



HARRIS

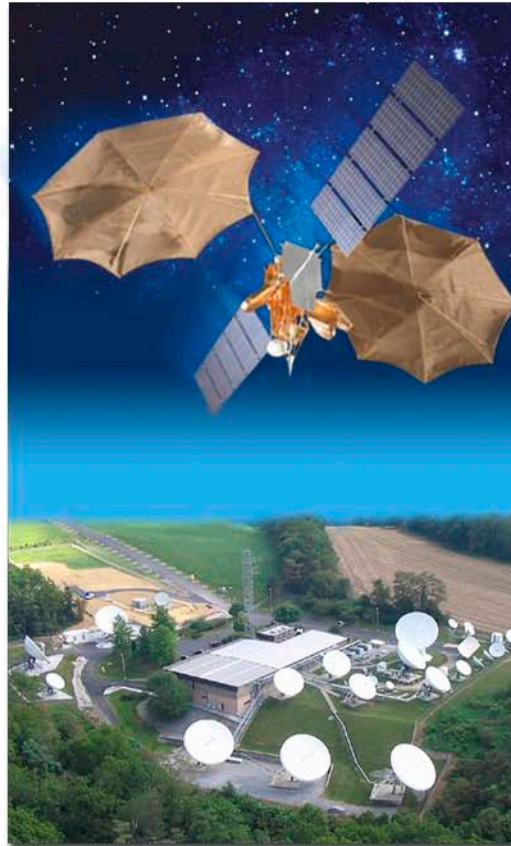
**Assured Communications™
Anytime. Anywhere.**

Process Improvement by the Numbers

*Debra Perry and Jim Goss
Harris Corporation
November 17, 2010*



Industry-leading avionics



Space and ground satellite communications systems



Communications and information networks



Intelligence, surveillance, and reconnaissance



Operations and support services

Mission Critical Solutions. Anytime. Anywhere.

- Background
- Lean Six Sigma
- Situation
- Process
- Results
- Conclusion
- Suggestion

- Process Improvement is a learned skill
- To increase awareness and capabilities Harris adopted Lean Six Sigma (LSS)
 - Encourages team members to look for ways to improve processes by
 - Quantifying the process
 - Recommending a change
 - Measuring the improvement
 - Teaches skills to assist in the efforts
 - Lean Fundamentals – eliminate waste
 - Simulation – understand system performance
 - Change behavior – people skills
 - Six Sigma tools – statistical skills to reduce variability

A set of principles, concepts, and techniques designed to enable key processes to produce an optimum system that will deliver to our customers:

