NAVAIR
Process Resource Team

Broadening the Ability to Train and Launch Effective Engineering and Service Teams

May 2011

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
MAY 2011		**00-00-2011 to 00-00-2011**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Broadening the Ability to Train and Launch Effective Engineering and Service Teams	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Naval Air Systems Command,Process Resource Team,47123 Buse Road, Building 2272 Suite 540,Patuxent River,MD,20670**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES
Presented at the 23rd Systems and Software Technology Conference (SSTC), 16-19 May 2011, Salt Lake City, UT

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**29**	

Agenda

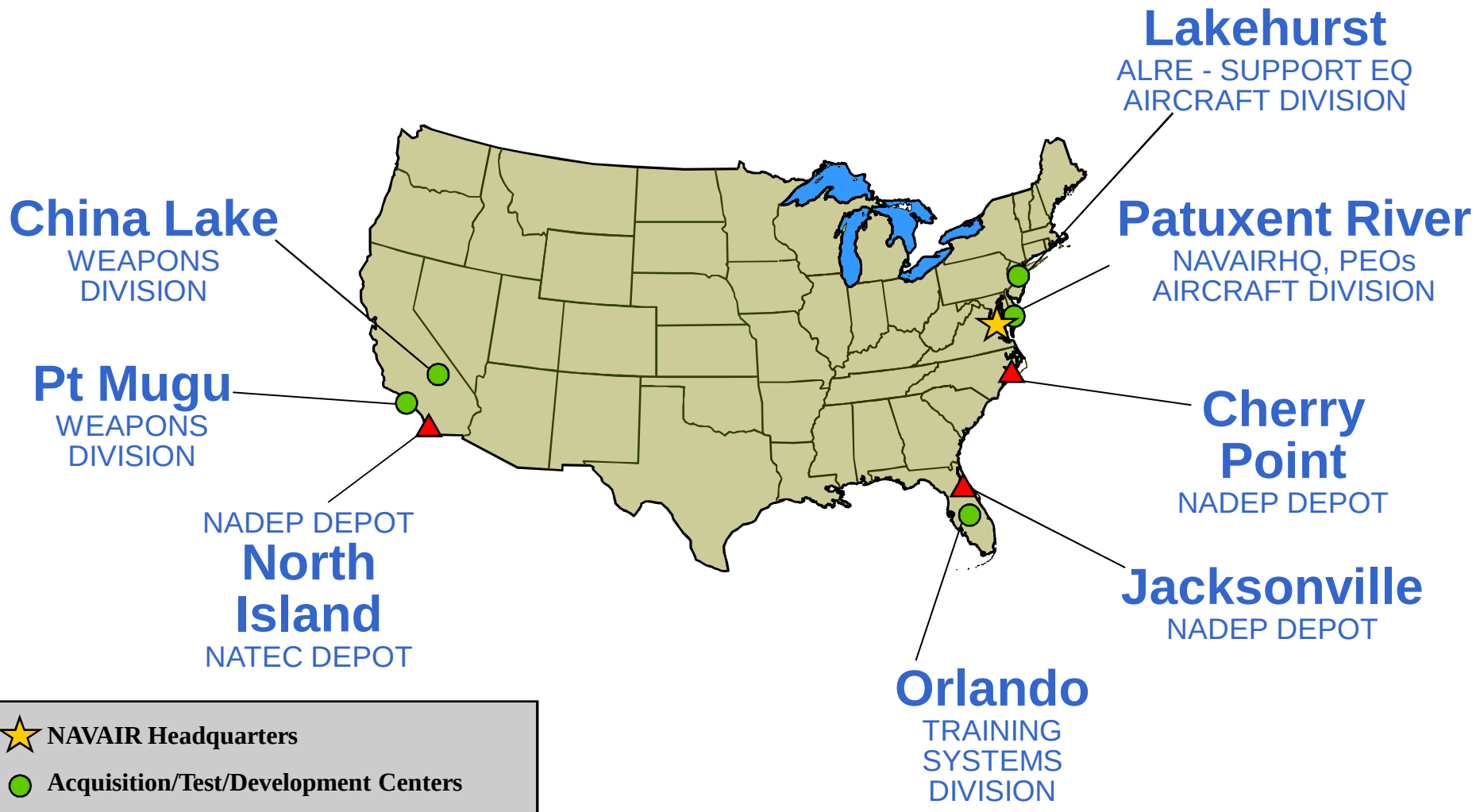
- NAVAIR
- TPI Implementation
- Process Modeling
- Bringing TPI Together
- NAVAIR Team Performance
- Things to Remember

NAVAIR

What is NAVAIR?

