A Question of Response Rate
(within US Army Cargo Helicopter PM)

SSTC – April 2010
Mamie Danley Morgan
Mike Cowperthwait
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Cargo Helicopters Project Mgmt Office, 5678 Jicks Road, Huntsville, AL, 35898

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Standard Form 298 (Rev. 8-98)  
Prescribed by ANSI Std Z39-18
Agenda

- Environment / Infrastructure
- What Needed to be Done
- What We Did
  - Lean Six Sigma Project
    - Define
    - Measure
    - Analyze
    - Improve
    - Control
- The Results
- Challenges
- What We Learned
The environment is a typical high-visibility, rapid fielding government *acquisition* organization; our process, while repeatable, only deals with “custom” articles whose lead time is 18+ months per item.
DoD 5010.12–M Procedures for the Acquisition & Management of Technical Data, May 1993:

“An organizational element shall be assigned responsibility for monitoring the distribution of contractor–prepared data. Specifically, procedures shall be established to ascertain actual receipt of the data and to ensure that all contractual requirements relative to technical data have been met…”

Lack of a management tool & a documented process in CH–47F Product Office meant:

- No predictive analysis
- Lack of document version control
- Data not readily available when needed
- Unclear document status
- Redundancies
- Lack of cross–checks
- No review time gates
- Lack of CDRL “ownership”
- No automatic routing
- No way for management to view status
- Time–intensive reporting
What We Did – 2-Pronged Approach

- **Tool:** CH-47F DPM provided direction to CM/DM Lead (Mike) to investigate, evaluate, and purchase a CDRL management software tool

- **Process:** CH-47F DPM directed Cargo Process Improvement Lead (Mamie) to charter a process action team addressing CDRL review

Lean Six Sigma Project

- Define → Measure → Analyze → Improve → Control

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Timelines

<table>
<thead>
<tr>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct Nov Dec</td>
<td>Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar</td>
<td></td>
</tr>
</tbody>
</table>

**Tool**
- IMO Tool Analysis
- CDRLvue Selection & Purchase

**DPM Direction**
- Expansion of Scope

**Process**
- Working Meetings / Process Development
- Kickoff Meeting
- CDRLvue goes "live"
- MY Contract Award

**Initial Data Analysis & Migration**
- Kickoff Meeting
- 2 pilot contracts data migration complete

**Remaining Data Migration**
- MY Post-Award Conf

**User Training**
- PMO Training

**Training Package Development**
- Process Document Complete
- Process Staffing
- Process Approved

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Project Title: Improving the Product Line’s Data Item Deliverable Response Rate

Definitions

- Contract Data Requirements List (CDRL) – DD Form 1423: The standard format for identifying potential data requirements in a solicitation and deliverable data requirements in a contract.
- Data Item Deliverable (DID) – DD Form 1664: A form that defines the intended use, preparation instructions, and content and format requirements for a specific data product.
The Charter

- Project Description
  - Improve response rate to the customer (vendor) after internal product line review.

- Business Case
  - Internal Government review of Vendor (Contractor) CDRLs were exceeding that period of time that was designated in the contract.
    - The lateness of responses causes delays in testing efforts, suspension of sub-contractor production, and impedes acquisition of long-lead items.
    - This has a domino effect, slipping an already tight production and fielding schedule of a critical wartime asset.
**Suppliers = Vendors (Contractors/OEMs)**

Vendor Submits CDRL

**Inputs = CDRLs**
- Analysis Documents
- Contract Documents
- Cost Reports
- ECPs
- Plans
- Prod Specs (PD)
- Technical Reports
- Test Plans

**Government receives, logs & distributes CDRL**

**Govt reviews, integrates & prepares letter then forwards**

**Outputs =**
- Disposition Recommendations
- Official Letter

**Customers = Vendors (Contractors/OEMs)**

Vendor Receives CDRL Disposition

The product line’s response dates are specified in the contract with each requirement having a unique due date.
Starting Metrics

Response rates to the customer (vendor) after internal Government review.

