Lessons Learned

Using Earned Value Management System to Track Effort and Schedule Weekly at the Individual and Team Level and Be Able to Detect a One-Day Schedule Slip

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Preamble

Don't think of business as a life without greatness

Unless the distant goals of meaning, greatness, and destiny are addressed, we can't make an intelligent decision about what to do tomorrow morning – much less set the long-term strategy of the company

First decision must be to commit to an ethical world, a civilized existence, a moral order

Nothing is more practical than for people to deepen themselves

- Peter Koestenbaum (pkipeter@ix.netcom.com)

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EVMS and Federal Acquisition

The EVMS guidelines have been published as an American National Standards Institute/Electronic Industries Alliance standard ANSI/EIA-748, Earned Value Management Systems

The DoD formally adopted ANSI/EIA-748 in August 1998 for application to major defense acquisition programs

Compliance with ANSI/EIA-748 is required for DoD cost or incentive contracts and agreements valued at or greater than $20M

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EVM ANSI 748 Objectives - 1

Plan all work scope for the program to completion

Break down the program work scope into finite pieces

Integrate program work scope, schedule, and cost objectives into a performance measurement baseline plan

EVM ANSI 748 Objectives - 2

Control changes to the baseline

Use actual costs incurred and recorded in accomplishing the work performed

Objectively assess accomplishments at the work performance level

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EVM ANSI 748 Objectives - 3

Analyze significant variances from the plan

Prepare an estimate at completion based on performance to date and work to be performed

Use EVMS information in the company's management processes

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EVMS Elements

Statement of Work

Work Breakdown Structure

Program Organization

Program Schedule

Budget Allocation and Resource Planning

Accounting Considerations

Earned Value Methodology

Performance Measurement

Estimates at Completion

Revisions and Data Maintenance

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The Headlines

GAO: Hundreds of federal IT projects are poorly planned and underperforming

Nextgov.com, July 31, 2008

$26 billion in projects on IT high-risk list

Federaltimes.com, October 24, 2008

Lawmakers today expressed frustration and disbelief over the continued shortcomings of information technology projects across the federal government

Washington Technology, September 21, 2007

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How do projects get to be one year late?

One day at a time!!!

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How many projects employ tracking systems that can detect a one-day schedule slip?

How many team leads can say weekly

"This job is under control and I don't need your help right now"
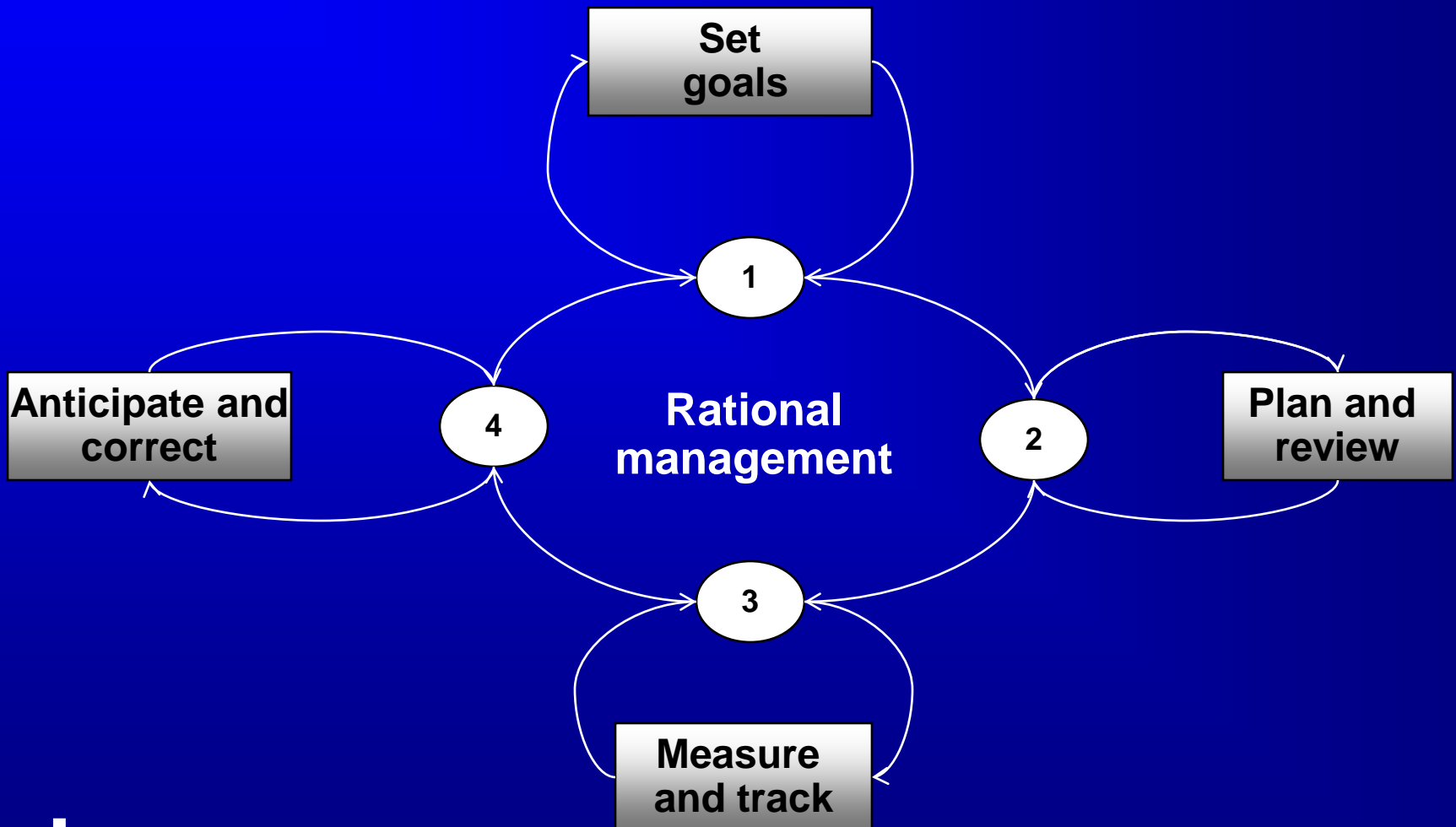
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How many team members can say weekly