- NAVAIR is the **Naval Air Systems Command**
- Develop, acquire, and support the **aircraft** and related **weapons** systems used by **U.S. Navy and Marine Corps**
- Our **goal is to provide the fleet with quality products** that are both **affordable** and **available** when most **needed**
- Our support extends across the **entire life span** of a product, including all **upgrades and modifications** to that product

Where is NAVAIR?



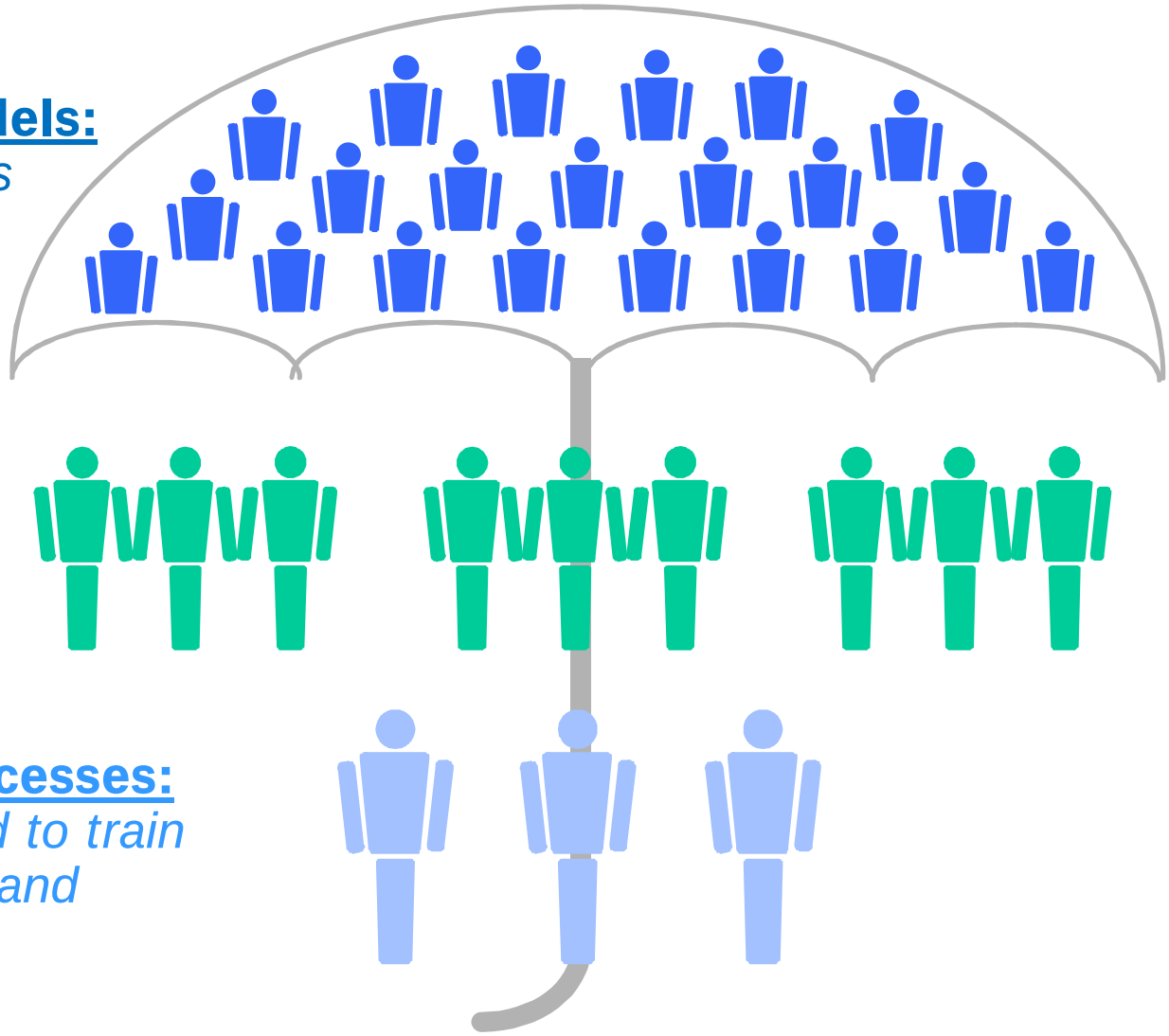
TPI Implementation

Models and Processes

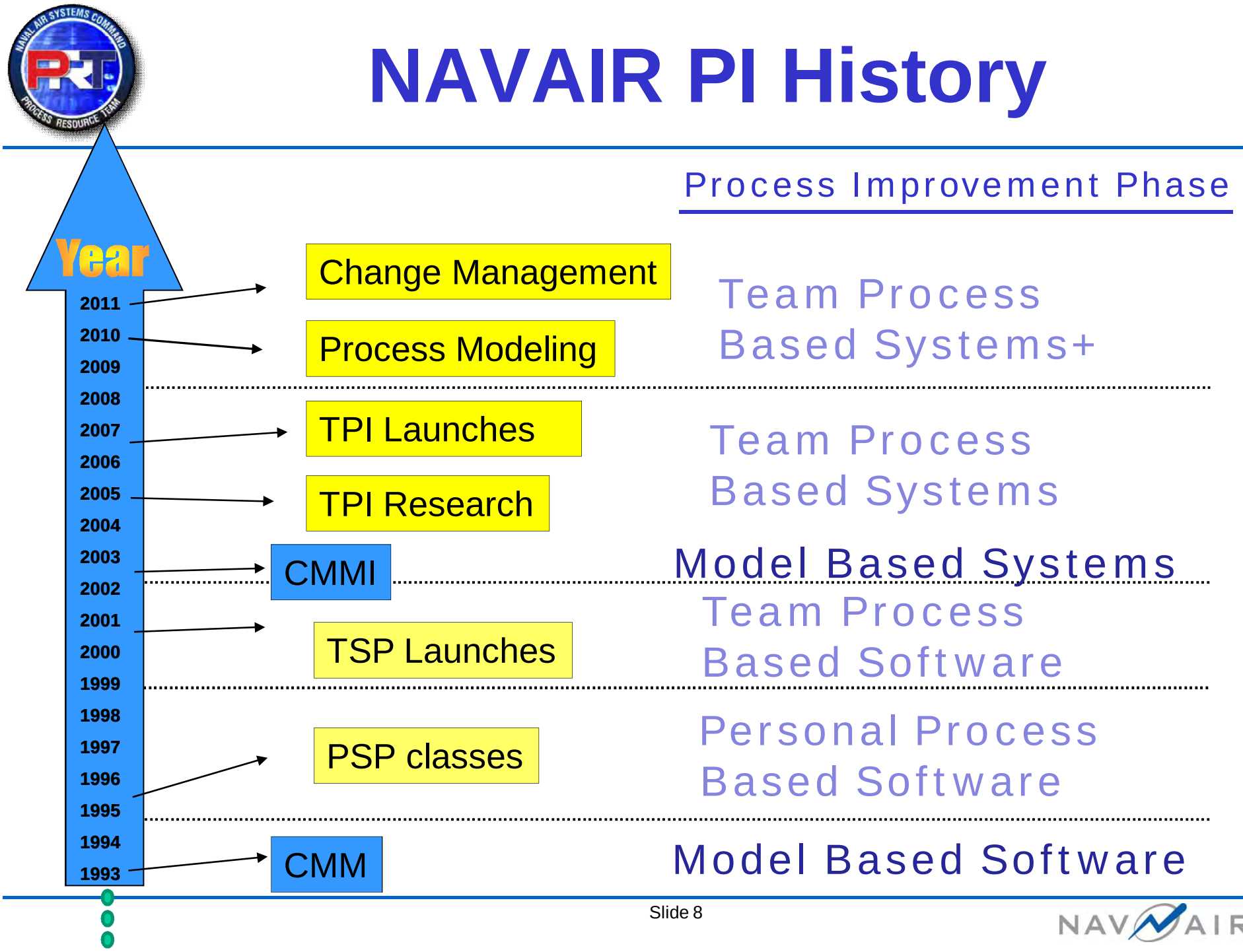
Capability Maturity Models:
Reference for organizations building process capability

Team Processes:
Processes for teams *building quality products on cost and schedule*

