Optimizing the Measurement Process

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Harris Corporation / DNV
Government Communications Systems Division: What We Do

- **Aviation electronics**
- **Intelligence, surveillance, and reconnaissance**
- **Space and ground satellite communications systems**
- **Communications and information networks**
- **Operations and support services**

We innovate, integrate, and manage technology.
Introduction
- Background
- Goals and Objectives
- Terminology
- Approach

Roadmap
- Characteristics of Success
- Measurement Analyst
- User Viewpoints
- Automation as an Enabler
- Leading Indicators

Results
- Information Needs
- Measurement Objectives
- Executive Management Viewpoint
- Indicator Improvements
- Lessons Learned

Summary
Harris CMMI® Level 3 compliant since 11/2005
Measurements used regularly for program monitor and control
Need for improvement still recognized
Measurement process relies on manual input
Perception too many measures, some measures redundant
Management desires increased emphasis on fact based decision making
**Goals**

- Improve measurement and analysis effectiveness
  - Enhance measurement infrastructure to improve
    - Efficiency & value
    - Predictability
    - Competitive advantage
  - Reduce quantity of measures to effectively manage programs and align with division objectives
  - Increase number of leading indicators

- Improve measurement foundation for advancement to CMMI® Level 4 or 5
Objectives

- Develop simple, consistent, reliable measurements
- Reuse or modify existing measurements
- Provide rapid access to fresh, actionable information
- Examine quality and completeness of data
- Increase consistency with industry standards
- Increase predictability of program execution
- Facilitate straight-forward and objective analysis of measures
- Enable automated collection of data and creation of indicators
- Evaluate adequacy of existing data to support high maturity analysis
**Optimizing the Measurement Process**

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**User Viewpoint**

**Information Product**

**Program CPI Chart**

**Examples:**

**Combination of Indicators and Interpretations**

**Level of Analysis and Flexibility**

**Indicator**

**CPI with Thresholds**

**Base or Derived Measure With Decision Criteria**

**Measurement Specification**

**Derived Measure**

**CPI = BCWP / ACWP**

**Function of Two or More Base Measures**

**Level of Data Collection and Standardization**

**Base Measure**

**BCWP, ACWP**

**Quantification of a Single Attribute**

**Repository Content**

**Attribute**

**Cost**

**Characteristic of a Process or Product**

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Examples:

**BCWP, ACWP**

**CPI = BCWP / ACWP**

**Program CPI Chart**

**Combination of Indicators and Interpretations**
Utilize an independent industry measurement expert to validate and achieve maximum results

Identify classes of measurement users

Define information needs of users, based on
- User role and responsibilities
- Business and improvement objectives

Specify indicators
- Define leading and concurrent indicators
- Use existing measures where possible

Conduct reviews with stakeholders

Update command media

Deploy incrementally
- Characteristics of Success
- Measurement Analyst
- User Viewpoints
- Automation as an Enabler
- Leading Indicators
Characteristics of Success

- Measures based on business goals
- Comprehensive measurement planning
- Measurement expertise
  - Training in defining, collecting and analyzing measures
  - Mentoring and advice
- Appropriate resources
  - Robust tool support
  - Measurement analysts
- Management support
- Broad participation
Use of measurement is a part of everyone's job

Additional expertise maximizes effectiveness

- Recognize significant trends
- Communicate with data providers and decision makers
- Efficient & consistent execution of measurement process

Areas of expertise

- Design/Plan measures and process
- Training and mentoring
- Analysis and interpretation to support decision makers

Often a part time job

- Program level support
- Organizational level support
Different users and purposes require different subsets of measures
Objectives for Automation

More Timely Access to Data and Analysis

- Makes data immediately available
- Facilitates drill down to investigate anomalies
- Makes information available in time to affect business and project outcomes
- Facilitates gathering and analyzing data for lessons learned
- Make data widely accessible

Improved Data Quality

- Ensures more complete data
- Reduces transcription errors
- Removes redundancy and inconsistency in data reporting
- Easily supports users with different information needs

Reduced effort for producing measurement reports
Å Definition
   • Has predictive value, provides early warning of trouble (in time to affect the outcome)