Exactly what they need

When they need it

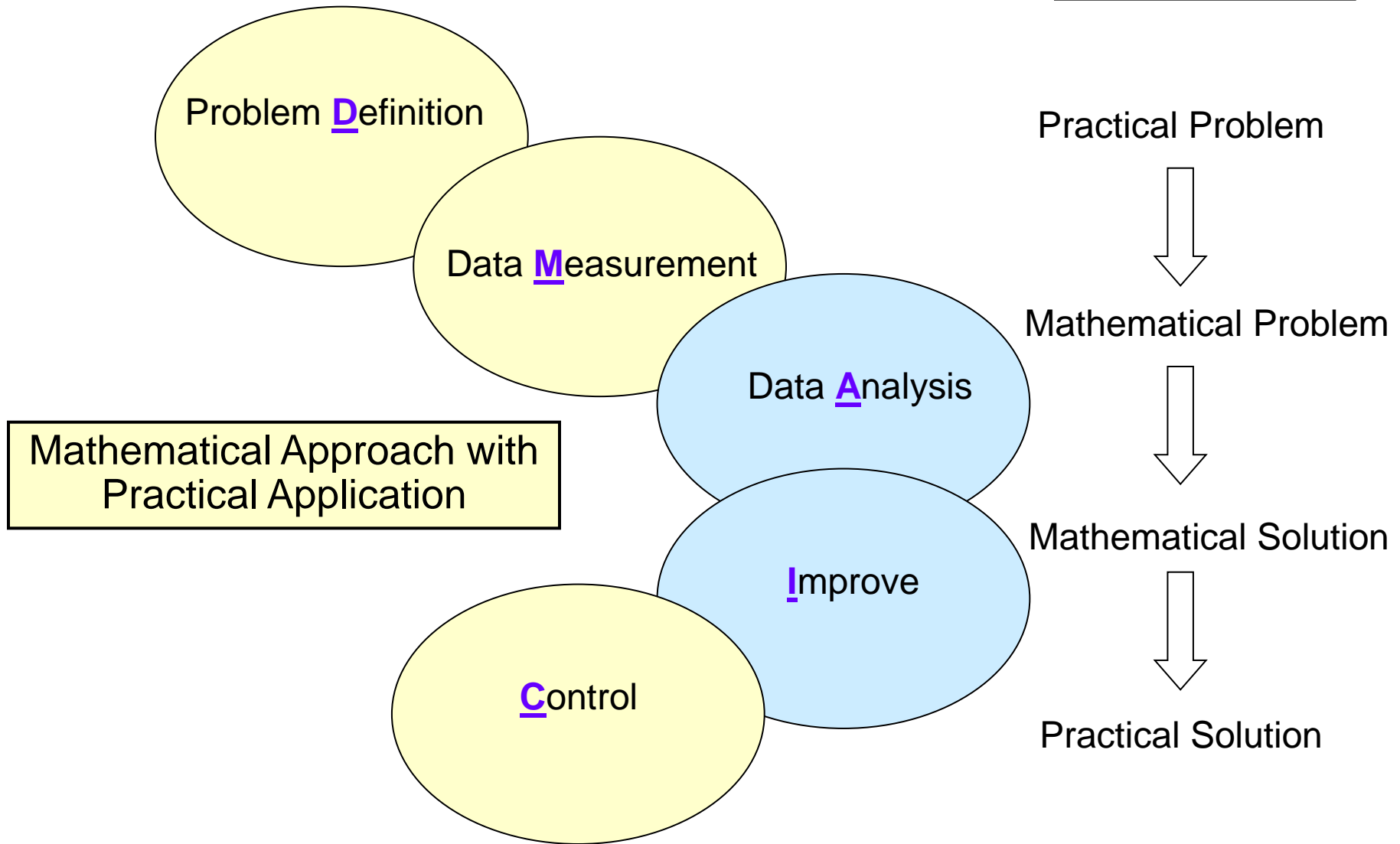
In the **quantity** they need

In the right **sequence**

Without defects

And **at the lowest possible cost**

Lean Six Sigma DMAIC Process



- To become LSS Green Belt certified requires two process improvement projects
- What steps were used to identify the projects:
 - Investigate areas where processes are repeated and used by more than one person
 - Apply Lean Six Sigma principles to areas where you currently work
 - Investigate ways to reduce waste in processes
 - Investigate ways to take less time to accomplish a task without losing quality
- Division Process Group (DPG) is responsible for maintaining the Division Program Review Template (PRT), investigate ways to improve that process

- **Policy** requires programs to prepare an extensive package for Program Reviews (PR) each month
- **Problem Statement**
- PR preparation is 4 – 8 hours per program per month per Program Finance Analyst (PFA): ~**7200 hrs/yr**
(~100 program * 12 months * 6 hours per month)
- **Goal**
- Reduce PFA PR preparation effort by 30%
- **Measurement**
- PFA PR preparation effort
- **Benefits**
- Reduced program cost

- A Business Intelligence Solution would be more elegant
 - Collect all data in a Data Warehouse
 - Use Business Intelligence Tools to automatically produce dashboards and charts, perform trend analysis across programs at different levels of the company
- Can't invest in a new tool at this time
- Data must be gathered from many different systems and entered manually or cut and paste
- Can we improve the process?