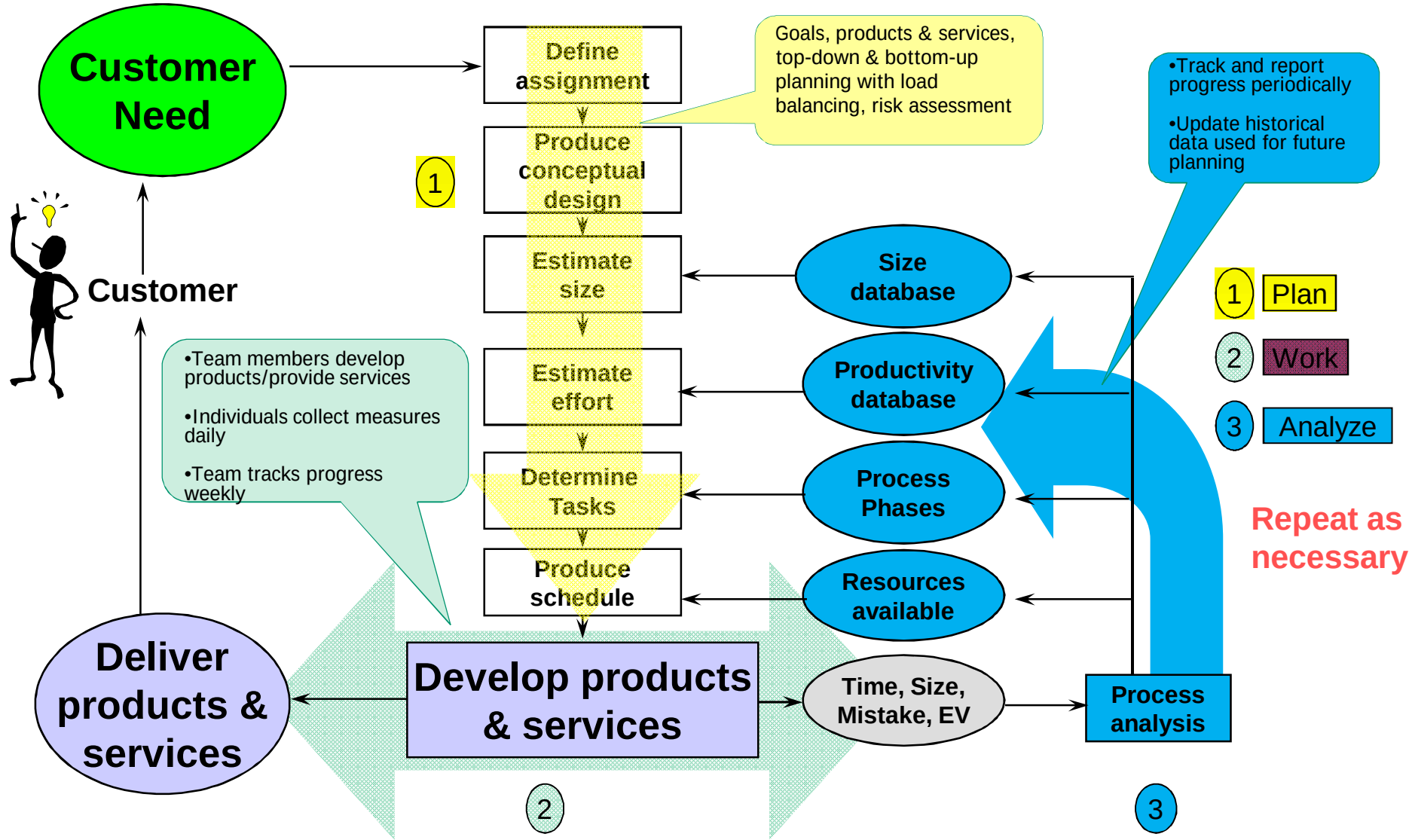
Personal Processes:
Processes used to train individual skill and discipline



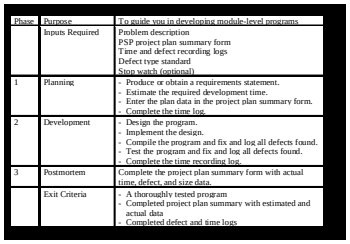
NAVAIR PI History



Key Project Management Framework



Process Elements & TPI



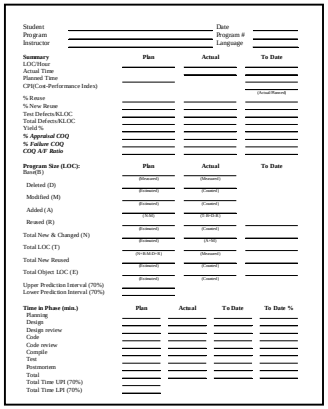
Phase	Purpose	To guide you in developing module-level programs
	Inputs Required	Problem description PSP project plan summary form Time and defect recording logs Defect type standard Stop watch (optional)
1	Planning	- Produce or obtain a requirements statement. - Estimate the required development time. - Enter the plan data in the project plan summary form. - Complete the time log.
2	Development	- Design the program. - Implement the design. - Compile the program and fix and log all defects found. - Test the program and fix and log all defects found. - Complete the time recording log.
3	Postmortem	Complete the project plan summary form with actual time, defect, and size data.
	Exit Criteria	- A thoroughly tested program - Completed project plan summary with estimated and actual data - Completed defect and time logs

Scripts

Document the process entry criteria, phases/ steps, and exit criteria. The purpose is to **guide** you as you use the process.

Measures

Measure the process and the product. They provide insight into how the process is working and the **status** of the work.



