestone.

2.2 Summary Master Schedule. A top-level schedule of key tasks/activities and milestones at the summary level of the CWBS and IMP (if applicable). It shall be an integrated roll up of the intermediate and detailed schedules (see 2.3 and 2.4 below) (vertical integration).

2.3 Intermediate Schedules. Mid-level contract schedules that include key tasks/activities and milestones and all associated accomplishments in the summary master schedule, traceable to the CWBS element or IMP event as necessary to display work effort at the intermediate level of summarization. There may be several intermediate schedules that depict varying levels of detail. They shall be integrated roll ups of the detailed schedules (see 2.4 below) (vertical integration).

2.4 Detailed Schedules. The lowest level of contract tasks/activities that form the network. The detailed schedules shall contain horizontal and vertical integration, as a minimum, at the work package and planning package level. The detailed schedules shall include all tasks/activities, work packages, and planning packages identified in the contract Performance Measurement Baseline (PMB). Every discrete task/activity, work package, and planning package shall be clearly identified and directly related to a control account. Work packages and planning packages shall be individually represented and summarize to or reconcile with the total budget for that control account. If Level of Effort (LOE) control accounts, work packages, or planning packages are included as tasks in the IMS, they shall be clearly identified as such. The detailed tasks/activities, work packages, and planning packages shall be traceable to only one CWBS, IMP, and performing organizational element, as applicable. The level of detail in the IMS (including number and duration of tasks/activities) shall follow the contractor's EVM process as documented in the EVMS system description, program directives, etc. Shorter-term work packages (ideally equal in length to the statusing interval) are preferred because they provide more accurate and reliable measures of work accomplished.

2.4.1 Key Elements of Detailed Schedules. The key elements of the detailed
schedules include the following:

2.4.1.1 Task/Activity. An element of work with duration.

2.4.1.2 Milestone. A specific definable accomplishment in the contract
network, recognizable at a particular point in time. Milestones have zero
duration and do not consume resources.

2.4.1.3 Duration. The length of time estimated (or realized) to accomplish a
task/activity.

2.4.1.4 Percent Complete (Schedule). The proportion of an activity or task
that has been completed to time now. This usually involves updating or
statusing the activity or task utilizing one of two methods: (1) update the
remaining time to complete (remaining duration) and the scheduling software
will then automatically update the schedule percent complete or (2) update the
schedule percent complete and allow the scheduling software to calculate the
time remaining (remaining duration) to complete. Either method will use the
following formula: Percent of Duration Completed = (Actual Duration / Total
Duration) X 100.

2.4.1.5 Task/Activity and Milestone Descriptions. These are descriptive
titles that are concise, complete, and clearly identify the work effort being
accomplished. Abbreviations may be used to shorten the descriptive titles.

2.4.1.6 Task/Activity Codes and Data Dictionary. A list of field definitions
and code structures. This list shall be provided to the procuring activity.

2.4.1.7 Relationship/Dependency. These identify how predecessor and
successor tasks/activities and milestones are logically linked.
Relationships, also called network logic, are modeled in four ways:

2.4.1.7.1 FS (Finish to Start). A predecessor task/activity or milestone
that must finish before a succeeding task/activity or milestone can start. FS
relationships shall be used whenever possible.

2.4.1.7.2 SS (Start to Start). A predecessor task/activity or milestone that
must start before a succeeding task/activity or milestone can start.

2.4.1.7.3 FF (Finish to Finish). A predecessor task/activity or milestone
that must finish before a succeeding task/activity or milestone can finish.

2.4.1.7.4 SF (Start to Finish). A predecessor task/activity or milestone
that must start before a succeeding task/activity or milestone can finish.

2.4.1.8 Total Float/Slack. The amount of time a task/activity or milestone
can slip before it delays the contract or project finish date.

2.4.1.9 Free Float/Slack. The amount of time a task/activity or milestone
can slip before it delays any of its successor tasks/activities or milestones.

2.4.1.10 Lag. An interval of time that must occur between a predecessor and
successor task/activity or milestone. Since negative time is not
demonstrable, negative lag is not encouraged. (Note: Lag should not be used
to manipulate float/slack or constrain schedule.)

2.4.1.11 Early Start (ES). The earliest start date a task/activity or
milestone can begin the precedence relationships. A computer-calculated date.

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2.4.1.12 <u>Early Finish (EF)</u>. The earliest finish date a task/activity or milestone can end. A computer-calculated date.

2.4.1.13 <u>Late Start (LS)</u>. The latest start date a task/activity or milestone can start without delaying the contract or project target completion date. A computer-calculated date.

2.4.1.14 <u>Late Finish (LF)</u>. The latest date a task/activity or milestone can finish without delaying the contract or project target completion date. A computer-calculated date.

2.4.1.15 <u>Critical Path</u>. A sequence of discrete tasks/activities in the network that has the longest total duration through the contract or project. Discrete tasks/activities along the critical path have the least amount of float/slack. The critical path and near-critical paths (reporting requirements for near-critical paths shall be specified in the CDRL) are calculated by the scheduling software application. The guidelines for critical path and near-critical path reporting are as follows:

2.4.1.15.1 <u>Methodology</u>. The IMS software application computes a critical path and near-critical paths based on precedence relationships, lag times, durations, constraints, and status. Artificial constraints and incorrect, incomplete, or overly constrained logic shall be avoided because they can skew the critical path and near-critical paths.