"This job is under control and I don't need your help right now"

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How many solicitations require that contractors report status weekly?

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Agenda

Rational Management and EVMS

Managing the Software Work

Level 5 Individual Process

Level 5 Team Process

Weekly Status Tracking

Lessons Learned

Transformation Principles

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Rational Management - Elements

Set goals

Plan and review

Measure and track

Anticipate and correct

Rational management

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Source: *Watts Humphrey, Winning with Software*

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Rational Management and EVMS

Set Goals
- Statement of Work

Plan and Review
- Work Breakdown Structure
- Program Organization
- Program Schedule
- Budget Allocation and Resource Planning
- Accounting Considerations

Measure and Track
- Earned Value Methodology
- Performance Measurement

Anticipate and Correct
- Estimates at Completion
- Revisions and Data Maintenance

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Managing the Software Work - 1

Software and systems development is knowledge work

The first rule for knowledge work is that managers can't manage it - the workers must manage themselves

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Managing the Software work - 2

The second rule is that developers and their teams

- Must know how to manage themselves
- Negotiate their commitments with management
- Manage with data
- Own their own work

The third rule is that management must trust the development teams to plan and manage their own work.

Source: Acquiring Quality Software, Watts Humphrey

Building Individual Capability - 1

The need is not for lots of process data but for engineers who gather and use that data

What would happen if software professionals used sound engineering practices?

- Made and followed detailed plans
- Gathered and used historical data
- Measured and managed quality
- Analyzed and improved their processes
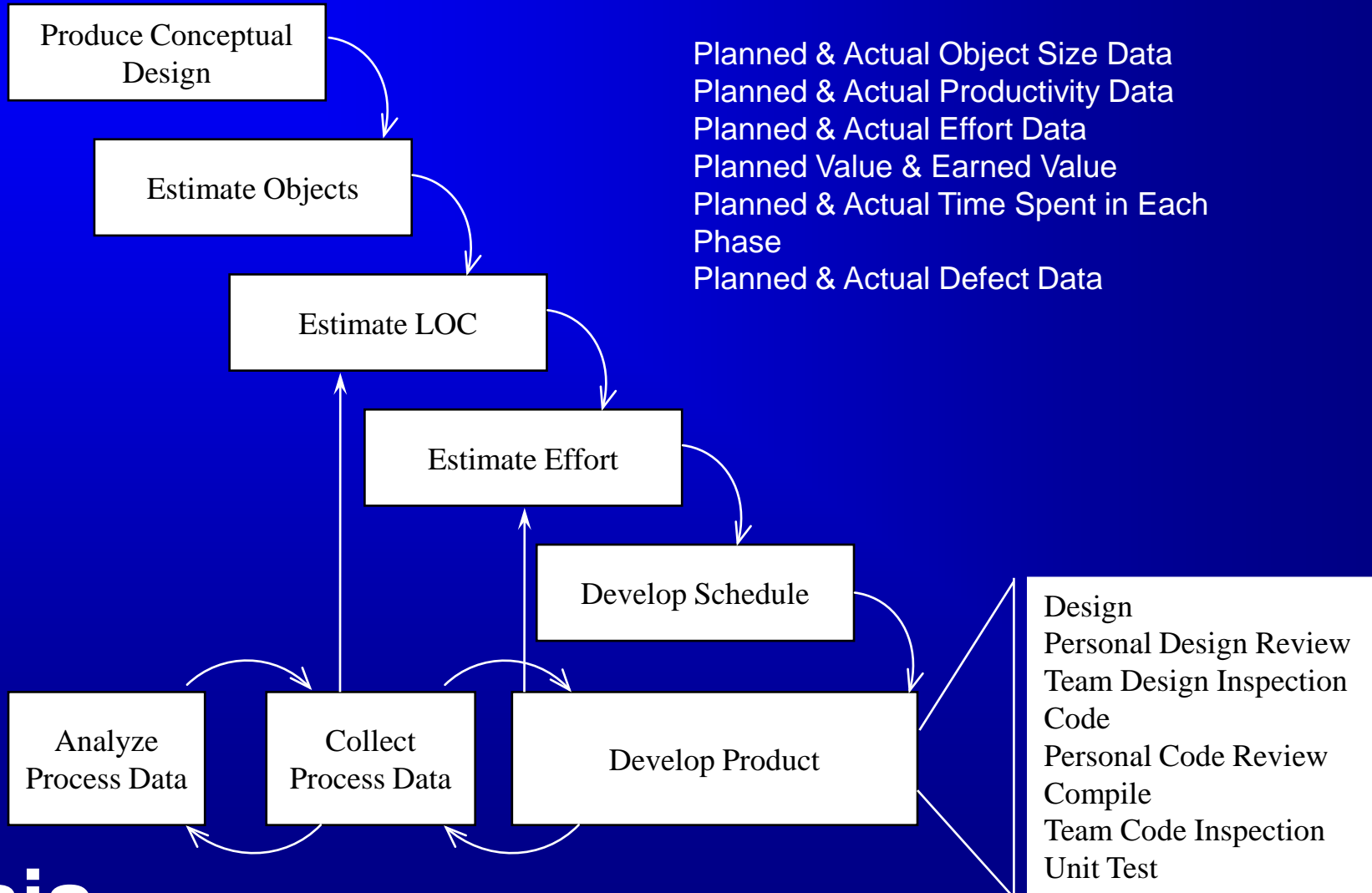
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Building Individual Capability - 2