Student _____ Date _____
Program _____ Program # _____
Instructor _____ Language _____

Summary	Plan	Actual	To Date
LOC/Hour			
Actual Time			
Planned Time			
CPI(Cost-Performance Index)			
			(Actual/Planned)
% Reuse			
% New Reuse			
Test Defects/KLOC			
Total Defects/KLOC			
Yield %			
% Appraisal COQ			
% Failure COQ			
COQ A/F Ratio			

Program Size (LOC):	Plan	Actual	To Date
Base(B)			
	(Estimated)	(Measured)	
Deleted (D)			
	(Estimated)	(Counted)	
Modified (M)			
	(Estimated)	(Counted)	
Added (A)			
	(A+M)	(A+M+R)	
Reused (R)			
	(Estimated)	(Counted)	
Total New & Changed (N)			
	(Estimated)	(A+M)	
Total LOC (T)			
	(N+BASE-R)	(Measured)	
Total New Reused			
	(Estimated)	(Counted)	
Total Object LOC (E)			
	(Estimated)	(Counted)	
Upper Prediction Interval (70%)			
Lower Prediction Interval (70%)			

Time in Phase (min.)	Plan	Actual	To Date	To Date %
Planning				
Design				
Design review				
Code				
Code review				
Compile				
Test				
Postmortem				
Total				
Total Time UPI (70%)				
Total Time LPI (70%)				

Forms, Logs, Charts (paperless)

Provide a **convenient and consistent framework** for gathering, retaining, viewing **data**

Standards

Provide consistent **definitions** that guide the **work** and gathering of **data**.

NAVAIR TPI

- Success of TSP projects led their organizations to ask for same project performance on other teams
  - Worked with the SEI to develop approach
  - Based on same TSP fundamental principles

- NAVAIR approach has become TPI for all teams
  - Teams plan all work from first launch forward
  - Work is based on all products and services defined in process modeling
  - PSP for Engineers training planned as part of project if appropriate

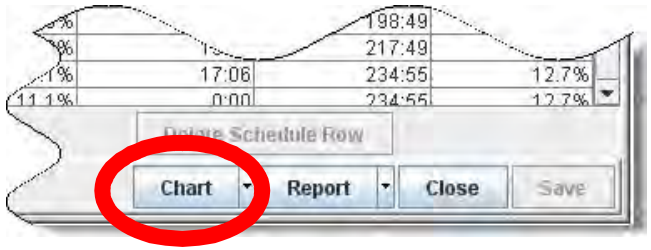
Evolution of the TPI Approach

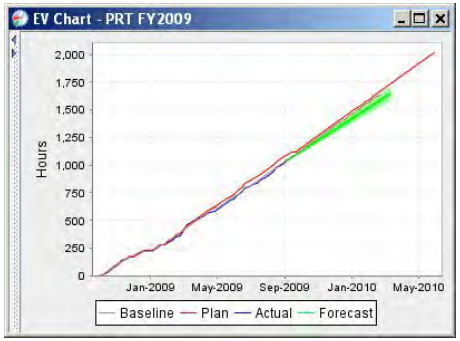
- Training has become just-in-time
- Explicit process modeling techniques added prior to launch
  - Better supports team's unique measurement framework
  - Enables team ability to establish firm foothold on planning and tracking
- Teams immediately begin to define quality for themselves
  - Log mistakes during first cycle
  - First post mortem analysis of mistakes leads to identification of rework types
  - Second launch will begin the application of mistake types

Team Measures and Metrics

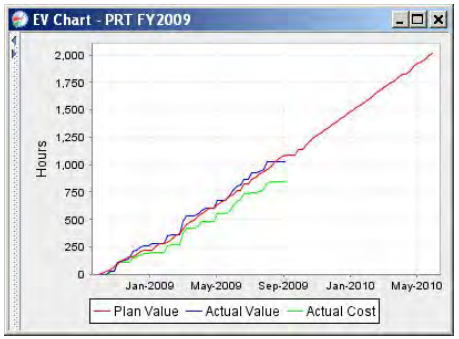
- **Each team member gathers four basic measures**
  - **Time**
  - **Size**
  - **Mistakes**
  - **Task completions**

Charts and tables of project metrics are available (updated in real time)

