How TSP/PSP Addresses CMMI Implementation Issues in Federal Acquisition

Case Study of a CMMI Level 5 Federal Contractor

8th Annual CMMI Technology Conference
November 17, 2008

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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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Advanced Information Services Inc.

Winner IEEE Software Process Achievement Award

http://www.sei.cmu.edu/managing/ieee-award/ieee.award.html

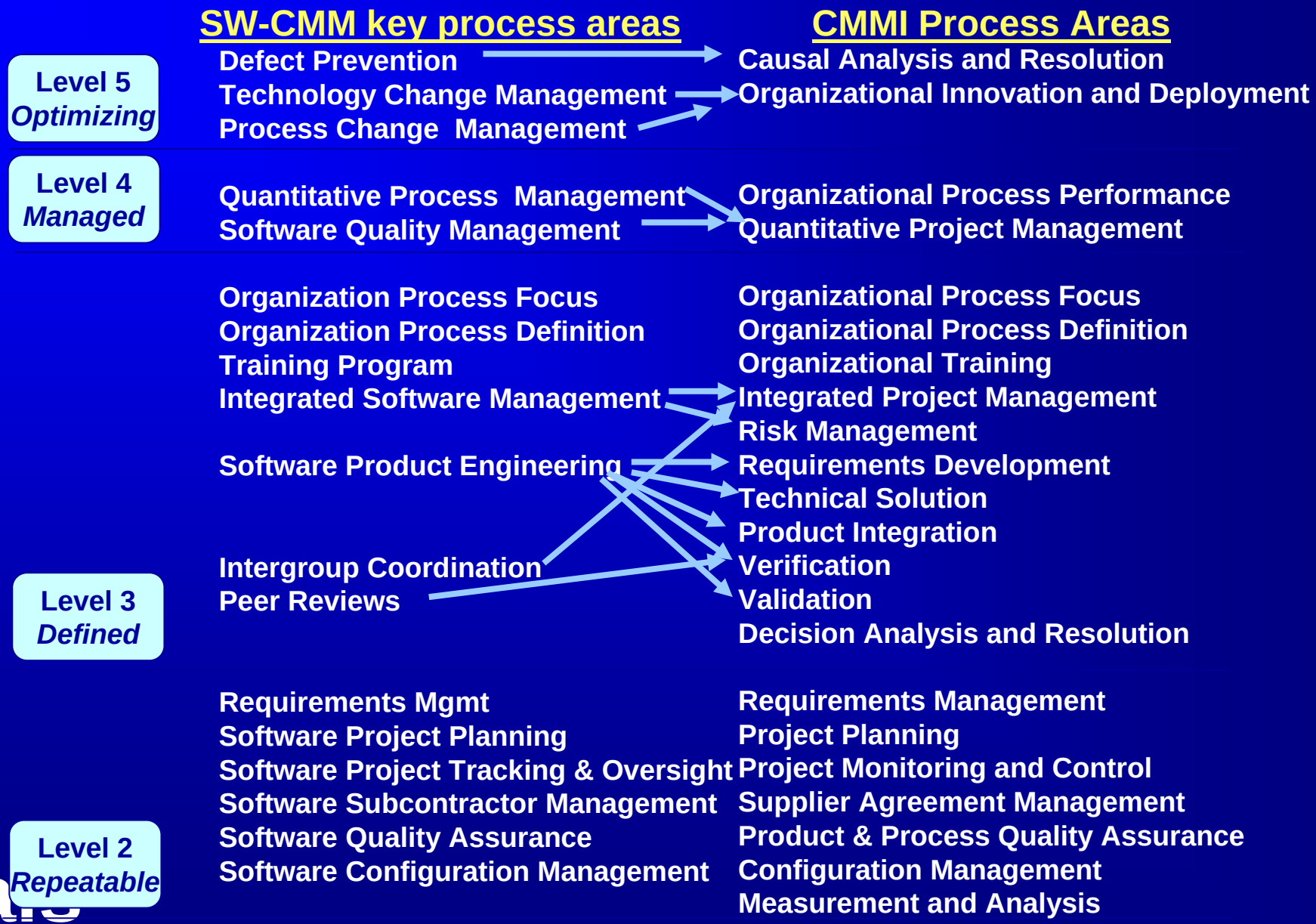
Topics

- Transforming the world of software
  - Building organization, team, and individual capability
  - Models of excellence
  - CMMI, TSP, PSP
- Federal IT projects
- CMMI implementation issues
- TSP/PSP practices
- AIS SCAMPI A global strengths
- CMM, TSP, PSP – AIS results

Building Organization Capability - Issues

- Getting management attention
- Maintaining long-term improvement focus
- Guiding the improvement work

