Extract From:

Easy EVM

Implementing Earned Value Management

using ISO 21508:2018

Easy EVM is a course-in-a-book designed to provide practical guidance to people involved in either implementing, or using information created by an earned value management system. It provides guidance on concepts, responsibilities, integration, and processes for the implementation of earned value management based on ISO 21508: *Earned Value Management in Project and Programme Management*.

See more at: **https://mosaicprojects.com.au/shop-easy-evm.php**

Contingencies are not released until after a risk has occurred and are only released for the defined set of risks used in the determination of the amount of contingency required by the project. The money is not there to cover other issues or to hide negative variances. Creating and using contingencies and the overall management of risk is discussed in Section 5.

2.2.7 The WBS Dictionary

The WBS Dictionary is a document (or database) that describes each component in the WBS in detail, may include:

- The code of accounts identifier (WBS number)

- The 'short description' used in the WBS diagram

- A full description of the element

- What is required to allow the work package to start

- A definition of the deliverables that are to be produced

- Exactly what work will be done (referencing the specification, contract drawings, etc)

- Who is responsible for performing the work (this person or organization, may be internal or external to the performing organization)

- Who is responsible for managing the work (this person must be a manager working for the project manager)

- Who will receive/accept the deliverables and how this will be confirmed (eg, by performing specified acceptance tests)

- How progress will be measured

- Planned and actual data for the element including information from the PMB, and the schedule and cost management systems, including the WBS element's:
  - Start and finish dates
  - Duration
  - Resources, and
  - Distributed cost (or value) information

- Other relevant technical references, standards, operating procedures, etc.

- How the element interfaces to other elements
  - At the same level (inputs from, and outputs to)
  - At the next lower level (Children) if applicable

- Any other relevant information such as HAZOPS[15], security, etc.

The WBS Dictionary has an entry for each element in the WBS, and the contents may vary depending on the WBS level, unnecessary duplication is not recommended. The example below is for a higher-level element:

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[15] HAZOP = A hazard and operability study. This is a structured and systematic examination of a complex planned process or operation in order to identify and evaluate problems that may represent risks to personnel or equipment. The HAZOP documentation defines constraints on the way work will be conducted.

Project: *New Aircraft*	Work Breakdown Structure Dictionary		WBS Element No: *1.3*	
Contract No: *xxx.xxxxxx*			Sheet No: *1*	of: *1* sheets
Checked: Approved: (Date & Signature)	Element Title: *Power and Lighting Subsystem*		Revision No: *original*	
			Date of Revision: *3/9/93*	

Element Description:

The Power and Lighting Subsystem element is a summary element which refers to that equipment which transforms rotary motion from the aircraft engines into electrical power, stores the electrical energy, distributes the electrical power to other elements which use that power and provides and control s illumination internal and external to the aircrft which is not provided by means integral to other equipments.

The element includes all efforts to design, develop, integrate and test the above equipment and the overall Power and Lighting Subsystem.

The element excludes installation and checkout of the Power and Lighting Subsystem into the airframe.

Attach continuation sheet(s) if necessary.

Interfacing Elements at the Same Level

Element No.	Element Title
1.1	*Airframe*
1.2	*Propulsion*
1.4	*Communications*
1.5	*Fittings*
1.6	*Aircraft System Assembly and Integration*

Subordinate Elements at the Next Level

Element No.	Element Title
1.3.1	*Generator No 1*
1.3.2	*Generator No 2*
1.3.3	*Battery Bank*
1.3.4	*Power Cable Loom*
1.3.5	*Light Fitting Set*
1.3.6	*Power and Lighting Subsystem Design*
1.3.7	*Power and Lighting Subsystem Integration*

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2.3 Layering EV and control

EVM cannot offer full control of a project, rather it should from part of an integrated controls system. The elements of an integrated controls system include:

- Processes to define and optimize the project's overall delivery strategy[16]

- Processes to develop and manage the project's cost estimate and budget

- Processes to administer and oversee the payment of invoices and other costs against the authorized budget

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[16] For more on **project strategy**, see: https://mosaicprojects.com.au/WhitePapers/WP1038_Strategy.pdf