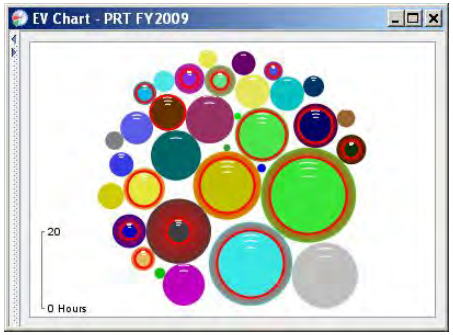




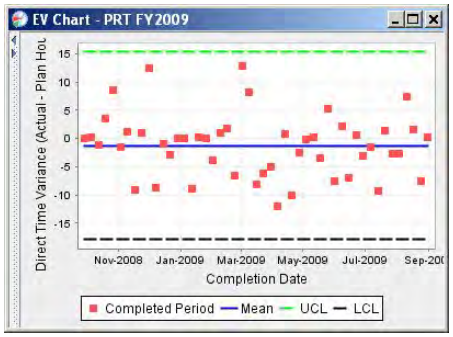
Direct Hours



Earned Value



Tasks in Progress

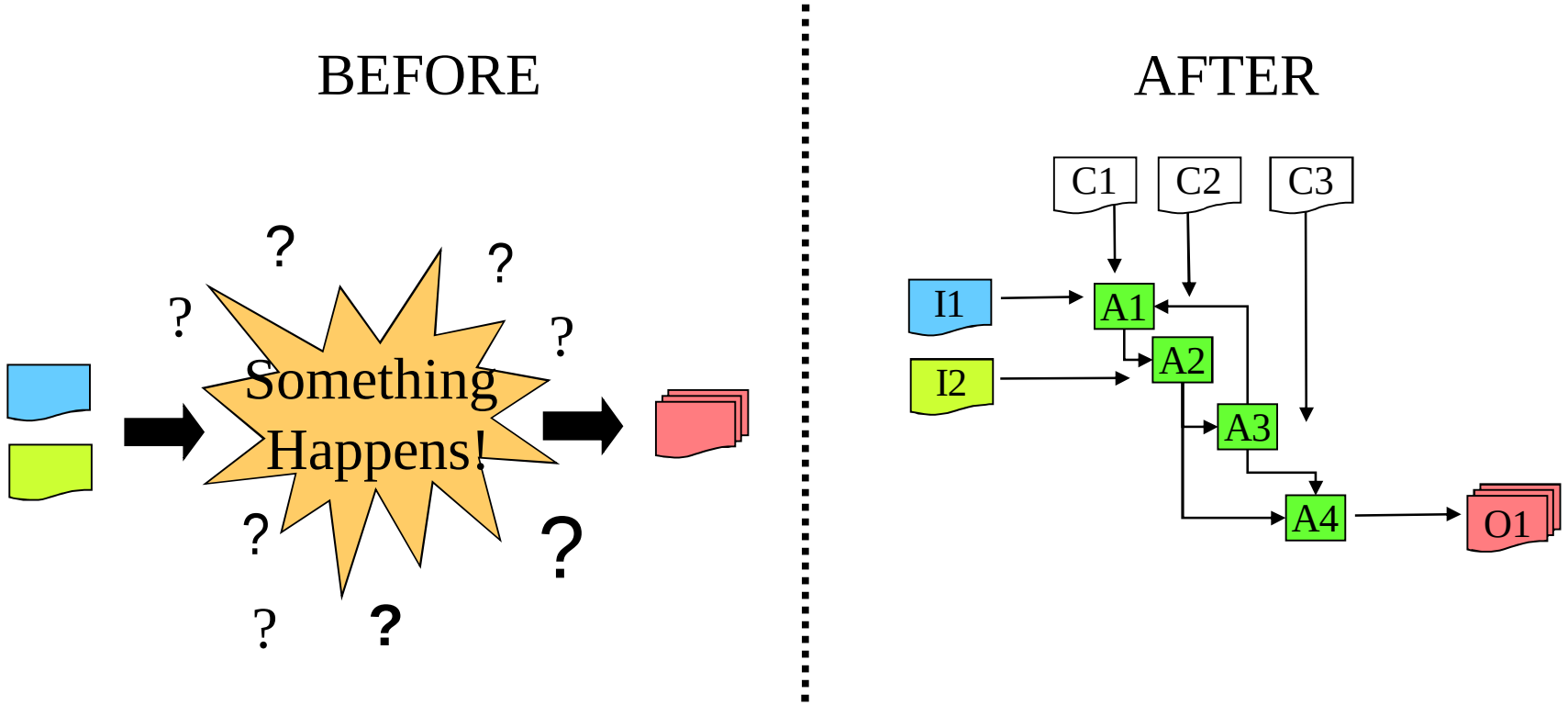


many more…

Process Modeling

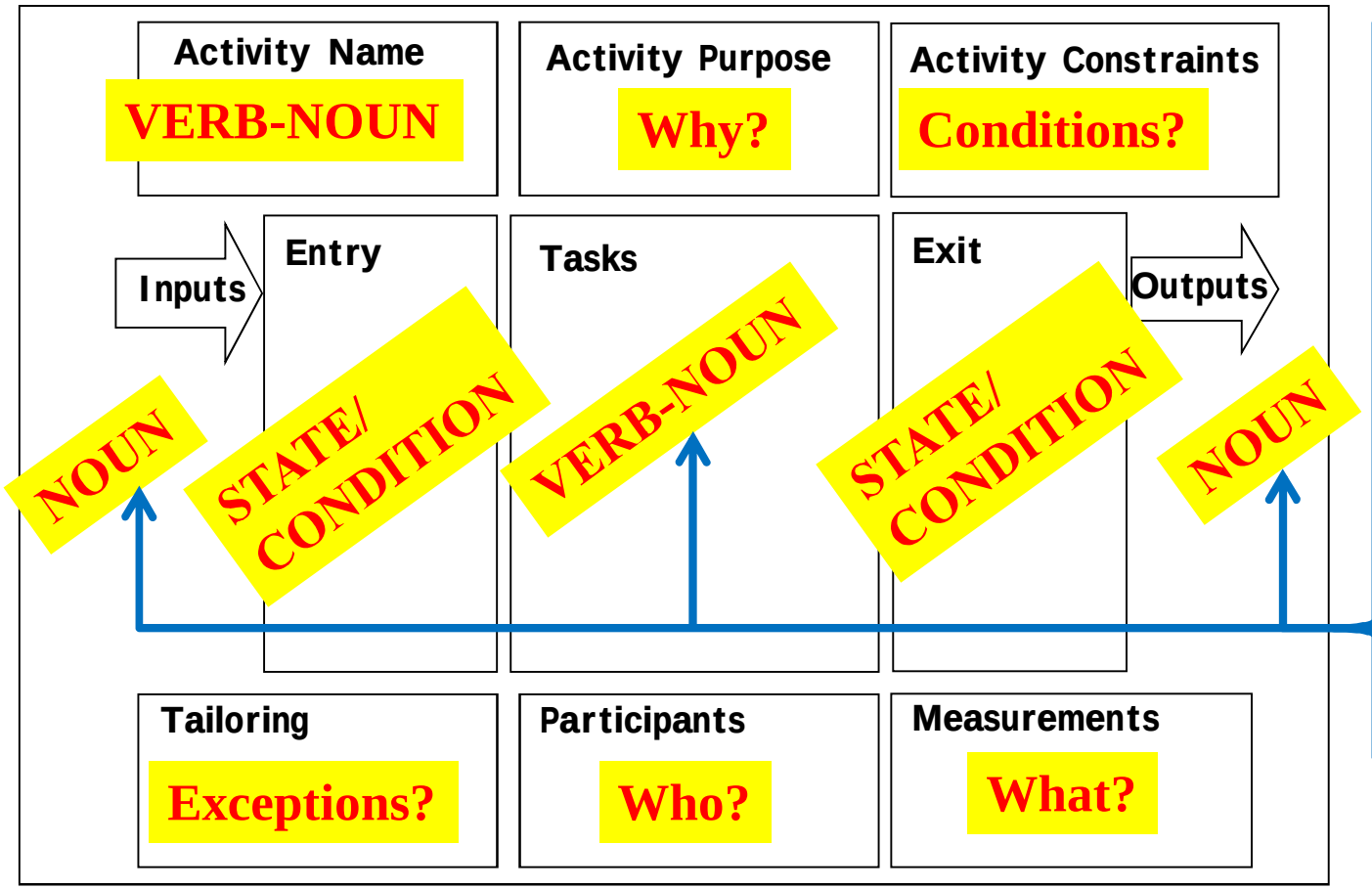
Process Modeling

- Method for describing processes
  - Existing “as is” processes
  - Desired “to be” processes



Process Modeling

Each field captures certain aspects of the process activity



The nouns and verbs identified here become key in the definition of the life cycle models unique to each team

Scripted Process Results

- Given to team for peer review prior to launch
- Reviewed by team in launch for quality removal potential
- Maintainable process artifacts post launch

