

---

# **Establishing an Enterprise Earned Value Management Capability**

**Anne V. Martt  
United Space Alliance, LLC**

**Copyright © 2008 by United Space Alliance, LLC.**



# Establishing an Enterprise EVM Capability

---

- **What is EVM**
- **Who is USA**
- **Background**
  - Past Experience
  - Compelling Need
- **Implementation Approach**
  - Processes
  - Tools
  - People and Projects
- **Other ‘Words of Wisdom’**
- **Going Forward**

# Earned Value Management (EVM) - What It Is

---

- **EVM is a management system that**
  - integrates the committed cost and schedule for a program's work content into a tightly controlled baseline;
  - and quantitatively measures progress towards those commitments
- **EVM is a technique for program/project managers to**
  - objectively measure contract performance,
  - have early identification of variances from the baseline,
  - mitigate risks associated with cost and schedule overruns,
  - and methodically forecast final cost and schedule outcomes
- **EVM is the best known, proven way to integrate:**
  - Content / Schedules / Resources / Risk Management

*Successful EVM is critically dependent on a sound plan*

# EVM – How it Works

---

- **EVM quantitatively measures work accomplished as the basis for variance analysis**
  - Variance is determined by actual work performed vs. actual cost incurred; not planned vs. actual costs for a given elapsed period
- **EVM regularly probes key measurement questions**
  - How much work should have been completed?
  - How much work was completed?
  - How much did the completed & in-process work cost?
  - What is the project risk/opportunity from late or early completion?
  - What is the project risk/opportunity from higher or lower cost for completed work?
  - How much is the total project supposed to cost?
  - What do we estimate the project actually will cost?

# **United Space Alliance**

## **The Space Operations Company**



**Premier provider of space operations services**

**NASA's Prime Contractor for end-to-end Space Shuttle Operations**

**24/7 Operations Support to International Space Station**

**Bringing space operations skills to the Constellation Program**

# EVM at USA – Past Experience

---

- **Pockets of “mini-EVM” throughout the company**
  - Adherence to basic concept; but performed manually on small scale projects
  
- **An EVM System was implemented in 2001-2002 for use on major Space Shuttle Upgrades development projects**
  - Selected program product tool
    - Did so very rapidly; and had to create substantial custom code
  - Baselined ‘System Description Document’, established internal processes, and trained personnel
    - In parallel with initial EVM execution and Integrated Baseline Review
  - Plus had major subcontractors with EV reporting requirements
    - Established roll-up interface while learning EVM ourselves

# EVMS at USA – Compelling Need

---

- **With the 2004 announcement of the ‘Vision for Space Exploration’, NASA entered a major acquisition phase for the first time in decades**
  - Drawing from DoD best practices, EVM is now imposed on virtually all NASA major acquisitions
  
- **USA began an aggressive internal change analysis designed to ensure the long-term viability of the company**
  - A new environment with new customer relationships, new contractual arrangements, and new requirements from both
  - Among the highest priority of many identified major enterprise wide projects was the need for an Enterprise EVM System

# Implementation Approach – 3 Key Components

---

**Tools + Process + People = System**

- **Each component requires unique attention for success**
- **Process and People take the longest to solidify and cultivate**
- **Understanding and documenting the process helps ensure appropriate tool selection**
- **Building all three at the same time should be avoided**
  - **Can be draining and counterproductive for the core team**

# Facing the Biggest Barrier to Success

---

- **Internal politics and “culture” are by far the biggest barriers to adopting change, including new systems**
  - There is a strong resistance to change in most organizations
  - Resistance, many times, stems from the fear of the unknown
  - It is human nature: people tend to blame tools and processes when it is really their own lack of knowledge and understanding
  
- **What worked best in addressing this:**
  - Senior Management commitment – visible and strong
  - Communications – lots of it
  - Training – early and often
  - Core Team with “Help Desk” mentality

# EVMS Implementation – A Full Blown Project

---

- **Project authorized in Feb 2006, to complete in Feb 2007**
  - Project completed (final vendor software installed) in June 2007
  - Project came in 9% under cost
- **Applied sound integrated project management**
  - System requirements definition first
  - High fidelity estimate of cost and schedule
  - Integrated baseline for implementation
  - Assignment of appropriately skilled resources
  - Clear requirements and selection criteria for tool solution
  - Allowance for design cycles
  - EVM and Risk Management

# Enablers to Implementation Success

---

- **Top management was committed to implementation of an Enterprise EVMS**
  - Commitment was regularly communicated
- **Adequate funding was provided**
- **Skilled leadership and expertise resources were assigned**
- **Imminent contractual requirements provided a strong “forcing function”**
- **Development of a structured training program was given high priority**

# Process Definition – Requirements First

---

- **Develop the Process prior to tool selection**
  - Provides context to the tool evaluation and selection
  - Trying to implement tool while defining the process is not cost effective and will delay implementation
- **Beginning EVMS implementation with a (somewhat) proven process is extremely beneficial**
  - However, must be open about changing that process
- **Define Process based on ANSI-748 guidelines**
- **Create Compliance document to map processes to each of the ANSI-748 Guidelines**
  - Provides assurance that the system will be compliant for DCMA validation
  - Map to the ANSI-748 very early in process development
    - Reduces the risk of significant rework later on