2.4.1.15.2 <u>Identification</u>. The critical path shall be easily identified.

2.4.1.16 <u>Constraints</u>. Limits applied to network start and finish dates (e.g., "finish no later than"). (Note: Certain types of constraints should be used judiciously because they may impact or distort the network critical path.)

2.4.1.17 <u>Current Schedule</u>. The IMS reflects the current status and forecast. It includes forecasted starts and finishes for all remaining tasks/activities and milestones. Significant variances to the baseline schedule shall be explained in the periodic analysis. Thresholds for reporting shall be specified in the CDRL.

2.4.1.18 <u>Baseline Schedule</u>. Baseline dates in the IMS shall be consistent with the baseline dates in the PMB for all work packages, planning packages, and control accounts (if applicable). The guidelines for maintaining the baseline schedule are as follows:

2.4.1.18.1 <u>Schedule Changes</u>. Changes to the schedule shall be baselined when incorporated into the schedule.

2.4.1.18.2 <u>Baseline Schedule Changes</u>. Changes to the baseline schedule shall be made in accordance with the contractor's EVM process. Any movement of contractual milestones in the baseline schedule shall be derived only from either authorized contract changes or an approved over target schedule.

2.4.1.19 <u>Schedule Progress</u>. The IMS shall reflect actual progress and maintain accurate start and finish dates for all tasks/activities and milestones. The guidelines for reflecting schedule progress are as follows:

2.4.1.19.1 <u>Actual Start and Finish Dates</u>. Actual start and actual finish dates shall be recorded in the IMS. Actual start and actual finish dates, as recorded, shall not be later than the status date.

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2.4.1.19.2 <u>Progress Line</u>. The progress line depicted in a Gantt chart shall be applied to the current schedule.

2.4.1.20 <u>Retention of Data for Completed Tasks/Activities</u>. Historical performance on completed tasks/activities shall be maintained electronically for analytical use. Historical performance shall be maintained at the time of key program events (Integrated Baseline Review, Critical Design Review, etc.) for all critical tasks/activities. Data to be retained includes logic, actual and baseline durations, actual and baseline start and finish dates, and the three-point estimates that were used before the task/activity started.

2.4.1.21 <u>External Dependencies</u>. The IMS shall identify significant external dependencies that involve a relationship or interface with external organizations, including all Government furnished items (e.g., decisions, facilities, equipment, information, data, etc.). The determination of significant shall be agreed to by the Government and contractor and shall be defined and documented in the CDRL. The required or expected delivery dates shall also be identified in the IMS.

2.4.1.22 <u>Schedule Margin</u>. A management method for accommodating schedule contingencies. It is a designated buffer and shall be identified separately and considered part of the baseline. Schedule margin is the difference between contractual milestone date(s) and the contractor's planned date(s) of accomplishment.

2.4.1.23 <u>Schedule Risk Assessment</u>. A schedule risk assessment predicts the probability of project completion by contractual dates. Three-point estimates shall be developed for remaining durations of remaining tasks/activities that meet any of the following criteria: (1) critical path tasks/activities, (2) near-critical path tasks/activities (as specified in the CDRL), (3) high risk tasks/activities in the program's risk management plan. These estimates include the most likely, best case, and worst case durations. They are used by the contractor to perform a probability analysis of key contract completion dates. The criteria for estimated best and worst case durations shall be applied consistently across the entire schedule and documented in the contractor's schedule notes and management plan. The guidelines for estimates are as follows:

2.4.1.23.1 <u>Most Likely Estimate</u>. Schedule durations based on the most likely estimates.

2.4.1.23.2 <u>Best/Worst Case Estimates</u>. Best and worst case assumptions shall be disclosed.

The contractor schedule risk assessment shall explain changes to the critical path, margin erosion, and mitigation plans. It shall be incorporated into the contractor's program risk management process. The schedule risk assessment shall be submitted as specified in the CDRL and prior to the Integrated Baseline Review. The risk analysis may be performed within the IMS or within a separate risk tool as appropriate based on the capability of the automated scheduling tool.

2.4.1.24 <u>User Defined Fields</u>. All user defined fields in the IMS shall be identified by providing a mapping of all fields used in the scheduling software application.

2.4.1.25 <u>Reserved Fields</u>. The Government may reserve some fields and/or require the contractor to use certain fields for specific information. The requirement for reserved fields shall be specified in the CDRL.

2.4.1.26 <u>Calendar</u>. The arrangement of normal working days, together with non-working days, such as holidays, as well as special work days (i.e., overtime periods) used to determine dates on which project work will be completed.

2.5 <u>Monthly Analysis</u>. Monthly analysis is a monthly assessment of schedule progress to date and includes changes to schedule assumptions, variances to the baseline schedule, causes for the variances, potential impacts, and recommended corrective actions to minimize schedule delays. The analysis shall also identify potential problems and an assessment of the critical path and near-critical paths. Thresholds for reporting significant variances to the baseline schedule and near-critical paths shall be specified in the CDRL. If a CPR Format 5 is required, the monthly analysis shall be submitted to the procuring activity prior to or concurrently with the CPR Format 5.

END OF DI-MGMT-81650