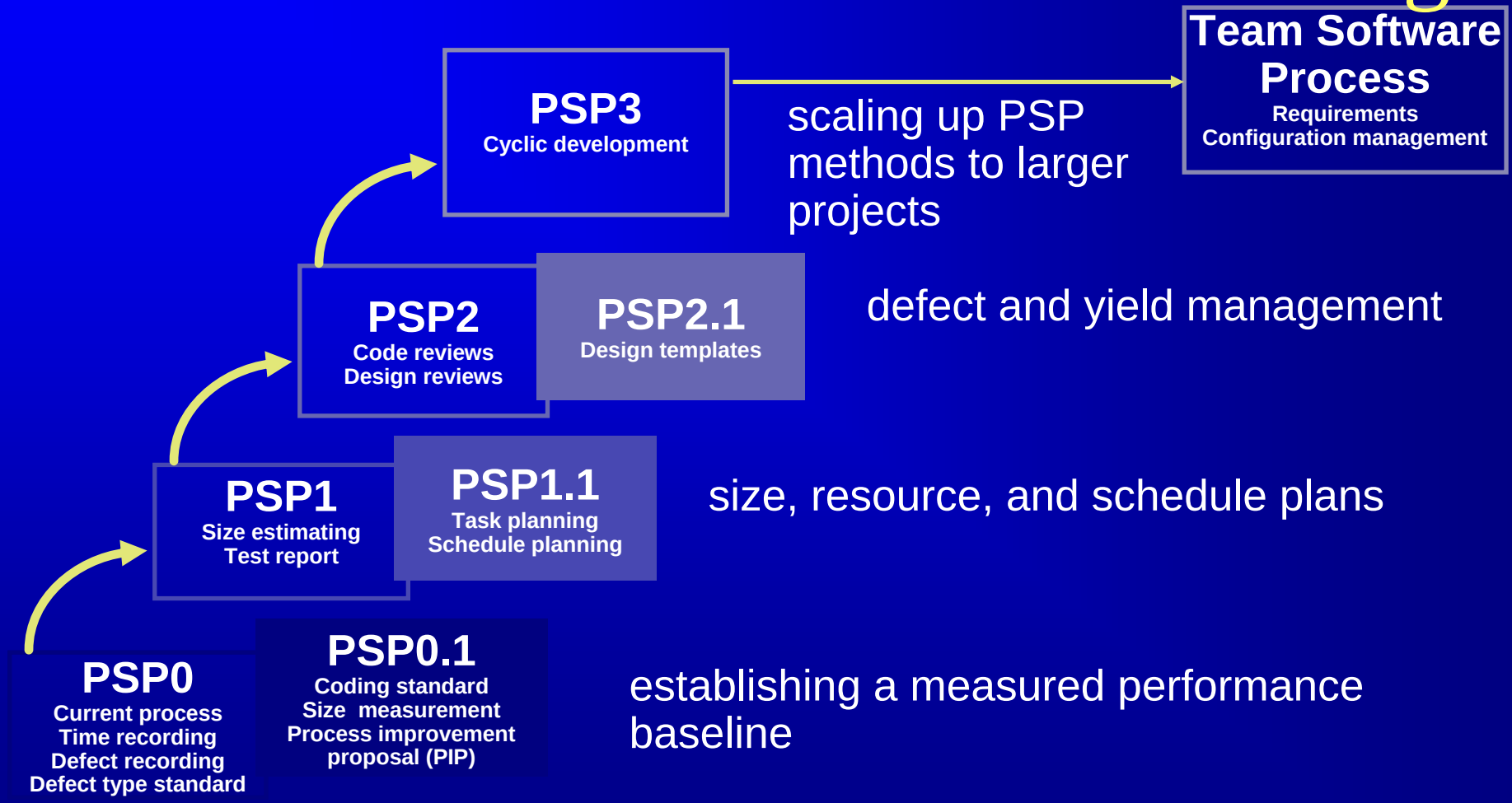
Organization Capability – SW CMM,CMMI



Building Individual Capability - Issues

- 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
- The need is for a Level 5 Process at the individual level

