

# Maintenance Measures and Measurement: A PDSS Viewpoint



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# Maintenance Measurement and Metrics

- Maintenance involves pursuit of the following tasks after the software is delivered to operations
  - New releases of operational code (28%)
  - Sustaining engineering activities (27%)
  - IV&V and IV&T (15%)
  - Acquisition management support (15%)
  - New software development (15%)
- Industry models exist, but are aimed at IT-based service level management (ITIL, etc.)
  - Service delivery and service support

# Objectives of Workshop

- Define the information needs and potential set of measures/metrics that might be useful in this domain
  - Must relate these needs to the different types of work PDSS shops perform as each has a different set of stakeholders
  - Must propose something that makes sense, else development measures/metrics will continue to be applied
- Determine whether it makes sense to apply service management concepts in the PDSS arena
  - Concepts seem to make sense as most of work performed (with exception of new software developments) are viewed as services
- Begin the process, get the community engaged

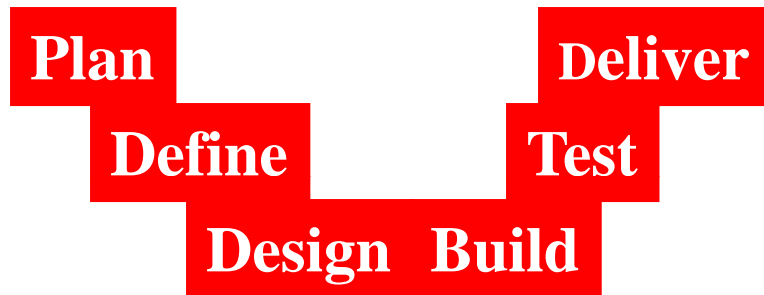
# Workshop Agenda

1:30 - 2:00	Introductions – Participant analysis - Your experience in maintenance, role in your organization
2:00 – 3:00	Findings of our Army maintenance study - Work done during maintenance in the PDSS arena - Metrics/measurement needs expressed by stakeholders - Typical constraints placed on organization/projects
3:00 – 3:45	Common issues and information needs in maintenance shops - Brainstorming and discussion - Assessment from both customer and supplier viewpoints
3:45 – 4:30	Available measures and metrics that satisfy these needs - Identify candidates and provide assessment of experience - Discuss applicability of service management concepts
4:30 – 5:30	Drafting of ICM entries/measurement specifications - Breakout groups if appropriate by type of work performed