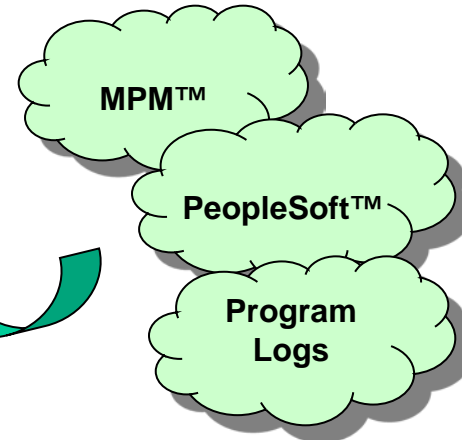
Project Context



- Summary evaluation & explanations, accomplishments, milestones and deliveries
- Issues / Actions
- Objectives / status
- Opportunities

- MPM™ data
- Headcount
- Contract/Budget data
- MPAR data
- Investment
- Cost (Period & ITD)
- Award Fee Data
- PEM data
- Supplier data
- Etc.

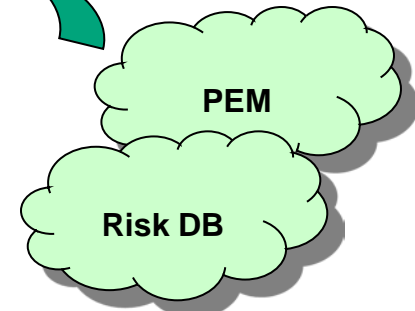
Program Financial Analyst (PFA)



