Tailoring PSM for Process Improvement Measurements

PSM User Conference

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Agenda

- **Process Improvement Initiative**
- **FAA Tailoring of the PSM**
- **Measuring Processes**
- **PSM Training at the FAA**
- **Lessons Learned**

The FAA-iCMM®

Corporate iPG is implementing the FAA-iCMM
(FAA - integrated Capability Maturity Model℠)

- **acquisition of software-intensive systems**
- **integrates the SE-CMM, SA-CMM, and SW-CMM**
- **follows the SEI's Common CMM Framework guidelines**
- **includes an appraisal method**

FAA-iCMM Goals and Expected Benefits

More *effective* process improvement

- **one model across AMS**
- **corporate perspective for FAA-wide improvement**
- **integrated processes and process improvement**
- **one model, one architecture, consistent terminology, common process assets, common goals**

More *efficient* process improvement

- **less costly, less confusing**
- **23 process areas (not 52); additions being considered**
- **one appraisal approach (not 3)**

The FAA-iCMM Architecture

FAA-iCMM uses the continuous architecture which is structured in 2 aspects:

- **Domain aspect (what we do)**
- **Capability aspect (how well we do it)**

FAA-iCMM also provides staging

- **Maturity levels (what to focus on next)**

FAA-iCMM architecture is becoming known as the "continuous with staging" architecture

FAA's Goal

- **Using the FAA-iCMM, we are striving to achieve maturity level 2 for selected projects by December 1999, and maturity level 3 by December 2001.**
- **Interim assessments to 12 projects in 3 process areas in FY98 as a benchmark for progress**

Selected Interim Findings

- few were doing measurements consistently
- few had measurement procedures documented
- few could justify measurements taken
- many tried to say Executive Metrics meet the intent!
- practically none were doing ‘Process’ measurements
- little historical database archiving; so little basis for future cost estimation

Tailoring the PSM for FAA

PSM focus	***FAA focus***
Software	**Systems**
Developer	**Acquisition, Operation & Maintenance**
DOD	**FAA - related**
Project	***Process*****, Project & Product**

iCMM and Measurements

- **Generic Practice** @ level 2 states

  'Measure Process' - applies to all Process Areas

- Most **Process Areas** state – or imply – some project and product measures
  - Project Management states tracking plan vs actual for size, effort, cost, quality, computer resources, ...

Why Process Measurements?

- **You can’t show process improvement unless you measure it!**
- **It provides a baseline/benchmark**
- **It can show where things aren’t working well - to prioritize improvement areas**
- **It provides data for future planning**

Process Measurements can answer...

- **Have you raised the capability level of your process areas?**
- **Are you doing more with less?**
  - **less resources [$, effort,..]**
  - **shorter cycle-time, schedules**
  - **less defects**
  - **less rework**

PSM Applies to Processes Too

- **Identify issues - project and process**
- **State questions which address issues**
- **Classify and prioritize for process measurements**
- **Determine process measures**
- **Develop *process* Measurement Plan, integrate it with *project* Measurement Plan**
- **Do it!**
- **Assess and revise**

Draft Practical SW and Systems Measurement: on process

- **Process Performance**
  - **Process Compliance**
    - **reference model level**
    - **process audit finding**
  - **Process Efficiency**
    - **cycle time**
    - **productivity**
  - **Process Effectiveness**
    - **rework**
    - **escapes**

Measurement Structure

- **iPG - integrated Process Group**
  - **Art Pyster, Deputy CIO chairs**
  - **members are Senior Management across FAA's lines of business**
- **Metrics WG**
  - **Joe Caravello, Process Engineering, chair**
  - **reps from all orgs**
  - **offer Training [5 PSM trainers]**
  - **guides implementation of Executive Metrics**
  - **supporting development of Enterprise Metrics**
  - **assists in PI measurement planning/implementation**

FAA Measurement Program

- **1 day PSysM course - Project staff and Process Action Teams for Process Improvement**
  - **learn methodology *[required for workshop]***
- **2 half-day workshops**
  - **focus on selected project/ process issues**
  - **identify specific measures and draft plan to implement**
  - **project leads, process owners/users, measurement rep are attendees**
- **Follow-up: review plans, assist in implementation, assess results**

Process Measurement Workshops

- Conducted 10 [mostly for Requirements processes]
- PSM helped us get started [Cheryl, Betsy]
  - conducted first workshops
  - developed initial material [we revised]
  - drafted first plans [we revised]
- Agenda
  - intro/overview/PSysM
  - understand project and process area
  - identify/priortize issues
  - identify possible measures
  - draft measurement plan
  - follow up

Top Issues

- **Requirements**
  - **management, traceability, communication, maturity**
- **Funding/resources**
- **Process management**
  - **roles/responsibilities**
  - **schedule**
- **firefights, grenades, non-material**

Top Process Measures

- **Resources**
  - **effort, cost**
- **Schedule**
  - **cycle time**
- **Process**
  - **audits findings**
- **Quality**
  - **rework, defects**
- **Requirements**
  - **definition, maturity, traceability**
- **Customer satisfaction**