Self Improvement Personal Software Process Training

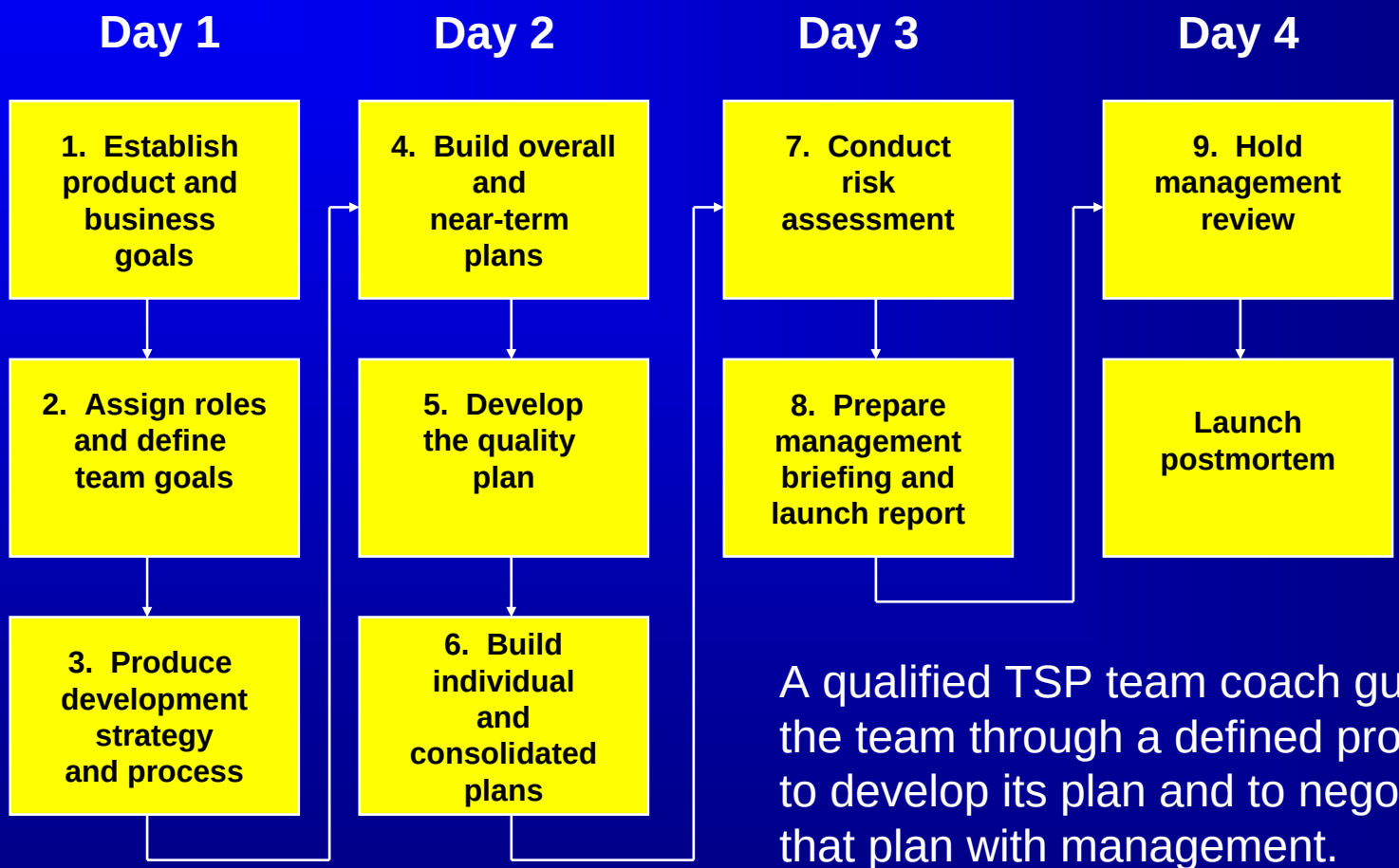


Source: Software Engineering Institute

Building Teamwork Capability - Issues

- Need a vehicle to help organizations capitalize on the potential benefits of disciplined teamwork
- Need a mechanism to guide teams through defining their processes and making complete, precise, and detailed plans
- Need a coach

Building Self-directed Teams
The TSP Launch Process



A qualified TSP team coach guides the team through a defined process to develop its plan and to negotiate that plan with management.

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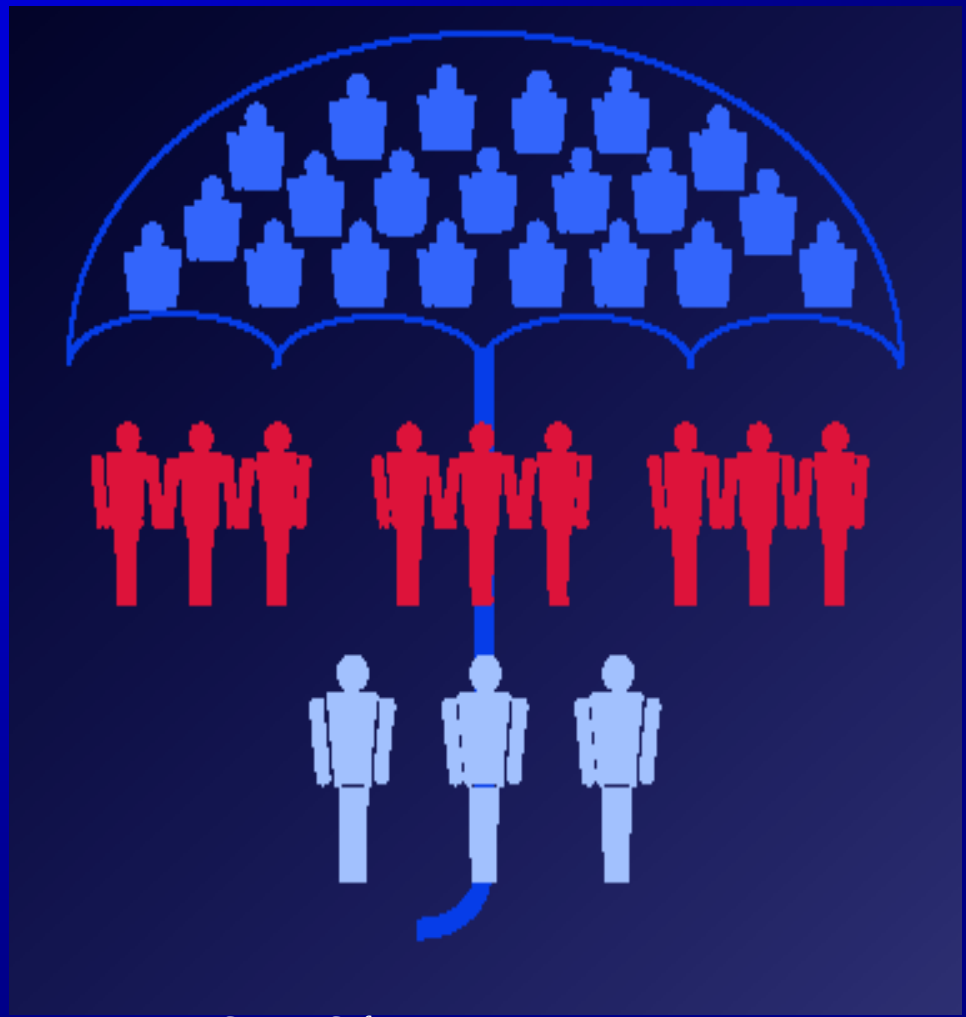
Transforming The World Of Software Models Of Excellence