5.6.5 Demonstration Review

The focus of a Demonstration Review is to validate the operation of the EVMS, both the people involved in the system and the tools and processes being used. Unlike the IBR which is focused on approving the project baseline, the demonstration review considers the total system with emphasis on how effectively the system operates. It should cover all of the functional areas that are involved in in operating, or interacting with, the EVMS, such as finance, controls, and the project management team. It generally covers five basic elements:

- The overall organization of the project management system, including sponsors, control boards, etc.
- The planning, scheduling and budgeting functions
- The flow of accounting and other information into the EVMS
- The quality and use of management reports and the analysis they contain, and
- The effectiveness of the change management system and data maintenance.

The demonstration review should highlight where the system is working well and address any system deficiencies and opportunities for improvement.

5.7 EV Software and tools

The organization should select a tool for their earned value management system that meets the needs of its projects and programs. Other considerations may include:

a) The need to meet contract or customer specifications for the system

b) Ease of use by the project management teams

c) The need for access by stakeholders beyond the project management teams, and

d) The need for the data to be easily exported to other systems.

Implementing an EVMS is time consuming and relatively expensive in terms of training and skills development, properly designed EVM software significantly reduces these costs and provides access to a rich resource in terms of management information.

It is nearly impossible to run an EVMS in either a scheduling tool, or accounting software[23]. The EVMS needs to be able to draw information from both the schedule and the accounts system but its structure and purpose are different to both.

Some modern integrated tools do have separate functional areas for scheduling, EVM, project cost controls, etc. These tools have the advantage of almost seamless data transfer, while retaining the integrity of each of the different functions. More traditional EVM software is built to import the needed data from a wide range of external systems.

5.7.1 Recommended minimum software requirements

The minimum requirements for an effective EVM tool are:

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[23] For more on the limitation of hybrid systems see **EVM - Six things' people don't get!**:
https://mosaicprojects.com.au/Mag_Articles/AA011_EVM_Things_people_dont_get.pdf

- The ability to construct and maintain a WBS, and WBS Dictionary, independent of other functions such as the schedule and accounting systems; the WBS dictionary should be able to store the information outlined in Section 2.2.7, showing as a minimum the planned (PMB) and current (actual) data, and preferably maintaining an accessible audit trail of changes and updates.

- An integrated log to document the transfer of budget and scope within the WBS:
    - To and from the 'outside of the PMB' into undistributed budget (eg, authorized variations)
    - To and from the 'outside of the PMB' into project reserves (eg, contingency 'top-ups' or draw-downs to compensate for changing risk exposure)
    - To and from the undistributed budget and specific work packages (for the transfer of scope)
    - From the project reserves to specific work packages (to compensate for a risk event)
    - Between specific work packages (eg, the transfer of scope from a planning package into its work packages)

- The ability to import actual cost data from the accounts system and structure the imported cost information to align with the WBS.

- A 'pencil book' to record estimates of undocumented actual cost and to correct the estimate as actual data becomes available from the accounts system.

- A cost adjustment log (which may include the pencil book) to manage and balance the reallocation of actual costs imported from the accounts system to specific work packages.

- The ability to generate and store formatted EVM reports based on the requirements outlined in Section 3.6.3 as a minimum:
    - The WBS (Format 1)
    - The organization's management structure; ie, CBS or OBS (Format 2)
    - Changes in the PMB and forecasts over time (Format 3)
    - Variance analysis reports
    - A problem analysis report (Format 5)

- A full audit trail of changes.

5.7.2 EVM Software

Some of the available integrated EVMS software tools[24] include:

- **Deltek Cobra**: Cobra is a 'high end' system designed for integrating with other systems (accounts schedule, etc), offers flexible reporting, scalability and ease of use. Its open architecture gives you the flexibility to customize the product to fit your organization's

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[24] This list is far from complete and focuses on specialist EVM tools. Many general project management tools have some EVM capability, but lack the reporting and data integration needed to implement a fully functional EVMS. Links are provided for information only, no recommendation is made as to the capability, effectiveness or suitability of the software listed.

For more software options see: https://mosaicprojects.com.au/PMKI-SCH-030.php