- Program Engineering Metrics (PEM) data
- Supplier Summaries
- Materials data



Program Team



- PEM Charts

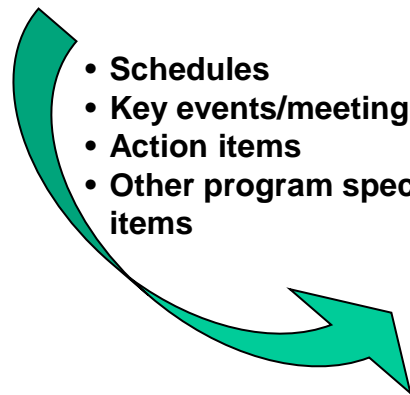


- Risk data

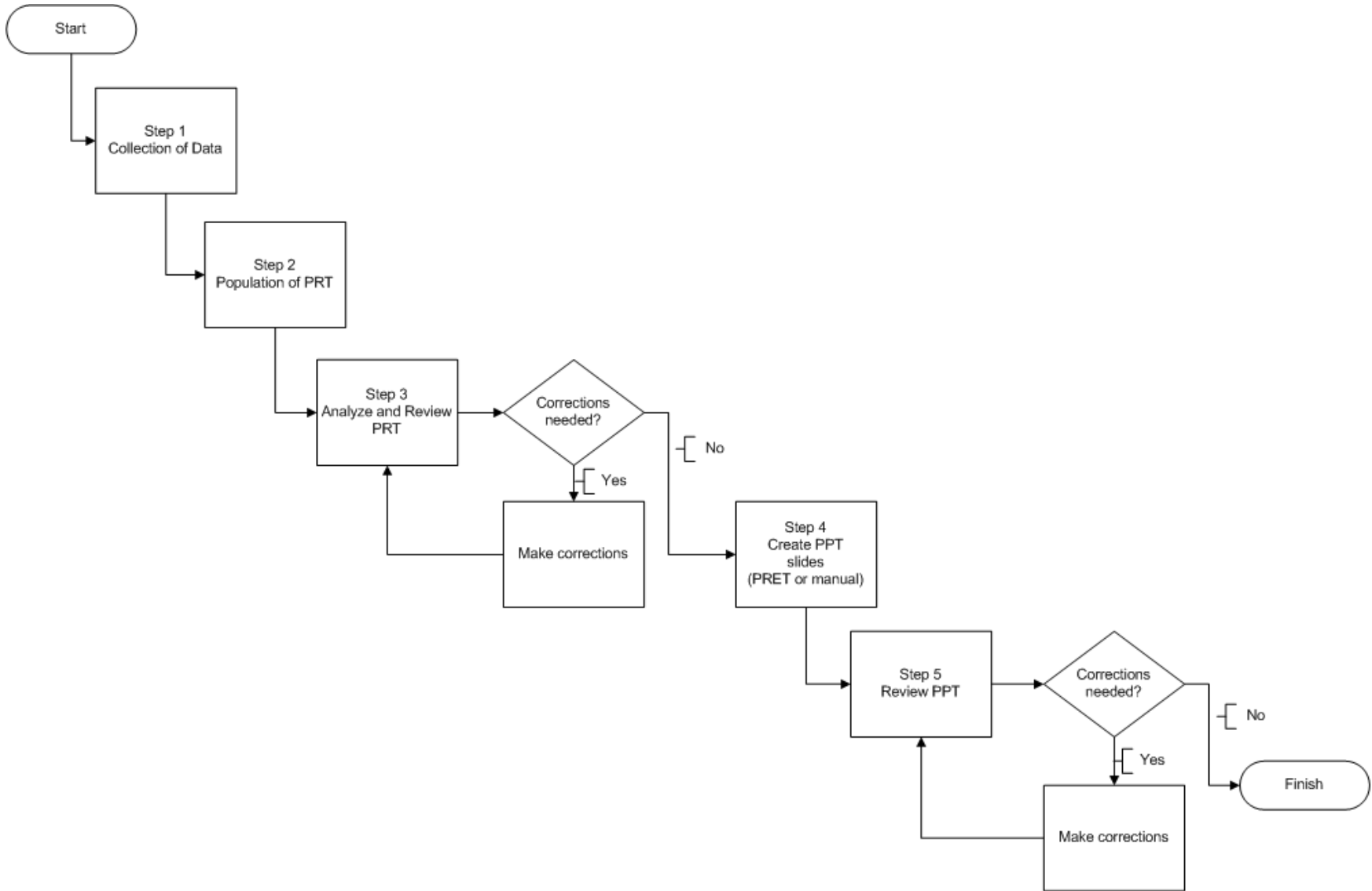


Program Manager (PM)

- Schedules
- Key events/meetings
- Action items
- Other program specific items



Process Steps



PRT Example



Program Name: Fictitious		Customer: NOADIS		PA#: 160G		Contract Value: \$701,955.5K	
Contract Type: CPAF		PM: John Doe		TCPI: 1.00 g		Available Funds: \$46,317.9K g	
Contract Start: May-2009		Contract End: May-2019		Replan (N) Latest Date: (1) 1/23/2010		Reporting Period: Jul-10	
Program Description: Design, Development, and Operate the Ground Segment. Consists of Enterprise Management (NOC), Mission Management (Satellite Command & Control), Product Generation (Data Processing), and Product Distribution (Data Distribution).							
Key Area	I/PW Assessment		Comments/Explanation				
	obj. indicator						
	Last Mo.	This Mo.					
Customer Relations	B 	B 	Good. Continue frank and open discussions.				
Cost Performance	B b ⇄	B b ⇄	PD CPI: 1.14 b PD CPI w/o Mtr: b ITD CPI: 1.03 b ITD CPI w/o Mtr: b Underrun for period mainly due to unplanned summer vacations				
Schedule Performance	B g ⇄	B g ⇄	PD SPI: 1.00 g PD SPI w/o Mtr: b ITD SPI: 1.00 g ITD SPI w/o Mtr: b On Track				
Technical Performance	B g ⇄	B b ⇄	Element Specs delivered on-time. SWRRs began on schedule.				
Staffing	G b ↑	G b ↑	Staffing is on-track. Future concern is staffing for additional studies, and impact of Antenna award.				
PMB Variance at Completion	G g ⇄	G g ⇄	Previous: \$375.4K g Current: \$1,497.7K g RW3/ECP04 planning complete. Bottoms-up EAC delayed until nearer PDR to accommodate AER.				
Quality	B y ↓	B y ↓	Last QA PCM Audit Aug-2010 Continue to track CARDS (closures slightly ahead of schedule). PCM in green. Yellow continues due to number of open defect action items vs. total action items (ratio in formula).				
Risk Exposure	B b ⇄	B b ⇄					
Material	G g ⇄	G g ⇄	No issues.				
Drawings	! N/A	! N/A					