CMMI – Builds organizational capability

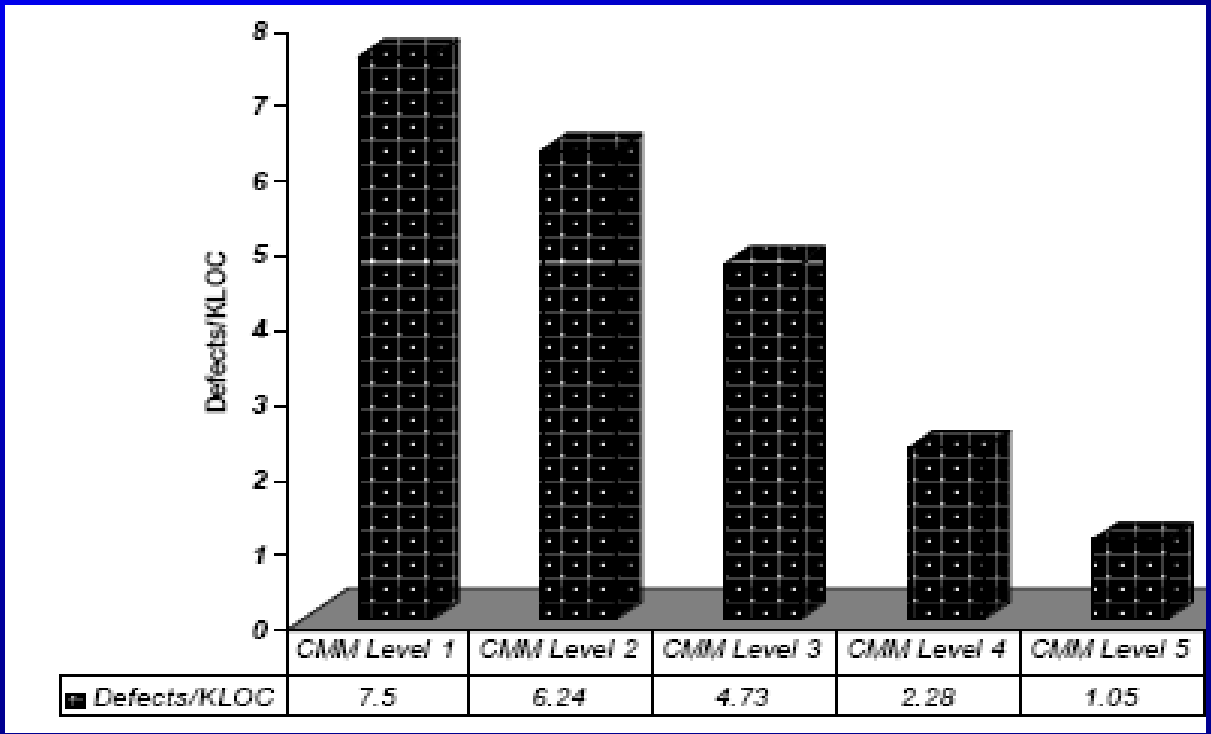
TSP – Builds quality products on cost and schedule

PSP – Builds individual skill and discipline



Source: Software Engineering Institute

CMM Results – Defects



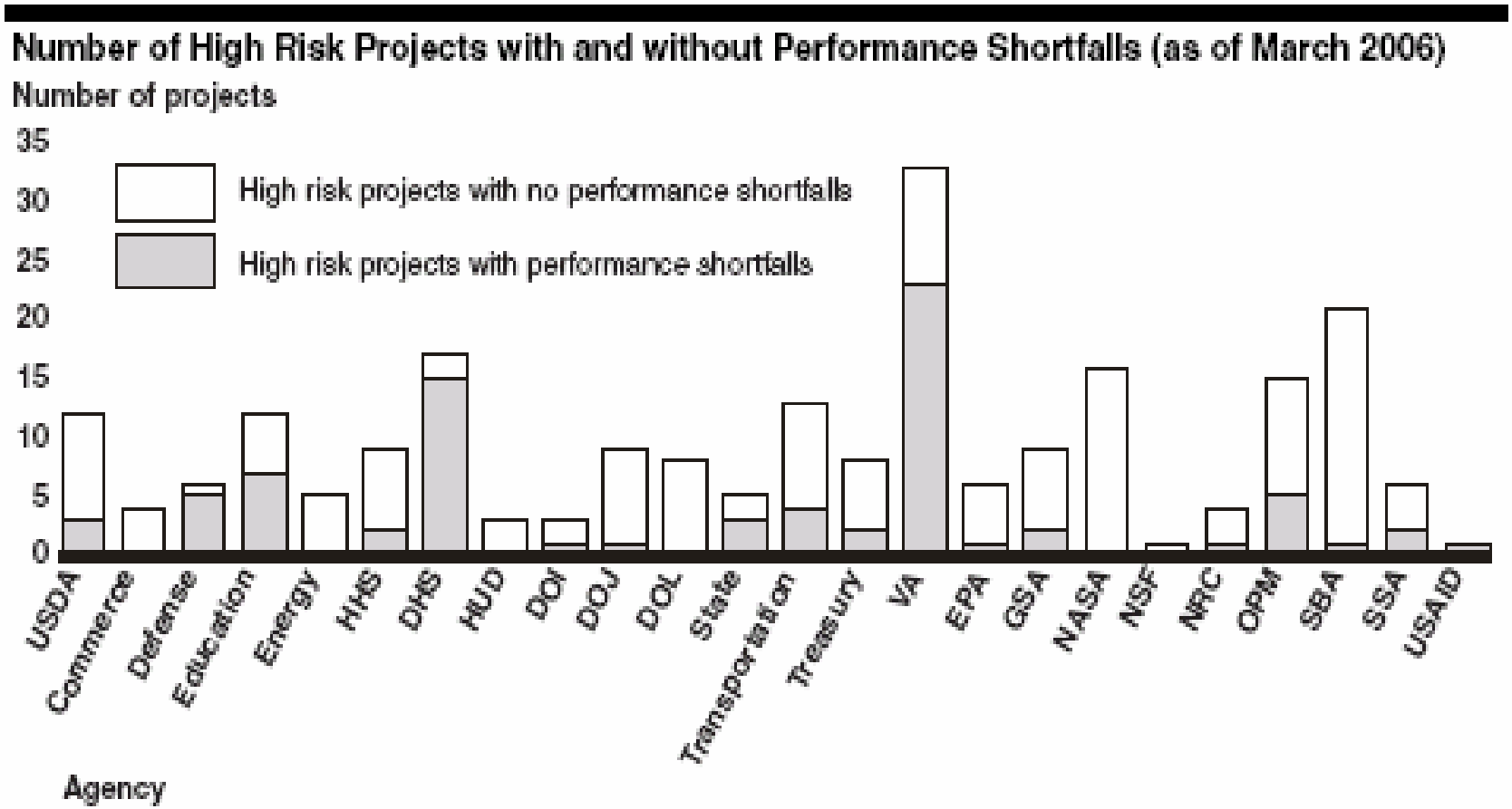
The TSP in Practice, SEI Technical Report, September 2003

Federal IT Project in Software Hell

- “THE Federal Bureau of Investigation has officially entered what computer professionals call "software hell." After spending $170 million to create a program that would give agents ready access to information on suspected terrorists, the bureau admitted last week that it's not even close to having a working system. In fact, it may have to start from scratch.”

