NATIONAL RECONNAISSANCE OFFICE

NRO Program Assessments
Best Practices and Lessons Learned

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Agenda

- Mission / Drivers
- Goals
- Where Are We Now?
  - Current Processes
- Define Good Metrics - Best Practices/Lessons Learned
  - PM Survey
  - Industry Research
  - Recommendations
- Ongoing Improvements
  - Cross Program Analysis
  - NRO Program Assessment Dashboard (N-PAD)
Identify and implement better metrics to provide the ability to identify program-specific and systemic issues earlier in a program than current cost, schedule and performance metrics provide.
Drivers

- The USD (AT&L) memo “Better Buying Power” (Sept. 14, 2010)
  - Conduct reviews that “support major investment decisions or to uncover and respond to significant program execution issues”

- OMB has asked for additional details programs funded to an Agency Cost Position (ACP) rather than an Independent Cost Estimate (ICE) from an oversight organization (e.g. ODNI, OSD CAPE)

- Ms. Betty Sapp (Principal Deputy Director, NRO)
  - Current tools provide too little emphasis on program vice contract performance
  - Difficult to interpret impact of current data on PMP performance baseline
  - Same level of detail for “good” and “poor” performing programs
  - Current program assessments don’t give sufficient insight to decision makers
Program Assessment Goals

- Leverage existing data and processes to maximum extent possible
- Minimize the effort of data collection while improving the usage of objective performance data
  - Only measure what provides genuine insight
- Synthesize data to efficiently focus leadership on potential trouble areas
  - Focus on technical metrics that provide necessary insight at major decision points
- Emphasize leading/predictive measures
- Include input and buy-in from Program Offices and other stakeholders
Where Are We Now?

- NRO CAIG provides diverse cost and EVM support throughout program acquisition life cycle
- Maintains a database of over 2000 space hardware data points
- Vast program historical data (cost data plus EV Central Repository data)
  - CFSR, CPR, IMS, CDRL, etc
- Current capabilities do not include automated data processing or reporting
- Due to the raw state of CPR data in the central repository, many of the basic earned value metrics such as Cost Performance Index, Schedule Performance Index, Cost variance, etc. are not directly accessible.
Current Processes

Program assessment occurs continuously throughout the acquisition cycle

Must determine the “right” metrics
Approach to Improved Metrics

- Conducted an NRO Program Manager survey to assess effectiveness and relevance of current metrics
- Conducted outside research to better understand the application of program metrics/indicators in program performance reviews
  - Held discussions with other Government entities
    - Federal Aviation Administration (FAA)
    - Naval Air Systems Command (NAVAIR)
  - Reviewed public domain information regarding other Government entities established program performance rating systems
    - Defense Acquisition Executive Summary (DAES)
    - Probability of Program Success (POPS)
  - Reviewed papers written on the topic
    - Leading Indicators vs. Lagging Indicators
    - What makes a good metric
- Compared all information to current package and developed gap analysis as well as recommended best practices/lessons learned
Current Program Assessment Gap Analysis

- Primarily focuses on lagging indicators rather than leading indicators
- Weak representation of technical metrics and indicators which could be leading indicators of future cost and schedule issues
- Lacks program roll-up summary based on detailed metrics (summary level scorecard)
- Current assessments tend toward a snapshot in time versus trending over time
- No synthesis of varied information into an overall program health
- Data fails to relate a comparison to the cost, schedule, or technical baseline
Summary of PM Survey Comments

- Redundant cost data
- Allow PMs to discuss what they believe is important
- Should have traceability to the PMP parameters.
- Reported as numbers should be shown as historical trend over time.
- Should show quality of work completed, which indirectly relates to performance.
- Need to see trends in Master Schedule over extended periods (i.e. several quarters) to see how margin is decreasing, critical path is doing
- Criteria for risk impact and probability
- Discuss more on how delivered capabilities enhanced mission success.
- Discuss contract performance with a single backup chart showing overall performance to the PMP criteria similar to past QPRs.
- For rebaselined programs, metrics should be measured against new baseline.
- Top line Cum SPI and Cum CPI are useless metrics for a program that has reset S & P equal to A - use metrics since contract reset
- Measurement should be at PMP baseline level, not technical or contract level.
Characteristics of a Good Metric

- **Consistent** - Criteria and calculations must be consistent with respect to time
- **Honest** assessment - good, bad or ugly
- **Actionable** – include only metrics that you will act on
- **Predictable** – predictability statement should be made when time-series tracking indicates that a process is predictable
- **Time-series** tracking – can describe trends and provide leading rather than lagging indicators
- **Relevant** – Must provide insight to performance, issues and requirements
- **Repeatable** and reproducible - Measurements should have little or no subjectivity
- **Specific** – Well defined measure that includes metric owner, frequency, definition and rating criteria
Leading Indicator Definition

A measure for evaluating the effectiveness of how a specific activity is applied on a program in a manner that provides information about impacts that are likely to effect the system performance objectives

- An individual measure or collection of measures that are predictive of future system performance
  - Predictive information (e.g., a trend) is provided before the performance is adversely impacted
- Measures factors that may impact the system engineering performance, not just measure the system performance itself
- Aids leadership by providing insight to take actions regarding:
  - Assessment of process effectiveness and impacts
  - Necessary interventions and actions to avoid rework and wasted effort
  - Delivering value to customers and end users
Choosing Your Metrics

 Likely program performance measures include:

- Cost
- Schedule
- Performance
- Risks
- Funding
- PM Assessment

Choose and define specific metrics within each performance measure that fit your program.
**Metric Definition Example**

**Metric**: Cost Performance Index (CPI)

**Metric Owner**: EVM Team

**Data Provider**: Program Office

**Frequency**: Monthly

**Definition**: The ratio of budgeted costs to actual costs. A value greater than 1 indicates that costs are running under budget. A value less than 1 indicates that costs are running over budget.