The need is for a Level 5 process at the individual level

"If our methods do not serve the individual professionals, they will not endure"

Watts Humphrey, *Managing the Software Process*

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Level 5 Personal Process

Produce Conceptual Design

Estimate Objects

Estimate LOC

Estimate Effort

Develop Schedule

Analyze Process Data

Collect Process Data

Develop Product

Planned & Actual Object Size Data
Planned & Actual Productivity Data
Planned & Actual Effort Data
Planned Value & Earned Value
Planned & Actual Time Spent in Each Phase
Planned & Actual Defect Data

Design
Personal Design Review
Team Design Inspection
Code
Personal Code Review
Compile
Team Code Inspection
Unit Test

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Building Teamwork Capability - 1

Provide a management environment where the engineers are encouraged and rewarded for doing quality work

Create a mechanism to guide teams through defining their processes and making complete, precise, and detailed plans
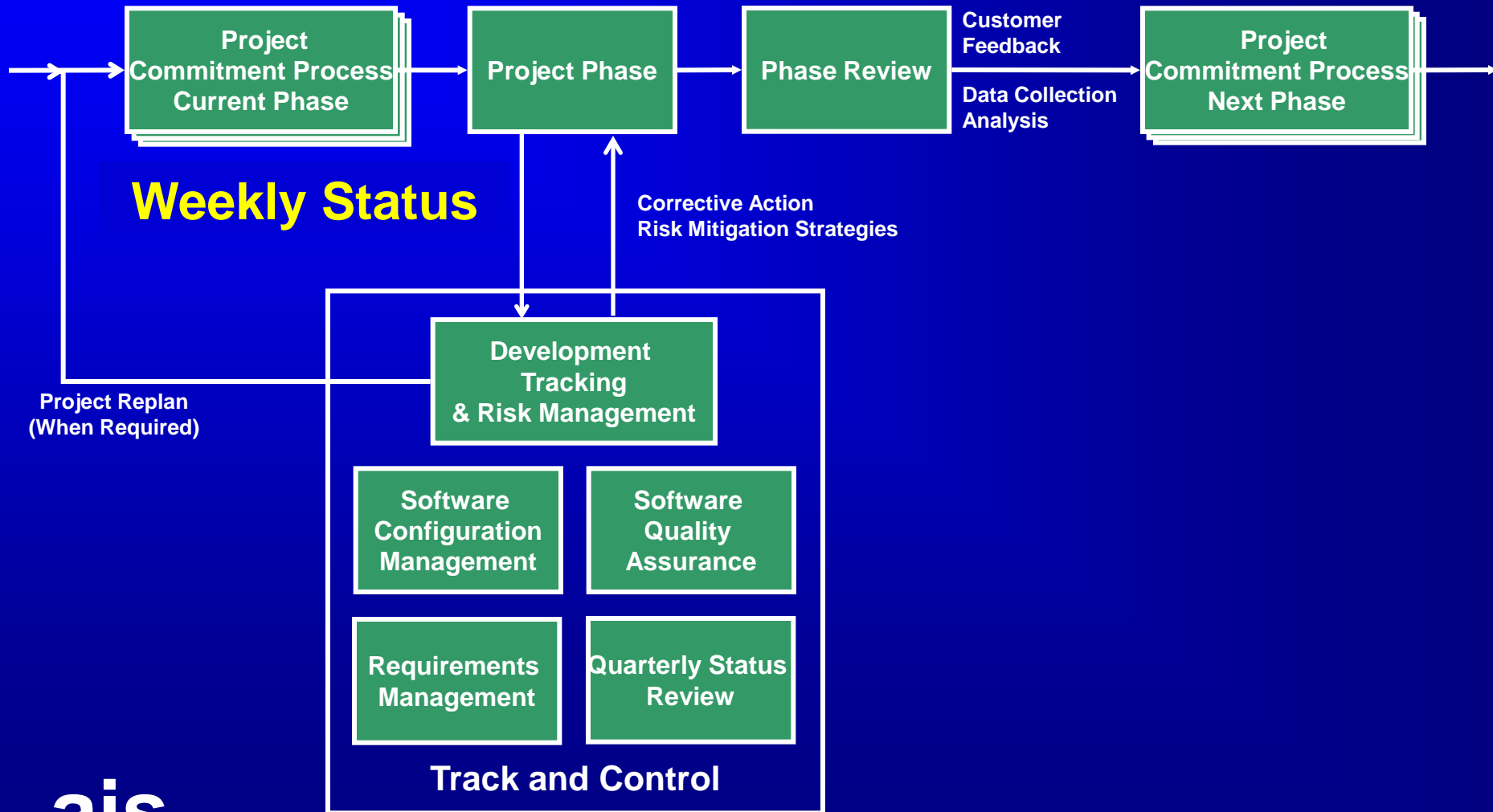
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Building Teamwork Capability - 2