  - NY Times, January 22, 2005

Federal IT High Risk Projects



Performance Shortfall

- "In addition, agencies reported that about 35 percent of the high risk projects—or 79 investments—had a performance shortfall, meaning the project did not meet one or more of these four criteria:
  - establishing clear baselines
  - maintaining cost and schedule variances within 10 percent
  - assigning a qualified project manager
  - and avoiding duplication with other investments"

Source: GAO-06-647

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

CMMI Implementation Issues

- Developers execute at lower maturity levels than their organizations have achieved and advertised
- Assurance that new projects will incorporate CMMI processes
- High capability and maturity level ratings do not of themselves guarantee program success

  - Baldwin, Kristen. “CMMI—Update and Next Steps” Systems Engineering Conference, San Diego, October 2007

- Failure to change root cause behavior that leads to programs that do not meet cost, schedule and performance expectations
- Adequate maturity at program initiation

  - Schaeffer, Mark. “CMMI: Fitting a Vision to Program Execution Needs”. 7th Annual CMMI Technology Conference & User Group, Denver, November 2007

CMM - Necessary, Not Sufficient

- No simple model could precisely measure process maturity and complex models are not useful in guiding improvement
- CMM consciously focused on *what* organization should do, not on *how* they should do it
- The teamwork practices and personal disciplines required for quality software work are almost entirely issues of *how*, and not just *what*
- Because engineers will not change the way they work without very specific guidance, the CMM does not change engineering behavior

CMM Implementation Issues TSP/PSP Practices - 1

- TSP teams require that individual team members must have successfully completed the two week official SEI PSP for Engineers course.
- PSP trained engineers
  - make and follow detailed plans,
  - gather and use historical data,
  - measure and manage quality,
  - analyze and improve their processes.
- With the support of a SEI-authorized TSP coach, the TSP framework enables PSP trained developers to consistently follow these practices at the personal level, and ensure that the developers execute at the maturity level of the organization.

CMM Implementation Issues
TSP/PSP Practices - 2

- TSP framework recognizes that only top management can motivate development teams to follow disciplined practices of the organization defined CMMI processes.
- In TSP, projects are initiated with the TSP launch process consisting of 9 scripted meetings led by an SEI-authorized coach.
- The coach and the team lead ensure that the team understands not only “what” management wants to accomplish in the project as well as the “how”, including the use of organization’s CMMI process.

CMM Implementation Issues
TSP/PSP Practices - 3

- Team members make detailed plans utilizing historical data
- Follow documented estimating procedure
- Teams negotiate schedule and cost commitment based on the plan
- In weekly status meeting, teams track schedule progress using earned value management
- Team members measure and manage the quality of their work products
  - Early defect removal
  - Personal review yields
  - Highest quality product into test

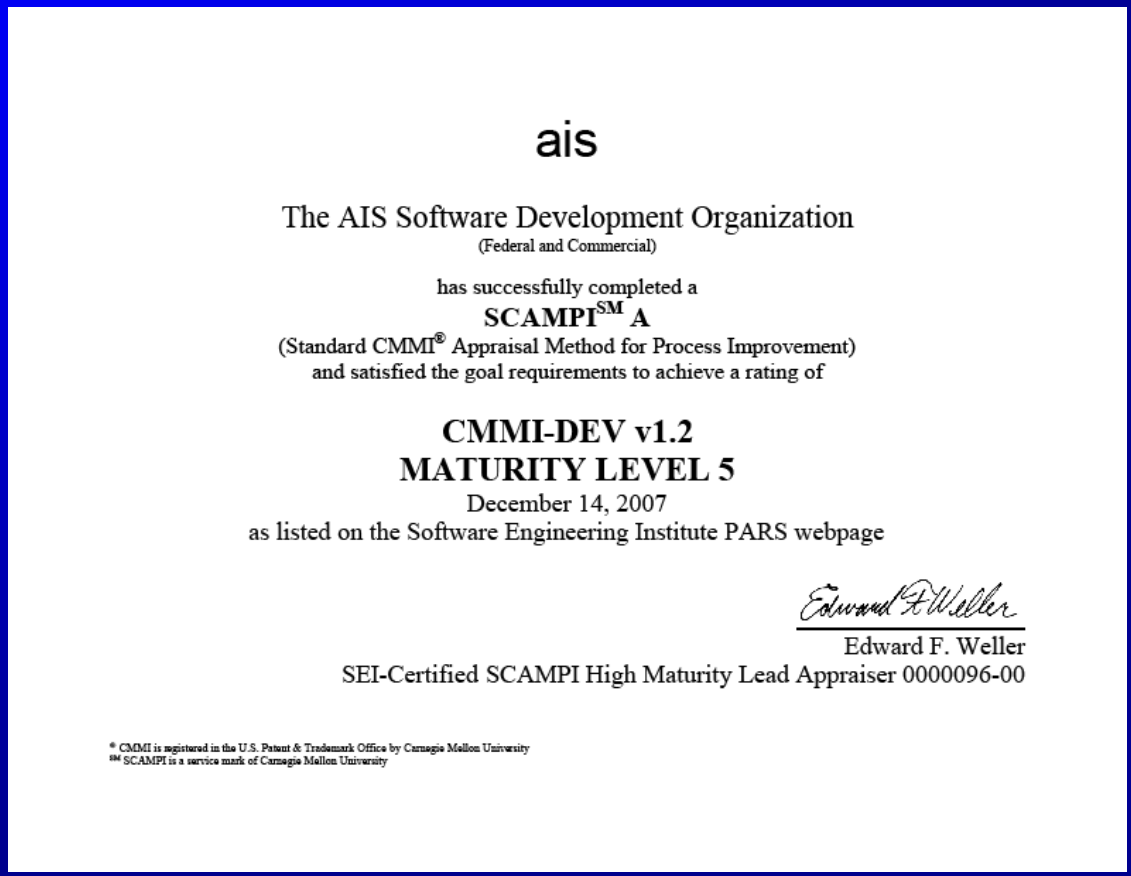
CMM Implementation Issues
TSP/PSP Practices - 4