<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Percentage</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-30 days</td>
<td>11, 19%</td>
<td></td>
</tr>
<tr>
<td>31-60 days</td>
<td>6, 11%</td>
<td></td>
</tr>
<tr>
<td>61-100 days</td>
<td>12, 21%</td>
<td></td>
</tr>
<tr>
<td>101-200</td>
<td>9, 16%</td>
<td></td>
</tr>
<tr>
<td>201-400</td>
<td>3, 5%</td>
<td></td>
</tr>
<tr>
<td>401+</td>
<td>4, 7%</td>
<td></td>
</tr>
<tr>
<td>Pending</td>
<td>0, 0%</td>
<td></td>
</tr>
</tbody>
</table>

Goal:
Increase percentage rates of:
1. 61–100 days overdue,
2. 31–60 days overdue;
3. 0–30 days overdue; &
4. Pending

Project Sponsor/Owner imposed acceptable limit:
Upper Requirement Limit < 120 days

Note: All data used in calculations (not sample data)
Descriptive Statistics
- Distribution = Non-Normal
- Mean = 259
- Median = 105
- Standard Deviation = 397.7

Confidence Interval for the Mean: One-Sample T, Box Plot & Histogram
- Conclusion: It is taking too long to respond to the data item deliverable.

Process Capability – process is NOT capable.

Process Probability – low probability that we can make predictions.
Cause & Effect Diagram (or Fishbone)

- **Color**
  - Red: Old data in database & XYZ Form
  - Blue: Little Management Support
  - Purple: Lack of Standard Operating Procedure (SOP)/Training

- **Root Cause**
  - Old data in database & XYZ Form
  - Little Management Support
  - Lack of Standard Operating Procedure (SOP)/Training

- **Machine/Tool**
  - Former tool not utilized
  - Input errors
  - History - lack of tool
  - Resistance to tool spotlight issues

- **Process/Procedure**
  - 1-fault tolerant (bottleneck)
  - XYZ issues
  - Excessive time in review & comments
  - No documented process
  - No process/norm training
  - Lack of delivery schedule
  - Lack of ownership transfer
  - Not made a priority or emphasis

- **Skills/People**
  - Employee turnover
  - Organizational knowledge lost
  - Resistance to change
  - Copy/paste used instead of cut
  - XYZ filled out incorrectly

- **Management**
  - Response Rates Overdue
Action Plan

- **Root Cause** – XYZ Form
  - Research the form and interview individuals to identify the “problem areas”.
    - “App Code” field
    - “Authority” field
    - “Requiring Office” field
    - “Remarks” field
    - “Distribution” field

- **Root Cause** – Old data in database
  - Perform housecleaning – reviewed & dispositioned every single CDRL

**Out-of-date, but DoD Mandated Form**
Addressed all findings in Form Training/ Cheat Sheet
Action Plan (cont)

- **Root Cause** – Little Management Support
  - Develop a Dashboard

![Comparison of Responses Overdue](image)

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Action Plan (cont)

- **Root Cause** – Lack of Standard Operating Procedure (SOP) / Training
  - Develop a Value Stream Map
  - Voice of the Customer (VOC) Questionnaires
  - Draft SOP & Training Materials
    - SOP Training
    - Form Training
    - Cheat Sheet
Value Stream Map

Process Cycle Time: 12,980 minutes (5.4 work weeks)
Process Time: 2,640 minutes (44 hours, 1.1 work weeks)

What should be taking 1.1 work weeks (or 5.5 days) is taking 5.4 work weeks (27 days).
Ending Metrics

- Descriptive Statistics
  - Distribution = Non-Normal
  - Mean = 57
  - Median = 10
  - Standard Deviation = 107.3

- Confidence Interval for the Mean: One-Sample T, Box Plot & Histogram
  - Conclusion: It is taking too long to respond to the data item deliverable.

- Process Capability – process is NOT capable.