**Formula**: CPI = Earned Value/Actual Costs

**Red/Yellow/Green Criteria**:
- Green: CPI > 0.95
- Yellow: 0.90 < CPI < 0.95
- Red: CPI < 0.90

Determine a precise description that defines a method to obtain the value for the metric being measured as well as the criteria for success.
Refining the Data

There are multiple metrics and assessment tools already in place at all levels of the management pyramid, but they may be looked at in isolation.

The key is to:

- leverage the tools already in place
- choose the right metrics
- refine and synthesize disparate information into a coherent overall picture for decision makers.
You can then determine / define consolidated performance measure ratings and an overall program rating in the same way based on individual metric ratings.
Where Are We Going?

- The NRO Program Assessment Desktop (N-PAD) under development will serve as automated and flexible tool that will assist senior management, acquisition managers, and analysts in monitoring program execution and performance as well as enabling cross-program/portfolio analysis.

- The N-PAD will integrate data at all levels across the life cycle of a program allowing for more efficient and in-depth analysis, and updated status of program health over time.
The N-PAD will provide a suite of web-enabled capabilities supporting:

- “Real-time” dashboard views of program performance for Executives
- Automated data upload, document posting and retrieval, and program analytics for Program Management
- Cross program/portfolio analysis at various levels of detail.
Includes:

- Executive Dashboard for senior leaders
- Program Manager’s View for managers
- Program Data Management page for uploading current program data.

Central location for existing program assessment tools and reports.
Level of detail provided depends on which tier you are in and what permissions you have.
Analysts will use N-PAD to perform detailed EV surveillance of programs as well as cost estimation for current and future programs.

N-PAD leverages existing tools and infrastructure in the NRO Enterprise. It will provide capabilities to export data in formats required by NRO standard tools such as wInsight, MS Project, and MS Excel.
Questions
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Back-Up
### DCMA 14 Point Analysis

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<th>ID</th>
<th>Description</th>
<th>Baseline</th>
<th>ACT</th>
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<td>1</td>
<td>Logic Problems (&lt;5%)</td>
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<tr>
<td>2</td>
<td>Leads (0%)</td>
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<td>Legs (&lt;5%)</td>
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<td>4</td>
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<td>5</td>
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<td>6</td>
<td>Total Float &gt;44d (0%)</td>
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<td>Negative Float (0%)</td>
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<td>0%</td>
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<td>8</td>
<td>Duration =44d (0%)</td>
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<td>0%</td>
</tr>
<tr>
<td>9</td>
<td>Invalid Dates (0%)</td>
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<tr>
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<td>0%</td>
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<td>11</td>
<td>Missed Tasks (0%)</td>
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<td>13</td>
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<td>14</td>
<td>Baseline Execution Index (&gt;0.95)</td>
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This metric ensures that high amounts of total float are not found within the schedule. Should the schedule fail the Metric #8 test, some areas to begin the investigation are missing predecessors/successors; incorrect sequencing of predecessors/successors; too many predecessors/successors connected to a milestone/task; or missing scope. This list is not all inclusive and the failure may be a result of several of these factors combined. Default setting is 44d. Customer may specify different time value as long as it is agreed upon by all parties involved. Investigation into values over 5% should be initiated.
MGM11: NRO Program Assessments - Best Practices and Lessons Learned

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Abstract: The National Reconnaissance Office (NRO) performs program assessments for a variety of purposes: the management of acquisition programs; portfolio analysis for resource allocation; and accountability to NRO’s oversight organizations - Execution to Oversight. The NRO Cost Analysis Improvement Group (CAIG) recently stood up a Program Assessment group to continuously improve the NRO’s program assessment process to become more efficient, consistent and standardized. This presentation provides the NRO’s approach to each level of the Execution to Oversight pyramid. We will provide insight into the current processes being implemented and improvements being made, a new tool under development called the NRO Program Assessment Dashboard (NPAD), and observations of industry best practices being considered for potential future improvement of NRO processes.

Execution to Oversight -

Cost/Schedule/Contract Execution:
The NRO Program Assessment Dashboard (NPAD) leverages CPR, CFSR, IMS, Winsight tools and Schedule Wizard to centralize program assessment information and make it accessible to senior leaders. NPAD is designed to provide portfolio wide comparisons in standard formats and enable drill down into deeper levels of detail as required. We will also present automated tools to provide in depth program execution analysis (e.g. schedule analysis and data quality assessment).

NRO Program Assessment:
The NRO has implemented program assessment processes that inform Program Managers, Agency management and external oversight. The CAIG is currently reviewing and updating these processes in order to use our program assessment capabilities to better manage NRO programs. We have broadened our support to IBRs to include detailed analysis of current programs compared to historical data. We are performing GEAC analysis at the corporate level providing deeper insight into the organization performance and have developed improved program management metrics for NRO leadership. At the program level we have developed standard work breakdown structures and standard templates to enable consistent cross program comparisons. We are integrating cost and EVM analysis in new ways to provide better prediction of cost and schedule outcomes.

ODNI/OMB Oversight:
The NRO provides Quarterly Program Reviews to external oversight organizations. We are currently assessing industry best practices to evolve and improve program oversight metrics for more efficient, consistent and standardized quarterly reporting.

Each of these steps has been designed to provide deeper insight and understanding using more efficient processes. In this briefing we will share our findings, recommendations, and challenges and solicit feedback on ways to continuously improve our program assessment capabilities.