- TSP teams ensure that at program initiation, sufficient time is devoted to getting consensus on development strategy and process.
- TSP teams make a detailed plan that is granular and facilitates tracking to detect one day schedule slip.
- The TSP launch process ensures a jelled team that takes ownership of the plan and the process.

CMM Implementation Issues
TSP/PSP Practices - 5

- TSP framework prescribes 8 roles within the project for team members to take, in addition to the normal development responsibility.
- The roles of Process Manager and Quality Manager within the team ensures high quality development processes to support team goals from program initiation to successful completion.

SEI CMMI Maturity Level 5



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The AIS Software Development Organization
(Federal and Commercial)

has successfully completed a
SCAMPI℠ A
(Standard CMMI® Appraisal Method for Process Improvement)
and satisfied the goal requirements to achieve a rating of

CMMI-DEV v1.2
MATURITY LEVEL 5
December 14, 2007
as listed on the Software Engineering Institute PARS webpage

Edward F. Weller
SEI-Certified SCAMPI High Maturity Lead Appraiser 0000096-00

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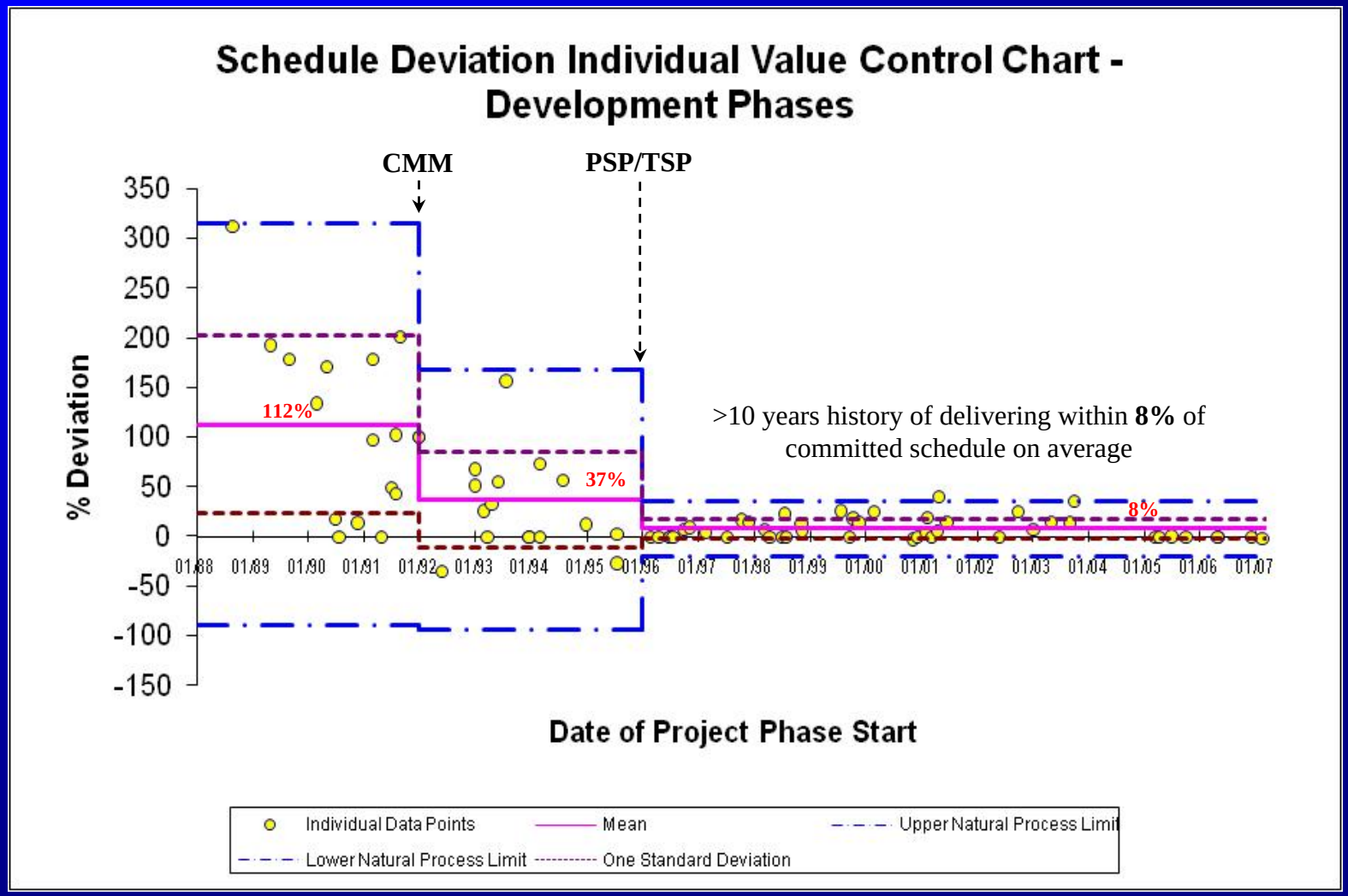
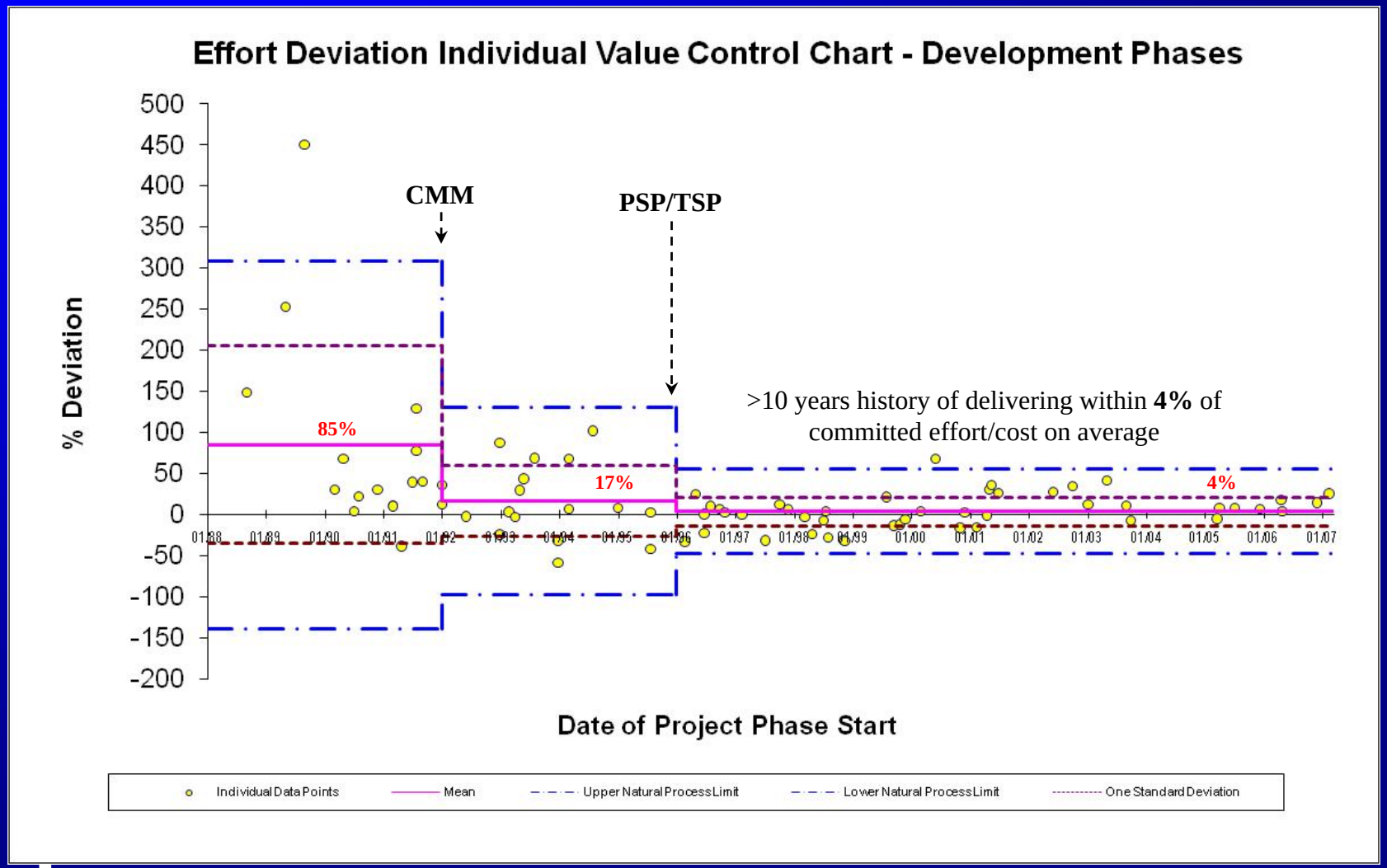
SCAMPI A – Final Findings
AIS Global Strengths