- Process Probability – low probability that we can make predictions.
Conclusion: The Mean, Standard Deviation and Variance have all been decreasing throughout the efforts per the data collected and compared below, but the process remains incapable, unstable, and unpredictable. There is still a high level of variability in the process.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Count</th>
<th>N</th>
<th>N*</th>
<th>Mean</th>
<th>SE Mean</th>
<th>StDev</th>
<th>Variance</th>
<th>Minimum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/5/09 Days Overdue</td>
<td>57</td>
<td>57</td>
<td>0</td>
<td>259.3</td>
<td>52.7</td>
<td>397</td>
<td>158199</td>
<td>-85.0</td>
</tr>
<tr>
<td>2/7/09 Days Overdue</td>
<td>72</td>
<td>72</td>
<td>0</td>
<td>201.4</td>
<td>41.8</td>
<td>354.9</td>
<td>125929</td>
<td>-38.0</td>
</tr>
<tr>
<td>3/6/09 Days Overdue</td>
<td>45</td>
<td>45</td>
<td>0</td>
<td>60.8</td>
<td>16.1</td>
<td>108.1</td>
<td>11681.4</td>
<td>-69.0</td>
</tr>
<tr>
<td>4/10/09 Days Overdue</td>
<td>40</td>
<td>40</td>
<td>0</td>
<td>56.0</td>
<td>17.0</td>
<td>107.3</td>
<td>11515.5</td>
<td>-59.0</td>
</tr>
<tr>
<td>5/13/09 Days Overdue</td>
<td>47</td>
<td>47</td>
<td>0</td>
<td>41.6</td>
<td>13.9</td>
<td>95.1</td>
<td>9045.3</td>
<td>-61.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Q1</th>
<th>Median</th>
<th>Q3</th>
<th>Maximum</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/5/09 Days Overdue</td>
<td>8.0</td>
<td>105.0</td>
<td>286.0</td>
<td>1493.0</td>
<td>1.63</td>
<td>1.48</td>
</tr>
<tr>
<td>2/7/09 Days Overdue</td>
<td>-3.0</td>
<td>71.5</td>
<td>154.3</td>
<td>1460.0</td>
<td>2.03</td>
<td>3.07</td>
</tr>
<tr>
<td>3/6/09 Days Overdue</td>
<td>-22.0</td>
<td>8.0</td>
<td>166.5</td>
<td>289.0</td>
<td>0.76</td>
<td>-0.81</td>
</tr>
<tr>
<td>4/10/09 Days Overdue</td>
<td>-20.8</td>
<td>10.0</td>
<td>151.0</td>
<td>269.0</td>
<td>0.94</td>
<td>-0.66</td>
</tr>
<tr>
<td>5/13/09 Days Overdue</td>
<td>-13.0</td>
<td>12.0</td>
<td>51.0</td>
<td>302.0</td>
<td>1.73</td>
<td>2.00</td>
</tr>
</tbody>
</table>
Sustaining

- Utilize Dashboard
- SOP & Form Training completed
- Cheat Sheet distributed
- Control Plan put in place
- Data collection continues
The Results

- Reduced the average late response rate from ~260 days to ~42 days in 6 mo.
- Captured a one-time cost avoidance of ~$623,000.
- A large reduction in the backlog of data item deliverable responses
- Reduced waste and increased throughput
- Improved organizational capability to operate more efficiently and effectively.
The Results – Calculations

<table>
<thead>
<tr>
<th></th>
<th>Every how many days</th>
<th>Time it takes (manhours)</th>
<th>total per 10 days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Updating Schedule</td>
<td>10</td>
<td>N</td>
<td>$N</td>
</tr>
<tr>
<td>DM sends Reminders</td>
<td>10</td>
<td>N</td>
<td>$N</td>
</tr>
<tr>
<td>Reviewers (3) Re-Education</td>
<td>20</td>
<td>N</td>
<td>$N</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>total $NNN</td>
</tr>
</tbody>
</table>

1/5/09 Days Overdue / 10 days + ~ $647,318
4/10/09 Days Overdue / 10 days = ~ $23,722

Cost Avoidance = ~ $623,596
Challenges

- Installation of a new integrated software system to manage data deliverables;
- Regulatory requirements to operate within strict DoD Acquisition processes and guidelines;
- An out-of-date, but DoD mandated form;
- Need of an organizational Standard Operating Procedure (SOP); and
- Lack of an effective means of reporting review and response status to the management.

- Will not realize any benefits from SOP & Form Training for 12+ months
What Did We Learn

- Need to make improvements personal – how does it affect “me”
- Improvement has a domino effect
- Improvements build on each other
- Need for closely managing the pace of change
- Commonality & consistency
- Importance of training (tool & process)
Contact Information

- **Mamie Danley Morgan**
  CH-47 Process Improvement Lead, Black Belt
  QinetiQ North America
  (256) 313–0716   DSN: 897–0716
  mamie.morgan@us.army.mil

- **Mike Cowperthwait**
  CM/DM Lead
  Cargo Helicopters Project Mgmt Office
  (256) 876–4583   DSN 746–4583
  BB: (256) 509–6380   Fax: (256) 313–1915
  michael.cowperthwait@us.army.mil

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