- **Initial Projected Statistics**

- Initial DPMO: 5000
- Current: 6 hours * 60 min = 360 min
- Desired: 3 hours * 60 min = 180 min
- $360 - 180 = 180$
- $(180 \text{ min} * 1,000,000) / (100 \text{ programs} * 360 \text{ min}) = 5000$
- Estimated COPQ: \$126K
- 3 hours * \$35/hour = \$105
- $\$105 * 12 \text{ months} * 100 \text{ programs} = \126K

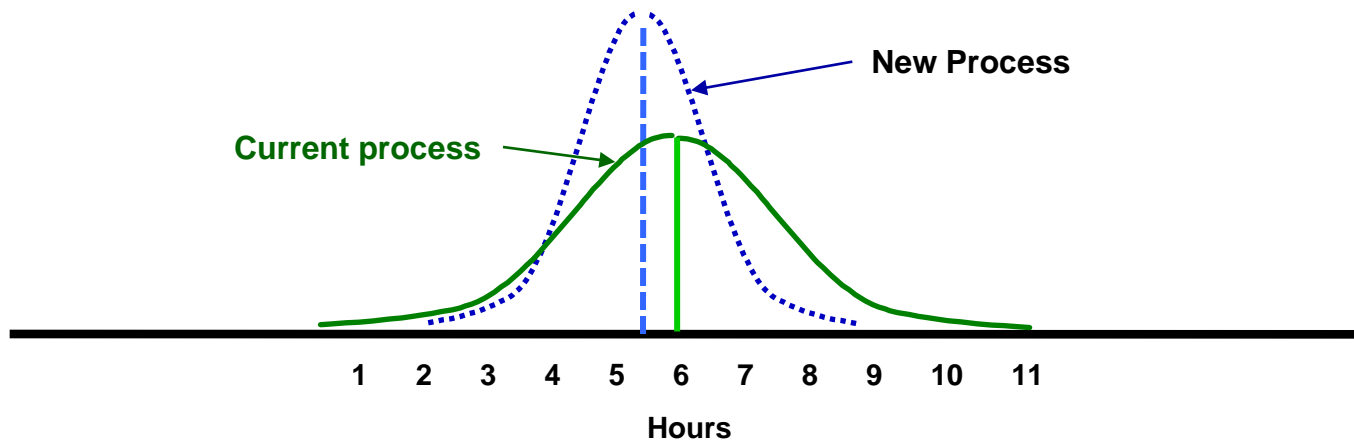
- **Target Projected Statistics**

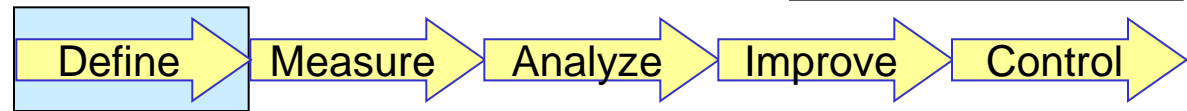
- DPMO Reduction Goal: 30 %
- Target DPMO: 2000
- $30\% * 360 \text{ min} = 108 \text{ min}$
- $180 - 108 = 72$
- $(72 * 1,000,000) / (100 \text{ programs} * 360 \text{ min}) = 2000$
- Target Savings/Revenue: would be \$76K/year
 $108 \text{ min} / 60 \text{ min/hr} * \$35/\text{hour} * 12 \text{ months} * 100 \text{ programs} = \76K
but due to investment cost only \$12K per year – See Slide 17