Build an environment where everybody planned and tracked their work and measured and managed the quality of their products

Provide a trained coach

Create an organization environment where Level 5 behavior is the norm

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Level 5 Team Process

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→ → [Project Commitment Process Current Phase] → [Project Phase] → [Phase Review] → [Project Commitment Process Next Phase] →
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Customer Feedback

Data Collection Analysis

Weekly Status

Corrective Action
Risk Mitigation Strategies

Project Replan (When Required)

Development Tracking & Risk Management

Software Configuration Management

Software Quality Assurance

Requirements Management

Quarterly Status Review

Track and Control

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Weekly Status – Team Goals (1)

| Goal	Measure	Target	Tracking responsibility	Tracking timing
Schedule				
Deliver all milestones that AIS commits to in its project plan on or ahead of schedule	WP Actual Earned Value - WP Baseline Planned Value	>= 0	Team Leader	Weekly
	Committed end date - Projected completion date (Days)	<=1	Team Leader	Weekly
	% of milestones completed (delivered for customer for acceptance) on time	100%	Team Leader	By milestone
Quality				
Substantially defect free deliverables	On or ahead of Quality Plan		Quality Manager	Weekly
Accurate & complete data (size, effort and defect) collection on a weekly basis	Track data by 9:00 AM CT on First working day: Number of team members who did not enter data ontime	0	Planning Manger	Weekly

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Weekly Status – Team Goals (2)