Å Types of leading indicators
   • Observed trends predict future results of that indicator
   • Changes in one indicator predicts future results of another indicator
   • Constraints that limit performance

Å Obstacles for leading indicators
   • Cumulative measures and percentages
   • Inconsistent measurement definitions
   • Delays in data collection and analysis
   • Subjective criteria and reporting
Information Needs
Measurement Objectives
Executive Management Viewpoint
Indicator Improvements
Lessons Learned
<table>
<thead>
<tr>
<th>Role</th>
<th>Needs</th>
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| Program Team Members | • Implement processes effectively  
• Produce quality products  
• Complete tasks on-time |
| Program Team Leaders | • Estimate and plan  
• Monitor and control |
| Customer | • Monitor product quality  
• Monitor performance to plan  
• Verify appropriate capability delivered to field |
| Functional Management | • Develop improvement plans with measurable objectives  
• Improve functional processes across projects  
• Develop staff within functions  
• Provide historical data for estimating |
| Executive Management | • Provide program oversight (project by project)  
• Ensure overall process/organizational health (across projects)  
• Achieve organizational financial performance (across projects) |
Executive Management Information Needs and Measurement Objectives

Â Provide program oversight (program by program)
   • Meet customer expectations & satisfy the customer
   • Produce a high quality compliant product
   • Perform in accordance with the agreed to cost & schedule
   • Meet program objectives

Â Ensure overall process/organizational health (across programs)
   • Increase productivity in all functions (increase effectiveness)
   • Reduce program rework (early & effective removal of defects across the product life cycle)
   • Increase predictability of program performance
   • Increase accuracy of program estimates
   • Maintain CMMI Level 3 maturity rating
   • Foster a rewarding & satisfying work experience for Harris employees

Â Achieve organizational financial performance (across programs)
   • Meet Annual Operating Plan (AOP) objectives
Provide program oversight (project by project)

- Meet customer expectations and satisfy the customer.
  - Technical Performance Measures
  - Risk Summary
  - Award Fee Graphs
  - Customer Satisfaction Data

- Produce a high quality compliant product.
  - Defects by Phase
  - Defects Currently Open and Total Closed
  - Defect Severity Tracking
  - Technical Performance Measures
  - Process Compliance Data

™ indicates leading indicator
Provide program oversight (project by project)

- Perform in accordance with the agreed to cost and schedule.
  - Milestone Progress
  - Staffing Tracking
  - Requirements Tracking
  - EVMS Tracking
- Deliver the expected Return on Sales (ROS) on the project.
  - Investment Profile
  - Financial Objectives
  - Sales, Order, Profit Tracking
Ensure overall process/organizational health (across programs)

- Increase productivity in all functions
  - Efficiency Measures
- Reduce project rework
  - Rework Effort Tracking
  - Defect Phase Containment Tracking
- Increase predictability of project performance
  - Earned Value Management System (EVMS) Reports
- Increase accuracy of project estimates
  - Project Characterization Worksheet Analysis by Function
Ensure overall process/organizational health (across programs)

- Maintain CMMI® Level 3 maturity rating
  - Process Compliance Data
- Foster a rewarding and satisfying work experience for Harris employees
  - Organizational Training Reports
  - Employee Engagement Surveys
Achieve organizational financial performance (across programs)

- Meet AOP objectives
  - Investment Profile
  - Financial Objectives
  - Award Fee Tracking
  - Sales, Order, Profit Tracking
Å Number of overall Indicators needed was reduced
Å Number of leading indicators was increased
Å Some objective indicators added to balance subjective indicators
Using a systematic framework helps organize the process

- Measurement process needs to evolve with the organization
- Tool considerations cannot be ignored
- Objective, external advice helps validate
- Expect resistance to change
- Efficiency measures should be determined by the functional organizations
CMMI® compliance doesn’t ensure and efficient and effective measurement program

A systematic approach is essential to balancing user measurement needs

Next Steps
- Develop Executive Management viewpoint first
  - Set expectations for leadership & program teams
  - Refine business objectives
- Develop other user viewpoints over time
- Measurement & Analysis training
- Develop a Business Intelligence (BI) architecture, design and deployment plan
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Optimizing the Measurement Process