# Up Front Definition of the Process

---

- **Create a System Description Document which defines the process in detail**
- **Use flows to define the process based on roles and responsibilities (Pgm Mgr, IPT Lead, Cntl Acct Mgr, etc)**
- **Executive Management ownership**
  - EVMS co-owned by the Program/Project Management Process Owner and the Chief Financial Officer
  - Joint approval authority on the System Description Document
- **Establish highly skilled Core Team**
  - Small number of people, that are experts in EVM and company rates/accounting structures
  - To provide leadership, guidance, assistance – and lots of it!
  - Need the right personality/temperament

# Establish the Process Infrastructure

---

- **Create a common Project Planning and Control (PP&C) organization with skilled schedulers and cost analysts**
  - The real “nuts and bolts” people – key to helping the technical folks understand the process and the data
  - Responsible for the Process and System Description Document
  - Provides guidance and knowledge to Project Start-ups
  - Supports training efforts
- **Train on the Process**
  - Early and often
  - Integrate the company specific processes in all training materials
- **Evaluate processes regularly and modify based on lessons learned**

# Tool Selection – Do Your Homework

---

- **Take the time to develop requirements from the top down and engage stakeholders along the way**
  - Allows the implementation team to focus on implementation without having to revisit the requirements along the way
- **Include all the requirements for a validated EVM system**
  - System Requirements, System Description, Processes & Tools
- **Use a requirements hierarchy**
  - High Level Objectives
    - First level of communication to stakeholders for buy-in
  - System Level Requirements
  - Detailed Requirements
    - Include justification and rationale in document
    - Directly drives evaluation criteria for tool selection

# Tool Evaluation – Be As Sure As Possible

---

- **Utilize prototypes/demonstrations in tool selection, particularly in high risk areas**
  - Don't just believe Suppliers when they say they can do something....make them show you
  - Ensure the tool can interface with and accommodate company capabilities and requirements
    - Example: demonstration of tool compatibility with internal rate/accounting structure
- **Even with all this preparation, expect “bumps in the road”**
  - Don't expect a “one pass” development effort
  - As hard as you try to cover everything, a project in the real world will encounter something (likely many somethings) that the preparations and procedures didn't address

# Tool Implementation – Manage Carefully

---

- **Develop a Project Implementation Plan**
  - Resource requirements for all participating organizations
  - Integrated Master Schedule
  - EV performance types and metrics
- **Plan for and generate all Supporting Documentation – complete before “go live” date**
  - Operating and desk procedures
  - Design documents (System Configuration, Interface Control Documents, etc)
  - Training Materials
- **Perform EVM on the Enterprise EVM Implementation**
  - Start with the previous system (even if manual)
  - Move to new system at earliest opportunity – excellent component of the systems’ verification

# Preparing the People – Skill Set

---

## Training, training, and more training

- Its difficult to truly understand and grasp EV concepts unless actively using on a project
  - Some of the training is “Use or Lose” and may require multiple training sessions over time
- Develop a structured, hierarchical training program
  - Create different levels of materials for progressive building of knowledge
    - EV 101 (general overview)
    - EV 102 (continues from EV 101 with focus specific to CAM duties such as trend analysis and performance report generation)
  - Train based on specific roles and responsibilities (PMs, CAMS, IPT Leads)
- Tailor materials to company specific processes and products
  - Off-the-shelf courses do not map to internal terminology and procedures
- Also include training on Project Management principles and techniques (EV, scheduling, planning, metrics, risks, etc)

# Preparing to Prepare the People - Iteration

---

- **Be prepared to iterate on the training materials, levels, and tailoring**
  - Conduct initial classes; plan for potentially significant modifications to materials
  - Conduct classes again; anticipate potential for additional iterations
- **Be careful not to underestimate the cost of training program development**
  - The training is critical to successful implementation on projects
- **Be prepared to iterate on the timing of training delivery**
  - Timing vs practical application is difficult
  - “Re-training” and “just in time” training is necessary

# Preparing the People - Mindset

---

## Communicate, communicate, communicate

- The culture change takes a long time!!!
  - Even with loads of training and attention, people gravitate back to “the way we’ve always done it”
- Constant and consistent supportive communications from the top down is required
- Ensure that the Manager of each Project has “the EVM mantra”
- Provide an “In-House Consulting” service – for the long haul
  - Experienced personnel to help project teams start up projects (planning, scheduling, tool usage, etc.)
  - The need for in-house expertise and “hands-on” mentoring of project teams cannot be over emphasized
  - It simply is not possible to bring a project team totally up to speed on all aspects of an EVMS through training alone
  - The need for this in-house expertise will continue longer than you think (we still don’t know how long)