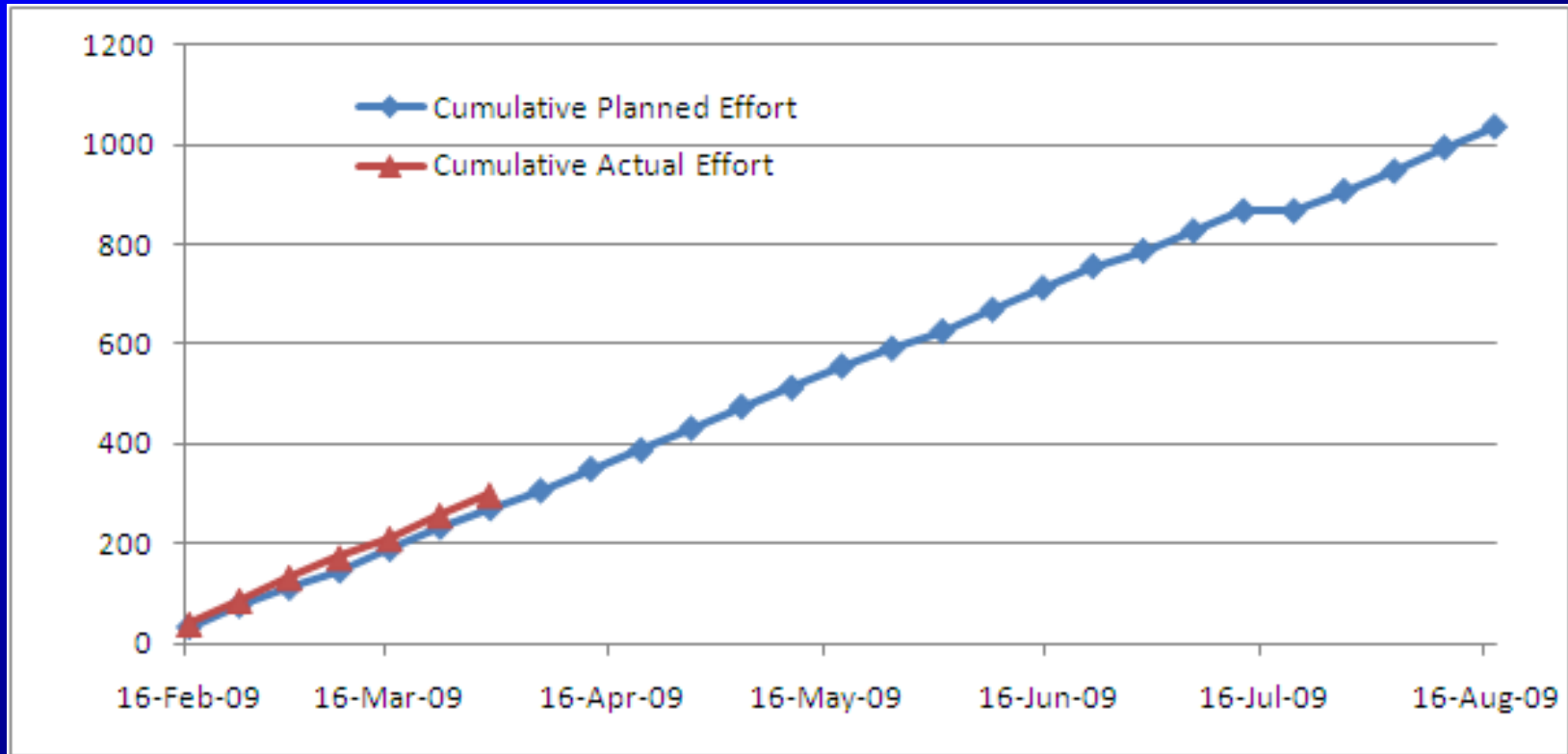| Goal	Measure	Target	Tracking responsibility	Tracking timing
Team Morale				
AIS Team members have a positive experience on the project	Positive (1), Neutral (0), Negative (-1): If not what can we change?	Team average >= 0	Team Leader	Weekly
Effective communication within the team	Positive (1), Neutral (0), Negative (-1): If not what can we change?	Team average >= 0	Team Leader	Weekly
Process Maturity				
Achieve/maintain CMMI Maturity Level 5 practices on the project level.	Red, Green, Yellow indicator for each PA (based on PA review with SQA Monthly Meeting)		Process Manager	Monthly
Profitability				
Rework less than or equal to planned	Plan/Act hrs for rework tasks complete	>= 1.0	Team Leader	Weekly
Meet commitments with less effort or equal to plan	Plan/Act hrs for tasks complete	>= 1.0	Team Leader	Weekly