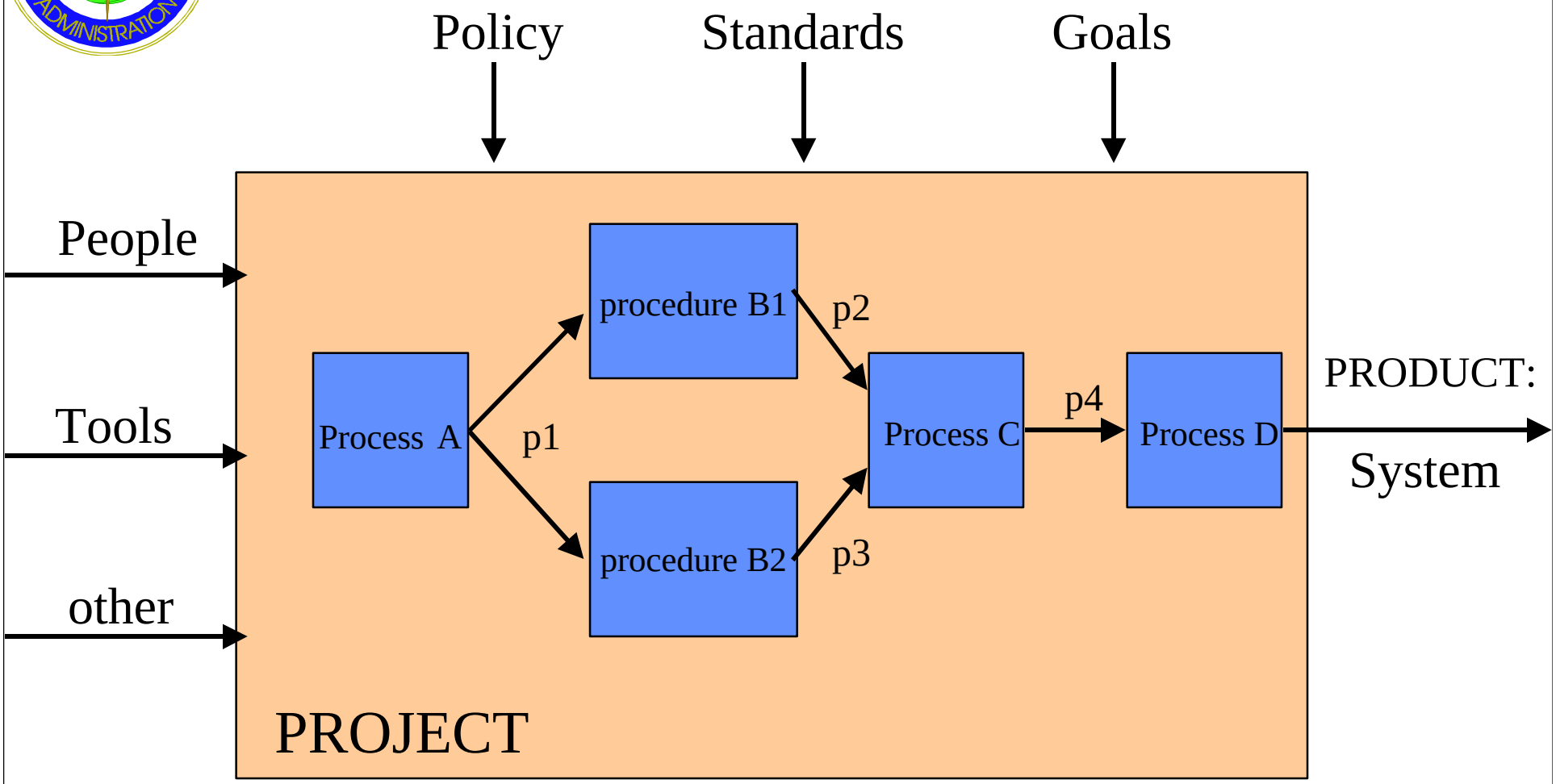
Lessons Learned

- get/keep management there at least until issues prioritized
- be sure all know their processes before class - including the trainers
- keep PSM overview at a minimum [60 min to 15]
- have a measurement example worked out as a template - related to anticipated FAA issues [eg, requirements]
- flush out the standard measurement plan template
- have ability to tailor PSM Indicator examples
- better guidance to get from hi-level qualitative issues to something to measure [eg; communications]

How Process & Project Measures relate

- **How do Process measures differ from Project measures?**
  - **Its how you slice it.**
    - **Aggregate it.**
      - **Level of detail.**
- **Process measures sum up to a project - for all activity in a process performed for that project**
- **Process activity estimates of resources, schedule for a given project product are based on its charateristics [product size, complexity] and historical relevant info [process efficiency, productivity]**

Project-Product-Process relationships



Process Effectiveness

- **Is the process doing the correct things?**
- **How well is it doing the right things?**
- **Is it doing what its supposed to be doing?**
- **Are there minimal defects in this process's product?**
- **Examples:**
  - **Does the Planning process result in realistic plans?**
  - **Is the Peer Review [or testing] process finding defects that are in the products?**