# Maintenance in Context

## CMMI World

*“Build World Class Solutions”*



## ITIL

## World

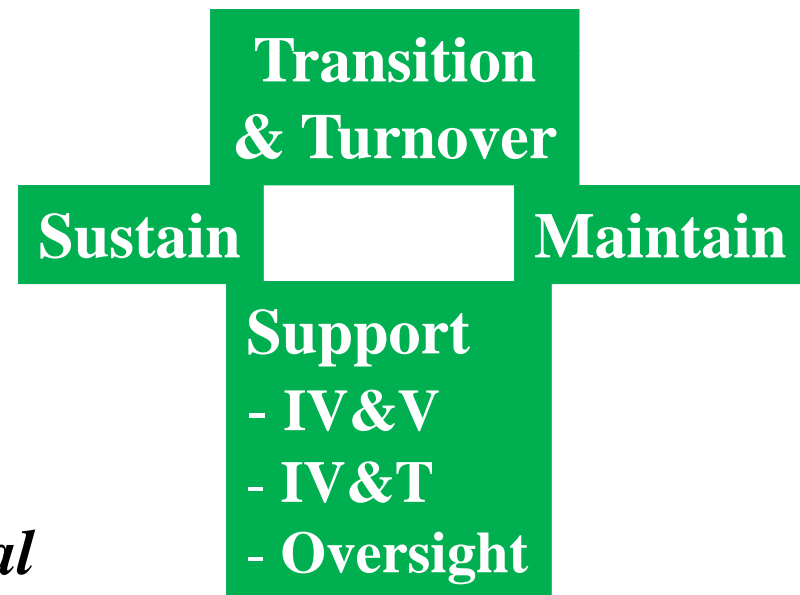
*“Provide  
Exceptional  
Service”*



## PDSS

## Maintenance World

*“Support Warfighter Needs”*

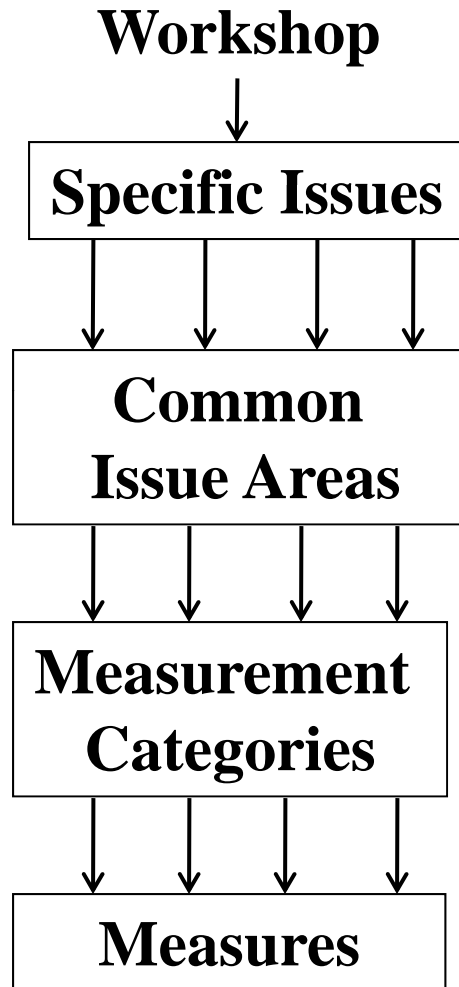


*ALL - “Measure to Manage”*

# Some of the Insights Needed

- Maintenance
  - Transition readiness
  - Release content
  - Cost/schedule goals being satisfied
  - Backlog reduction
- Sustaining engineering
  - Operational readiness
  - Facility readiness
  - Test effectiveness
  - Backlog reduction
  - Budget satisfaction
- IV&V/IV&T
  - Operational readiness
  - Test effectiveness
  - Error reduction
  - Budget satisfaction
- Oversight
  - Operational readiness
  - Supplier performance
  - Budget satisfaction
- Software development
  - Normal agile measures
  - Others

# Issue Mapping



Specific Issue	Common Issue Area
<ul style="list-style-type: none"> <li>- Sustaining budgets provided LOE</li> <li>- One year money</li> <li>- Only one charge number</li> </ul>	Cost and schedule progress
<ul style="list-style-type: none"> <li>- Never get to Cat. 3, 4 and 5 trouble reports</li> <li>- Cuts in budget handled by cuts in release scope</li> </ul>	Backlog management
<ul style="list-style-type: none"> <li>- Transition neither planned nor adequately handled</li> <li>- First year devoted to finishing product</li> </ul>	Transition management
<ul style="list-style-type: none"> <li>- Staff experience needed high</li> <li>- Staff retention low</li> </ul>	Human resources management

# Workshop Participants

- |                                       |   |
|---------------------------------------|---|
| 1. Donald Reifer, RCI,<br>Facilitator | 6. Douglas Mann, USAF                           |
| 2. Jill Ann Allen, USA                | 7. Sean Murphy, BAE<br>Systems                  |
| 3. Dennis Goldenson,<br>SEI           | 8. David Seaver, PRICE<br>Systems               |
| 4. Susy Iype, Elantech<br>Systems     | 9. Mimi Trinh, Lockheed<br>Martin Space Systems |
| 5. Shally Malhotra,<br>SAIC           | 10. Rick Welch, Northrop<br>Grumman             |



# Conclusions, Recommendations and Results - I

- Consensus reached on validity of study findings
  - Applicable to government and industry
  - Generally true with some slight variations
- Good handle on how to measure for about forty percent of maintenance effort scope
  - Block updates and new development
  - New metrics needed to reflect differences in the work performed (e.g., test effectiveness)

# Conclusions, Recommendations and Results - II

- Need to develop measures to gain insight into other sixty percent of work scope
  - Sustaining engineering (30%)
  - Acquisition support (15%)
  - IV&V/IV&T (15%)
- Agreed that better insight needed for total work scope
- Industry best practices has few examples for acquiring better insight into this work scope
  - Need to poll other parts of the businesses to see if they have some solutions

# Conclusions, Recommendations and Results - III

- Estimating challenges often driven by money issues for maintenance
  - Estimating and budgeting models, practices and methods do not adequately address maintenance's scope
  - Need to develop a more comprehensive Work Breakdown Structure (WBS) that address maintenance's full scope
    - We have developed draft WBS inputs for possible incorporation into MIL STD 881
  - Need to collect additional data and valid new heuristics for improved funding
  - Need to pilot new measures to validate effectiveness

# Candidate Measures

Common Issue Area	Management Category	Measure(s)
Schedule and Progress		
Resources and Cost		
Product Size and Stability		
Product Quality		
Process Performance		
Technology Effectiveness		
Customer Satisfaction		
Backlog		
Test Effectiveness		
Operational Effectiveness		

# Next Steps/Action Items

- Form a collaborators group (DONE)
- Setup a web site for collaboration (IN PROCESS)
- Poll collaborators to pinpoint access information about metrics used within other parts of their organizations that may be applicable
- Continue data collection at Army and Air Force sites
  - Focus on space business starting next month
  - Continue to gather data for the aircraft and missile domains
- Formulate measures, metrics and models to fill gaps
- Make incremental improvements (do what we can)

# Conclusions

- Working groups was very engaging
- Participants were open and courteous
- Workshop was very worthwhile
- I would like to than everyone for their participation