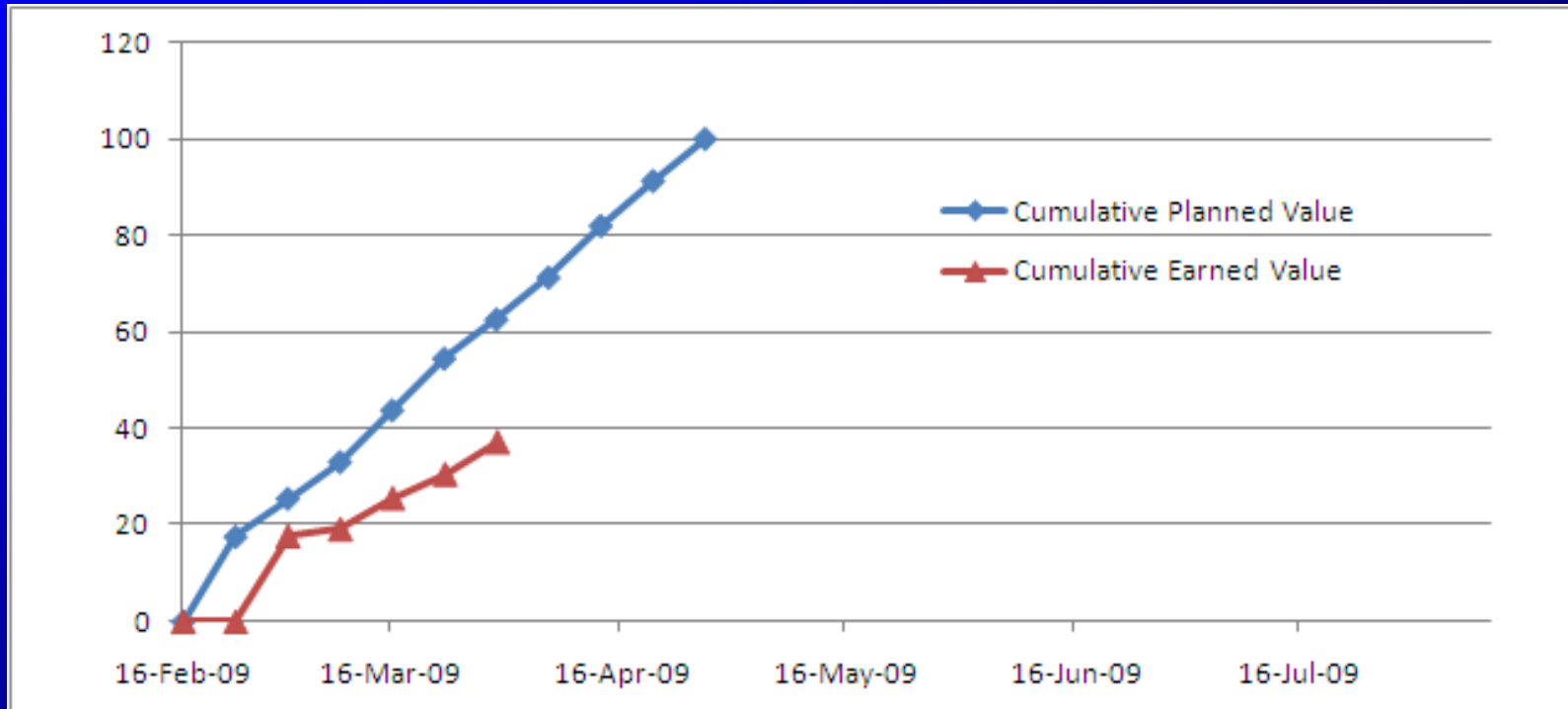# Weekly Status - Team Hours
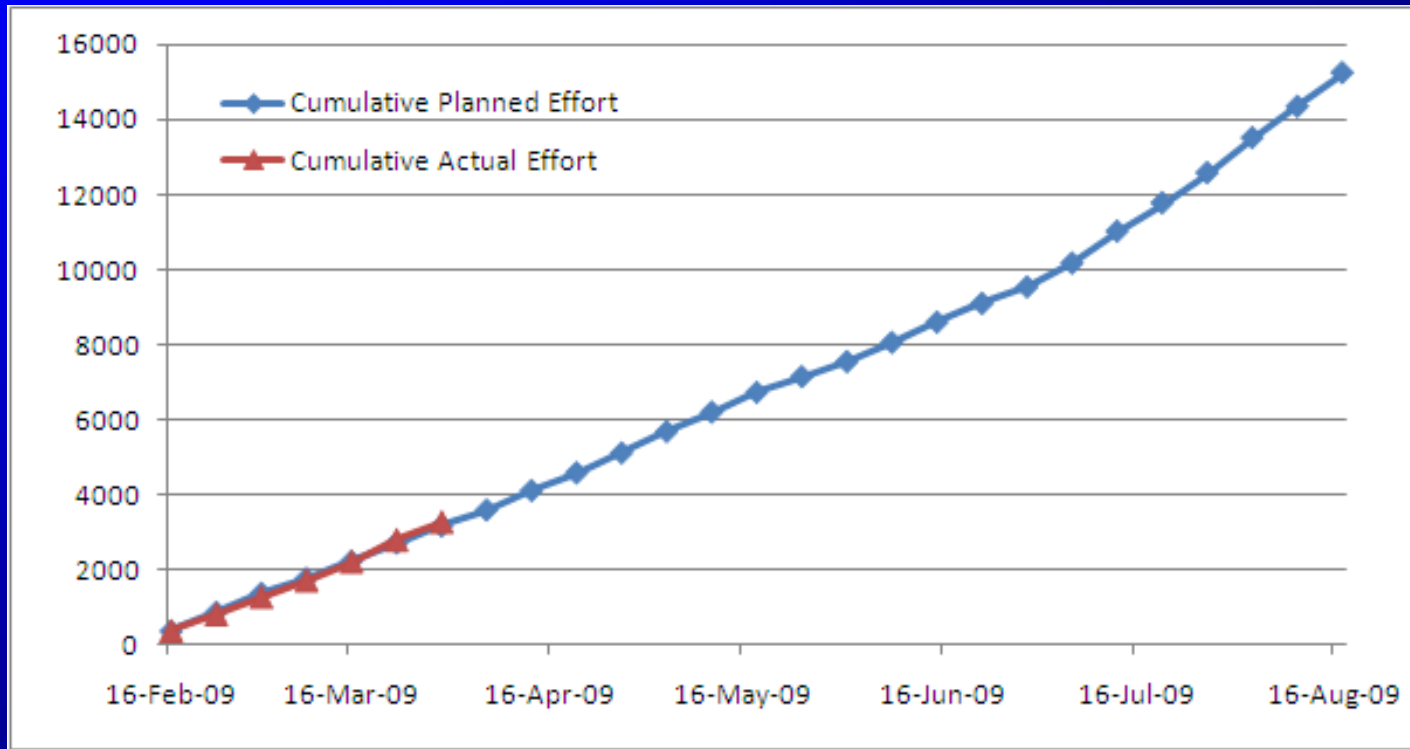
Weekly Status – Team Earned Value