- TSP coaches provide continuous mentoring for project team members
- Process focus at all levels in the organization
- Open communication
- Self-managed team structure and roles
- Individuals with:
  - Strong quality focus
  - Commitment to customer and organization
  - Sense of ownership
- Opportunity for involvement with multiple groups within the organization
- Empowered to make decisions that affect the organization

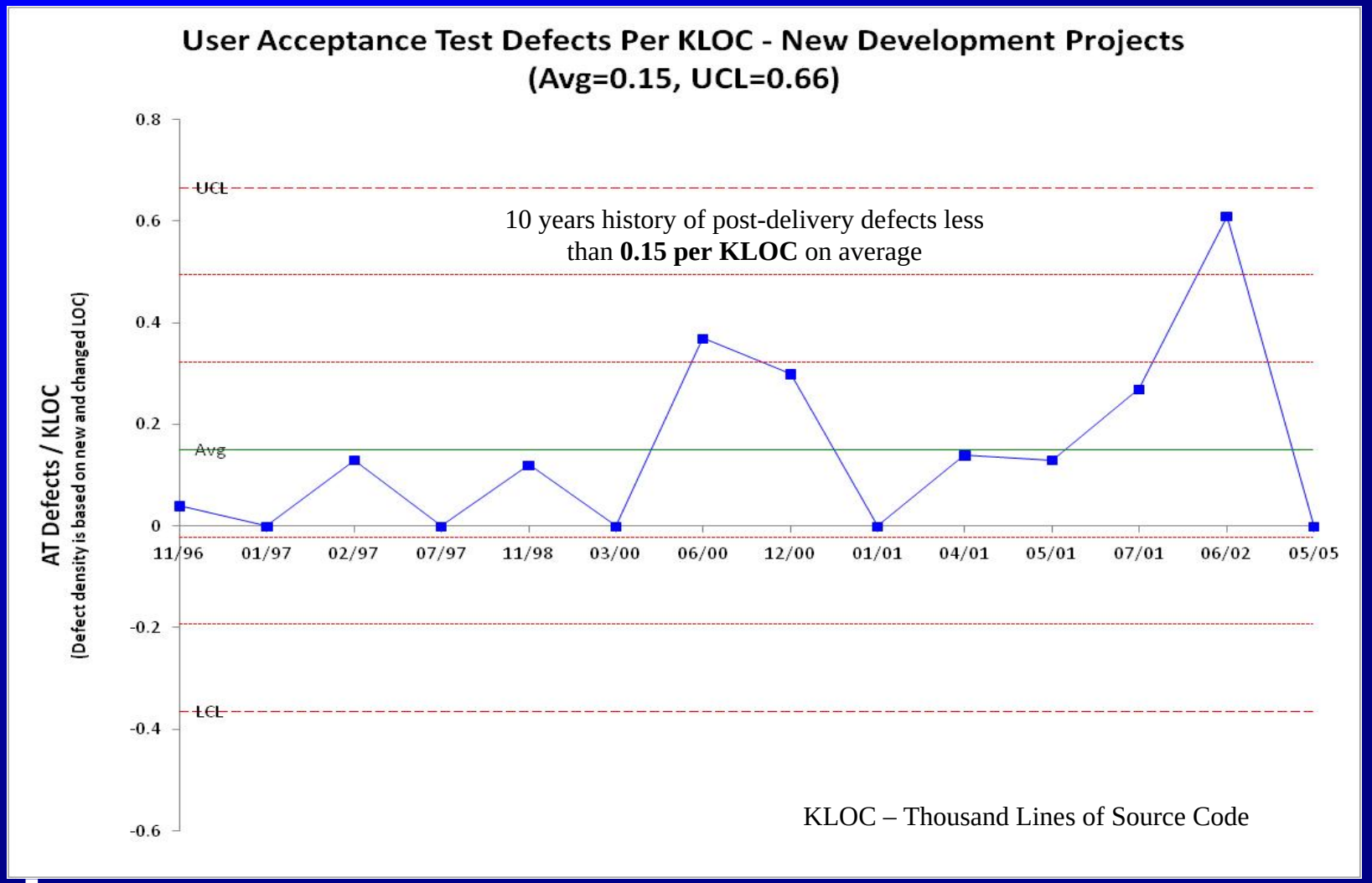
CMM/TSP/PSP Results – Schedule AIS



CMM/TSP/PSP Results – Effort/Cost AIS



CMM/TSP/PSP Results – Defects AIS



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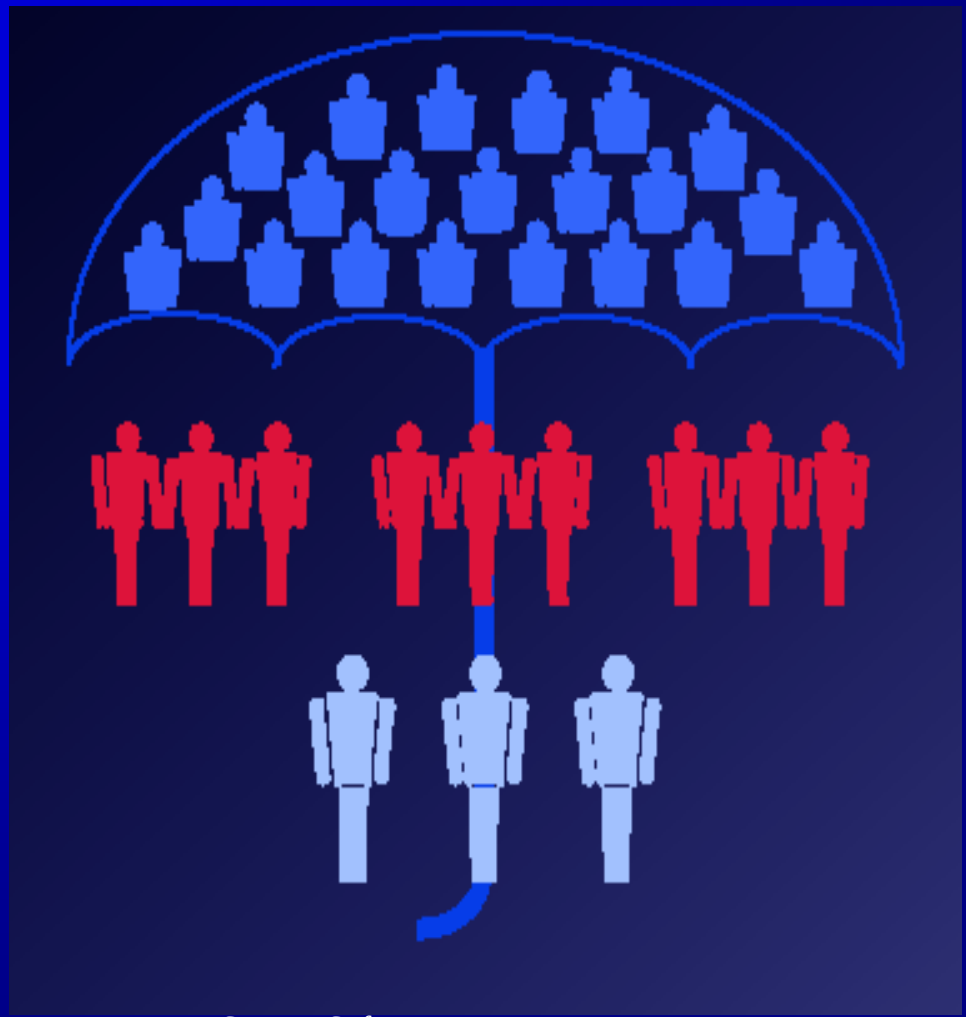

Source: Software Engineering Institute

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