# **‘Words of Wisdom’ – Other Hard Knocks**

---

**Some of our specific most difficult challenges have been**

- **Playing “catch up” after contract award**
  - Lots of work and the project’s EV plan structure may have permanent major flaws
  - Really need to have much of this in place during proposal phase
- **Misunderstanding of Management Reserve (MR)**
  - What it is for; how you get it; how you use it
  - Particular threat in contracts with change thresholds
  - Additional oversight of MR is highly advised
- **Difficulty in grasping forward estimate concepts**
  - Estimate At Complete (EAC), best case, worst case, most likely

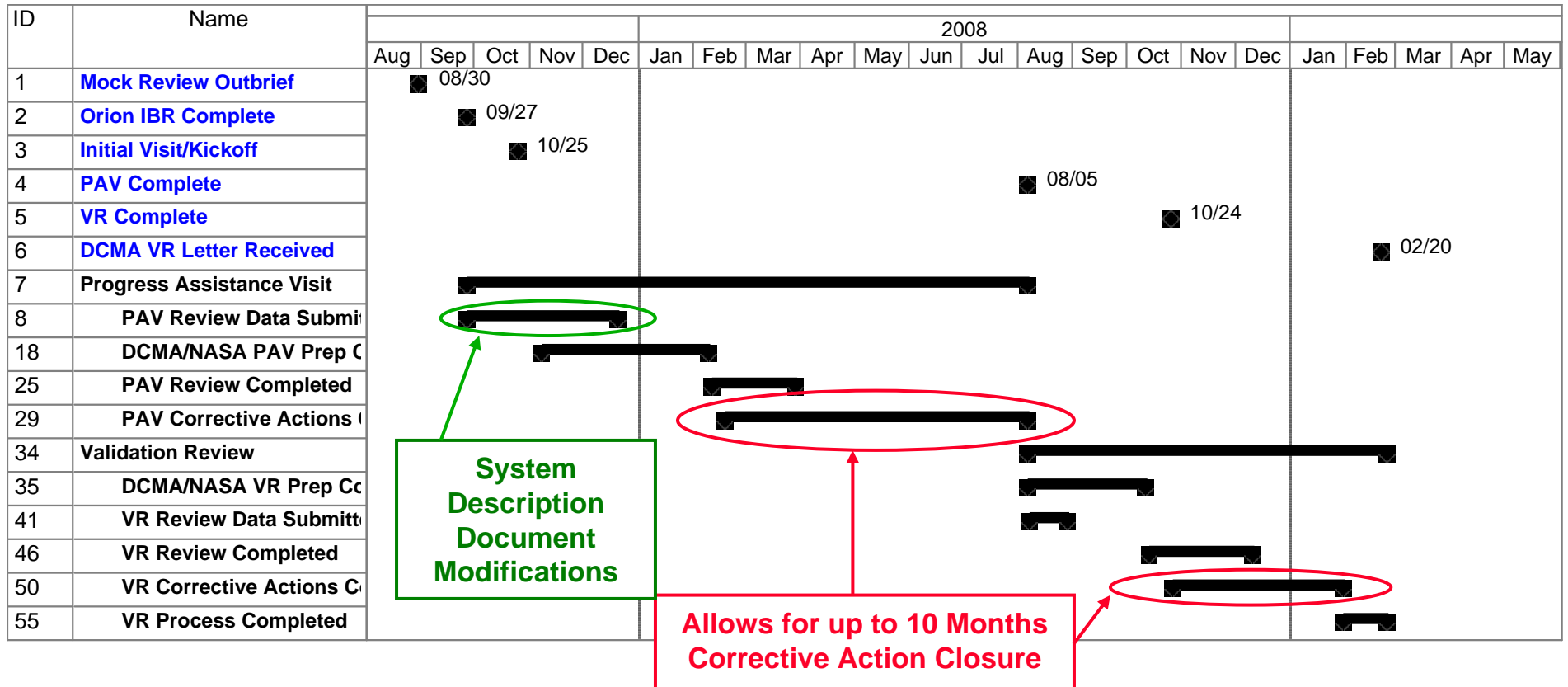
# Going Forward - EVMS Validation

---

- **Validation of the company's Enterprise EVMS**
  - Driven by contractual requirements
  - DCMA led with NASA and prime contractor involvement
- **DCMA “24 Step” process for EVMS Validation**
  - Lengthy (up to 18 months) but designed to maximize probability of success
  - Process consists of:
    - **Progress Assistance Visit (PAV)**
      - “Pre-review”
      - Corrective action period
    - **Validation Review (VR)**
    - **Joint Surveillance**
      - Draft Plan in work by DCMA
  - Kick-off meeting held October 25, 2007
  - PAV scheduled for March 11-14, 2008

# EVMS Validation

## Applying the DCMA Validation Review Template.....Example



## Reduced Corrective Action Time Can Shorten this Template

# Summary – Best of ‘What Went Right’

---

- **Process in place first; clearly mapped to ANSI-748**
- **Solid requirements and evaluation approach for tool selection**
- **Structured EV training tailored to company process, structure, culture, terminology**
- **Strong management commitment and communication**
- **Core Team for “In-House Consulting”**
- **Central PP&C group for detailed assistance**
- **Anticipation and planning to address issues**
- **Continual evaluation and mitigation**
- **Patience and sense of humor**

# Thanks for your attention

---

## Questions or comments?