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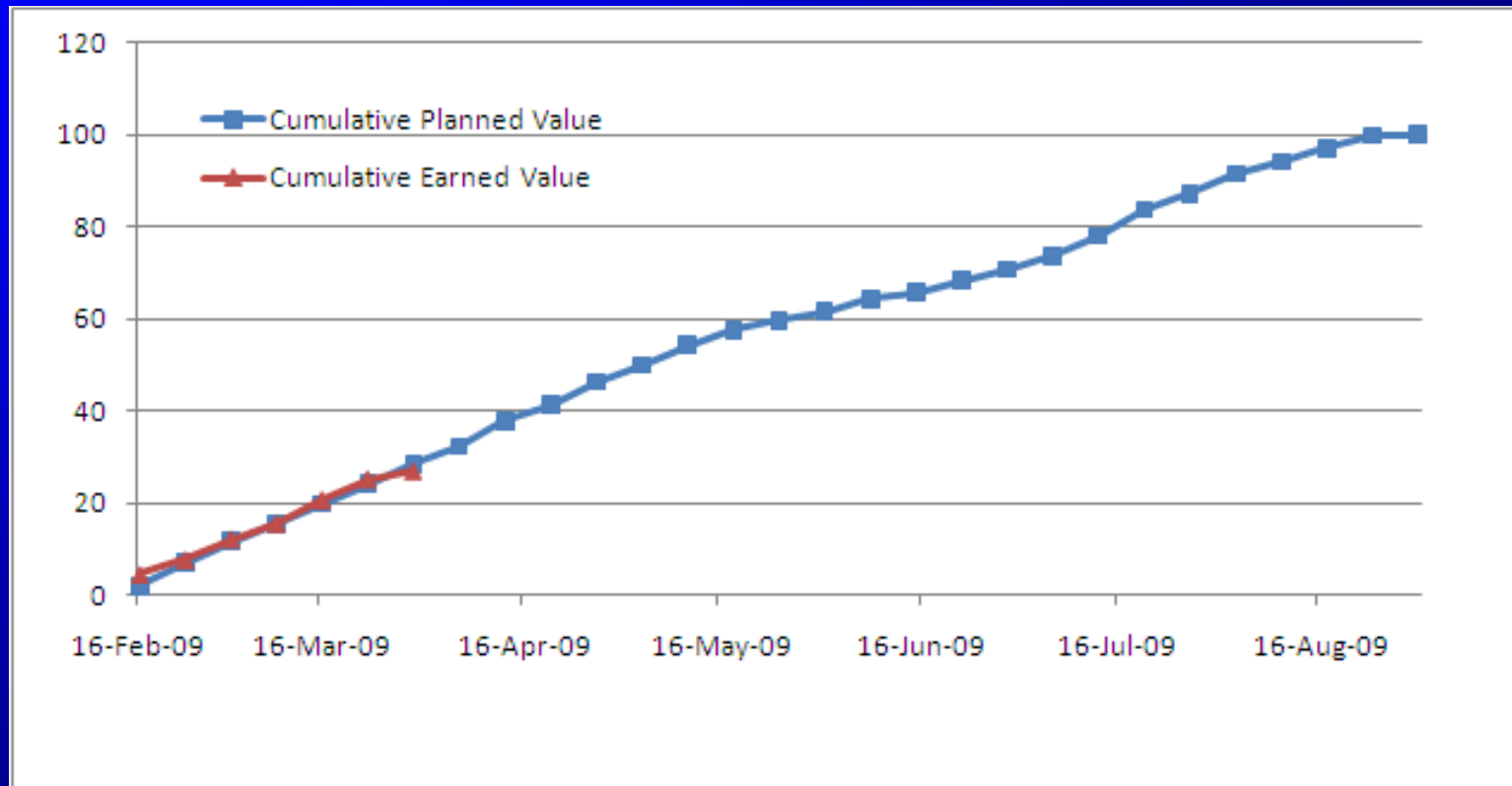
Weekly Status – Team Estimate At Completion

Task Status Summary

Status Summary	Plan	Actual	Pln/Act	Act/Pln
Project Hours	450.3	468.3	0.96	1.04
Project Hours To-date	3173.0	3255.3	0.97	1.03
Earned Value	4.3	1.7	2.51	0.40
EV To-date	28.5	26.9	1.06	0.94
To-date Hours for EV Tasks Closed	2482.0	1977.1	1.26	0.80
To-date Hours for Non-EV Tasks		429.6		

Current Week	7 of 29	
	Week(s)	
Current Status Based On EV	0.4	Behind
Projected Completion Based On		
Earned Value Earn Rate	3.0	Ahead
Remaining Plan Hours and EV		
Project Hours and Estimate Accuracy	4.9	Ahead

Blocked EV Effort	848.6
Avg EV Hours Per Week	465.0
Avg EV Per Week	3.8
EVHours reqd for 100% EV	5219.9
For ontime completion	Per Week
Required EV	3.3
Required EV Hours	237.3

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Weekly Status - Individual A Hours

Weekly Status – Individual A Earned Value

Weekly Status – Individual A Estimate At Completion

Task Status Summary

Status Summary	Plan	Actual	Pln/Act	Act/Pln
Project Hours	38.0	41.1	0.92	1.08
Project Hours To-date	269.7	298.8	0.90	1.11
Earned Value	8.1	6.7	1.22	0.82
EV To-date	62.6	36.9	1.70	0.59
To-date Hours for EV Tasks Closed	141.9	269.4	0.53	1.90
To-date Hours for Non-EV Tasks		20.7		