- **Benefit/Assumptions**

- More efficient Program Review preparation process

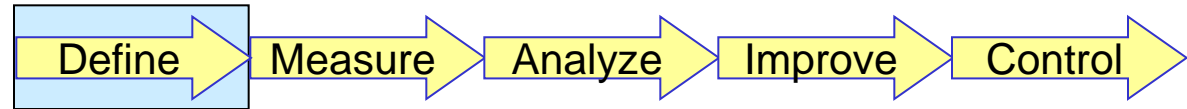
Program Review Preparation Process





- Facilitated two PFA Round Tables sessions with team resulting in 33 improvement suggestions
 - Identified 2 possible Lean applications
 - Reduce effort to gather data and populate PRT
 - Reduce number of worksheets being populated
 - No measurement breakdown available for PRT preparation steps
 1. Collection of data
 2. Population of PRT
 3. Analyze and Review PRT, (correct if needed)
 4. Create PPT
 5. Review PPT, correct if needed)
 - Need to 'instrument' the process

Effort data is currently only verbal estimates

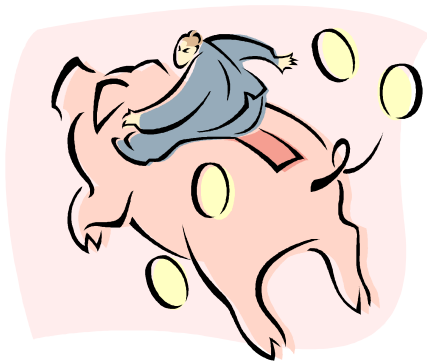


PRT Improvement Preparation Effort

- Create PFA Survey to establish baseline preparation times
- Round table indicated 4 – 8 hours per month preparation
- Approximately 100 programs use PRT each month
- Improvement savings estimate of 30 – 60 minutes each month per program
- Conservative improvement savings estimate (30 minutes):
 - $0.5 \text{ hours} * 12 \text{ months} * 100 \text{ program} * \$35/\text{hr} = \$21\text{K}/\text{year}$
- Expected improvement savings estimate (60 minutes):
 - $1.0 \text{ hours} * 12 \text{ months} * 100 \text{ program} * \$35/\text{hr} = \$42\text{K}/\text{year}$
- Aggressive improvement savings estimate (108 minutes) :
 - $1.8 \text{ hours} * 12 \text{ months} * 100 \text{ program} * \$35/\text{hr} = \$75.6\text{K}/\text{year}$

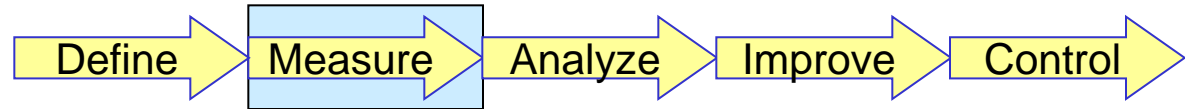
Survey to establish baseline and measureable improvement

Projected Savings			Projected Cost		
Labor		\$42K/year	Labor		~\$150K
	Equipment	\$0K		Equipment	\$0K
	Material	\$0K		Material	\$0K
	Other	\$0K		Other	\$0K



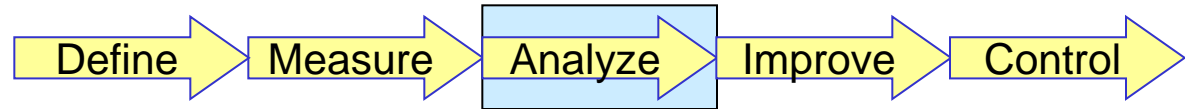
Net Projected Savings amortized over 5 years
 $\$42\text{K/year} * 5 \text{ years} = \210K
 $\$210\text{K} - \$150\text{K} = \$60\text{K net savings}$
 $\$60\text{K}/5 \text{ years} = \$12\text{K annual savings}$
for first 5 years

Measurement Data Collected



- **Drafted Initial PFA Survey**
- **Anonymous Survey Distributed**
 - 200 PFAs received survey
 - 76 responded
 - 51 use the PRT

Good response rate, shows high interest



- **Data indicated:**

Time Spent Collecting Data

AVG. 192 min.