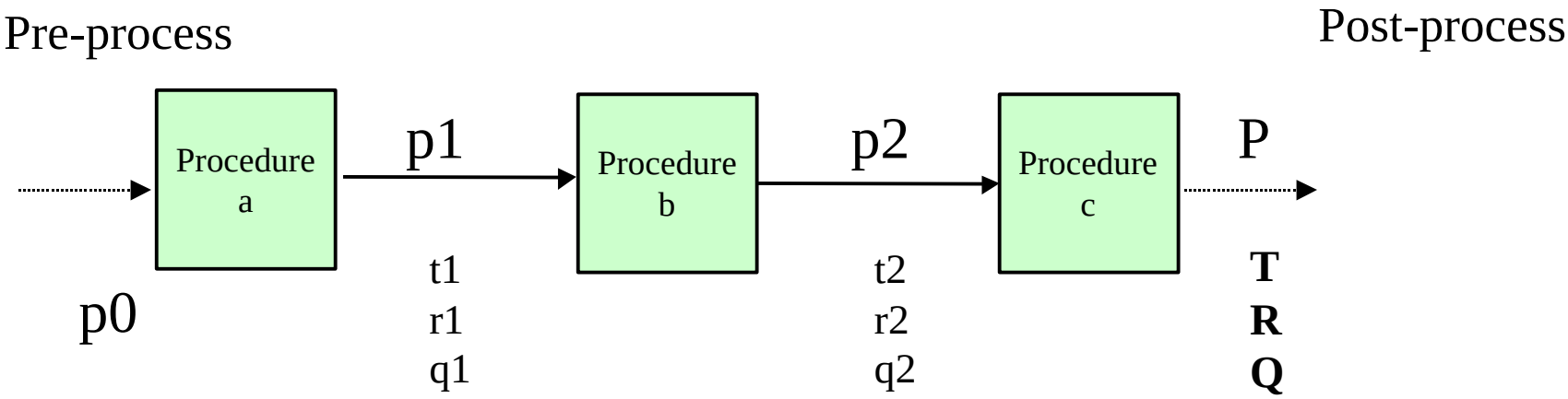
Process Efficiency

- **Is the process working properly with minimal resources?**
- **Is the process completing its activities in acceptable time?**
- **Is the process using its resources properly?**
- **Is there minimal rework required?**
- **Example:**
  - **Was the Requirements definition phase completed on time? within budget?**
  - **Was the peer review rate within plan?**

Generic Process measurement

by *'statusing' activities* /products …

1] schedule plan vs actual progress
2] resources expended vs plan
3] quality of product



t = time [cycle-time]
r = resources [$, effort]
q = quality [defects]
s = product size, units

Effectiveness = q/s
Efficiency = s/t, s/r
[usually compared to a norm]

Summary

- **FAA is serious about Process Improvement**
- **Measurement is key to knowing where we are, & how well we're doing**
- **PSM methodology provides a flexible basis**
- **Tailoring is needed to address systems & processes**

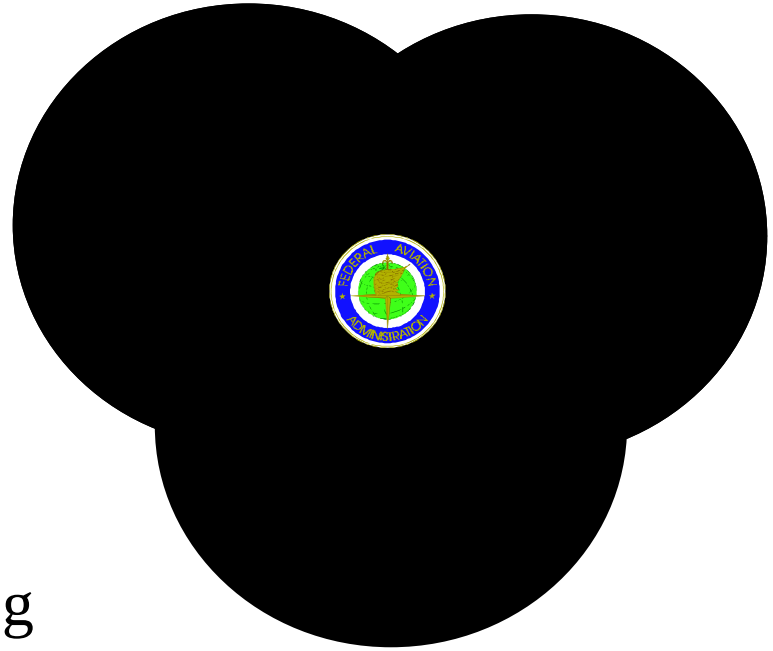
Any Questions?

Key Issues* for FAA Executives

- **Contractor Costs/Earned Value**
  - **within budget?**
- **Schedule Status**
  - **on schedule?**
- **Requirements Stability**
  - **is growth unexpected?**
- **Technical Risk Performance Parameters**
  - **performance risks status?**
    [can be quality, sw size,…]

*** general form: 6 months historical, 6 months projection - planned vs actual**

The FAA-Integrated Capability Maturity Model℠ [FAA-iCMM®]



Www.faa.gov/ait/sepg