Current Week	7 of 29	
	Week(s)	
Current Status Based On EV	4.9	Behind
Projected Completion Based On		
Earned Value Earn Rate	10.0	Ahead
Remaining Plan Hours and EV		
Project Hours and Estimate Accuracy	15.7	Behind

Blocked EV Effort	8.7
Avg EV Hours Per Week	42.7
Avg EV Per Week	5.3
EVHours reqd for 100% EV	460.4
For ontime completion	Per Week
Required EV	2.9
Required EV Hours	20.9

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Weekly Status – Individual B
Estimate At Completion

Task Status Summary

Status Summary	Plan	Actual	Pln/Act	Act/Pln
Project Hours	38.0	60.5	0.63	1.59
Project Hours To-date	261.7	234.7	1.12	0.90
Earned Value	4.9	0.0	0.0	0.00
EV To-date	58.4	23.8	2.45	0.41
To-date Hours for EV Tasks Closed	88.7	79.9	1.11	0.90
To-date Hours for Non-EV Tasks		11.2		

Current Week	7 of 29	
	Week(s)	
Current Status Based On EV	10.2	Behind
Projected Completion Based On		
Earned Value Earn Rate	0.4	Behind
Remaining Plan Hours and EV		
Project Hours and Estimate Accuracy	0.1	Behind

Blocked EV Effort	143.6
Avg EV Hours Per Week	33.5
Avg EV Per Week	3.4
EVHours reqd for 100% EV	255.6
For ontime completion	Per Week
Required EV	3.5
Required EV Hours	11.6

Weekly Status – Individual C Estimate At Completion

Task Status Summary

Status Summary	Plan	Actual	Pln/Act	Act/Pln
Project Hours	39.5	40.5	0.98	1.03
Project Hours To-date	291.6	282.6	1.03	0.97
Earned Value	3.8	0.0	0.0	0.00
EV To-date	26.6	24.1	1.10	0.91
To-date Hours for EV Tasks Closed	223.9	176.1	1.27	0.79
To-date Hours for Non-EV Tasks		60.3		

Current Week	7 of 29	
	Week(s)	
Current Status Based On EV	0.7	Behind
Projected Completion Based On		
Earned Value Earn Rate	0.0	Behind
Remaining Plan Hours and EV		
Project Hours and Estimate Accuracy	4.1	Ahead

Blocked EV Effort	46.2
Avg EV Hours Per Week	40.4
Avg EV Per Week	3.4
EVHours reqd for 100% EV	554.0
For ontime completion	Per Week
Required EV	3.4
Required EV Hours	25.2

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Lessons Learned - 1

If schedules are unrealistic, tracking methods are of little value

Team members must be trained in estimating, planning, tracking and measuring/managing quality

When team members participate in preparing the baseline plan, they believe in the plan and do their utmost to meet their commitments

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Lessons Learned - 2

Plans are not accurate beyond 18 to 24 weeks

Plans need to be adjusted periodically to keep them relevant and for EV to accurately reflect status of the project

Plan for at least two task completions per week for each team member

Keep the amount and type of data to be collected to a minimum – size, time, defects, and task completion

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Lessons Learned - 3

Initially focus on helping individuals to provide precise and accurate data timely

Team lead should set the example

Team lead should press for daily results

Weekly EV tracking helps individuals appreciate the importance of completing each day's planned tasks on that day

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Lessons Learned - 4

Weekly EV tracking helps individuals and teams maintain product focus, meet intermediate milestones consistently and thereby complete project on schedule

Schedule problems are normal

Trust the individuals and teams to identify and solve the problems in time and meet their commitments

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Transformation Principles - 1

Quality Is More Important Than Schedule

"In today's software marketplace, the principal focus is on cost, schedule, and function; quality is lost in the noise. This is unfortunate since poor quality performance is the root cause of most software cost and schedule problems."

Watts Humphrey

Transformation Principles - 2

If it doesn't have to work any body can deliver on time

If you want the product in the worst way, that's how you will get it

If the situation looks truly impossible, it probably is

Schedule is what must happen; quality determines what will happen

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Transformation Principles – 3

Insanity - Doing the same thing over and over and expecting a different result

Malpractice - An organization which does not have a top-management-sponsored continuous improvement initiative in place

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Transformation Principles - 4

Why do competent software professionals agree to delivery dates when they have no idea how to meet them?

Why do rational managers accept schedule commitments when engineers offer no evidence that they can meet the commitments?

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Transformation Principles - 5

When pressed for early deliveries, the responsible team members say

"I understand your requirements, I will do my utmost to meet it, but until I make a plan, I can not responsibly commit to a date"

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Transformation Principles - 6

When pressed for early deliveries, the responsible managers say

> "I trust you to create an aggressive and realistic plan, I will review the plan, but I will not commit you to a date that you can not meet"

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Managing The Software Work

"Software work is entirely manageable, but only if you know how to manage it."

Watts Humphrey, *Winning with Software – An Executive Strategy*

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What does

"FUN ON THE JOB"

Mean to you?

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