STD. DEV. 203 min.

Number PeopleSoft Reports Generated

AVG. 6.5

STD. DEV. 2.2

Time Spent Generating PPT Slides

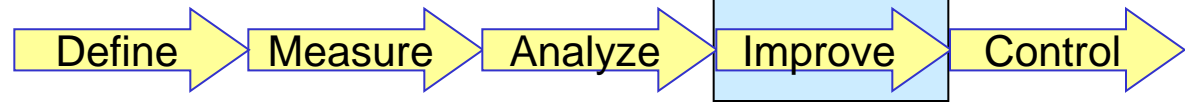
AVG. 41 min.

STD. DEV. 30 min.

Not all programs are using PRET

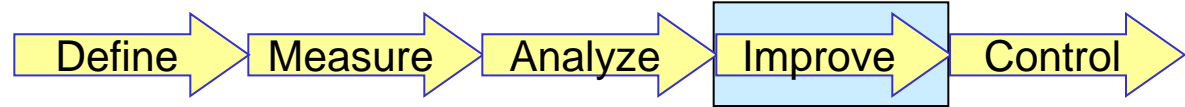
29/47 = 61%

Data showed room for improvement



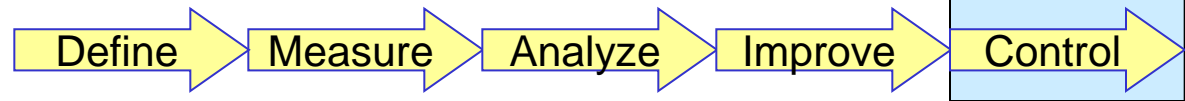
- **Process Improvement Project submitted and funded**
- **Create Working Group with PFAs, PeopleSoft Engineers and Improvement Engineers to:**
 - Create automatic PeopleSoft Import function for PRT
 - Update documentation (Program Review Instructions Manual)
 - Create roll out training
- **Other improvements:**
 - Update PRET
 - Delete unused worksheets in PRT
 - Improve PRT analysis capability, remove indirection

Pilot Programs Liked Improvement



- Updated PRT, PRET and documentation
- Created training, PFAs to present training
- Piloted new process with 6 programs
- Improvement demonstrated
- Rolled out process to division (166 trained)
- New process in use for several months
- Anonymous Follow up survey distributed
 - 200 PFAs received survey
 - 23 responded
 - 19 use the PRT

Response rate much lower



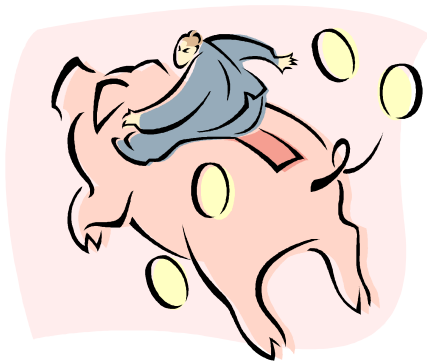
- **Follow-up Survey data analyzed**

- **Data indicated:**

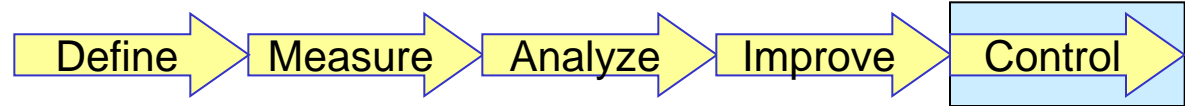
	NEW	(OLD)
Time Spent Collecting Data		
AVG.	100 min.	(192 min.)
STD. DEV.	79 min.	(203 min.)
Number PeopleSoft Reports Generated		
AVG.	4.2	(6.5)
STD. DEV.	3.2	(2.2)
Time Spent Generating PPT Slides		
AVG.	68 min.	(41 min.)
STD. DEV.	65 min.	(30 min.)
Not all programs are using PRET		
	14/18 = 78%	(29/47 = 61%)

PFA Data Collection Time reduced on average 48%!!

Actual Savings			Actual Cost		
Labor		\$63K/year	Labor		\$144K
	Equipment	\$0K		Equipment	\$0K
	Material	\$0K		Material	\$0K
	Other	\$0K		Other	\$0K



Net Projected Savings amortized over 5 years
 $\$63\text{K/year} * 5 \text{ years} = \315K
 $\$315\text{K} - \$144\text{K} = \$171\text{K net savings}$
 $\$171\text{K}/5 \text{ years} = \$34\text{K annual savings}$
for first 5 years



- **Educate Executive Management, PMs and PFAs on improved process**

- 42 PMs Trained
- 119 PFAs Trained
- 5 Others Trained

- **Modify expectations for Program Reviews**

Improvement Sustained

- Lean Six Sigma project: **SUCCESSFUL!**
 - Measurable improvement was achieved for preparation times for Program Review Package
- Improved quality of process a bonus
 - Some programs were not following the standard process in creating their financial data
 - Automating the process flushed out some of the inconsistencies and helped improve understanding and use of the standard process
 - Improved documentation increased understanding
 - Training in the new process pointed out non-standard pitfalls
- Additional improvements were also beneficial

- Lean Six Sigma training:
 - Helps people look at things differently and question habits
 - Helps people look for ways to improve how we do business
 - Provides people with tools to enable facilitating change
 - People skills
 - Mathematical skills
 - Modeling skills
 - Increased awareness of available resources
- Supply Chain Operations (SCO) Center for Excellence
 - Provides Lean Six Sigma training
 - Has data to show it pays for itself!

-
- People do not naturally look for process improvement
 - People need to be trained to think critically
 - If your company is not familiar with Lean Six Sigma processes, you should consider adding them

Contact Information



Harris Corporation
P.O. Box 37
Melbourne, Florida 32902-0037

<http://www.harris.com/>
SEI Partner

Debra Perry
dperry@harris.com
321-727-6830

Jim Goss
jgoss@harris.com
321-727-6830

Backup Slides

- **Define** the problem, the voice of the customer, and the project goals, specifically
- **Measure** key aspects of the current process or product and collect relevant data
- **Analyze** the data to investigate and verify cause-and-effect relationships. Seek out root causes of the defect under investigation
- **Improve** or optimize the current process or product based upon data analysis using techniques such as design of experiments, poka yoke or mistake proofing, and standard work to create a new, future state process or product. Set up pilot runs to establish process capability
- **Control** the future state process to ensure that any deviations from target are corrected before they result in defects. Implement control systems such as statistical process control, production boards, and visual workplaces, and continuously monitor the process

- PM
 - Program Manager
 - Responsible for execution and reporting for program
- PR
 - Program Reviews
 - Review of program status with upper management
- PFA
 - Program Financial Analyst
 - Provides financial status for program review package
- PRT
 - Program Review Template
 - Macro enabled Excel spreadsheet that collects PR data
- PRET
 - Program Review Extraction Template
 - Macro enabled PowerPoint file that creates slides from PRT
- LSS
 - Lean Six Sigma

- DPMO
 - Defects per Million Opportunities
 - A measure of process performance
- COPQ
 - Cost of Poor Quality
 - Costs that would disappear if systems, processes, and products were perfect
- PEM
 - Program Engineering Metrics tool
 - Web-based tool that collects and reports engineering metrics
- MPM™
 - Deltek MPM™
 - Tool for program-based earned value management and reporting
- ITD
 - Inception to Date
- PeopleSoft
 - Oracle financial tool to track labor, costs, etc.