Process Name: Perform Ground Testing

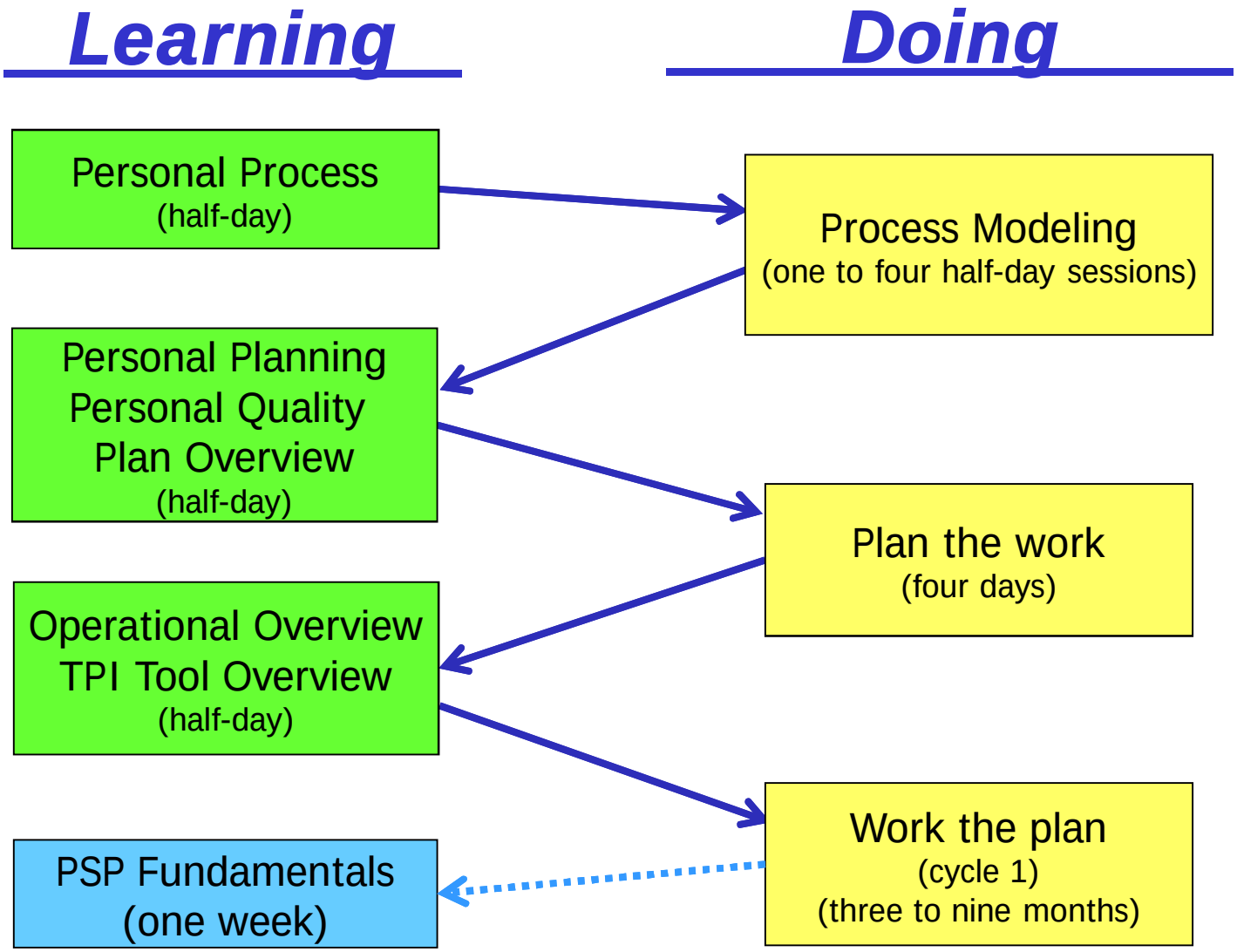
Purpose	- Verify performance of system under test in aircraft in safe ground environment
Controls	- Constraint aircraft available - Test plan - 3960 - TECT
Tailoring	- Xpdr testing
Participants	- Test Engineers - MX support - Aircrew - Contractors (Bell, NG) - PMA
Measurements	- Test coordinator spreadsheets - CM data base metrics
Inputs	- Test procedures (from CM) - Aircraft mod package - Aircraft configuration - GSE Licenses and Certs - Fly Me - Weekly aircraft schedule
Entry Criteria	- Ensure required hardware is installed - Ensure test equipment available - Ensure aircraft is available - Coordinate ground turn if required - Coordinate capture carry article if required - Coordinate with test coordinator
General	- N/A

Step	Activities	Description (details)
1	Check in with QA maintenance	- TBD
2	Perform aircraft setup ground test procedures	- TBD
3	Run procedures	- TBD
4	Redline procedures	- Verify repeatable conditions - Check out QA and maintenance Create TAR

Exit Criteria	- Results exist for each test point - TAR created - MAF signed
Outputs	- Performed Test - TAR# - Redlined procedures - Notes and data for SARs - Test event data

Bringing TPI Together

Just in Time TPI



NAVAIR

What's next for TPI

- Definition of CBA (cost benefit analysis)
  - Use team data to show performance metrics
- Defined tiers of TPI
    - Associated ROI so that we can answer the question from the customer

      "...so what am I getting for my investment..."

NAVAIR Team Performance

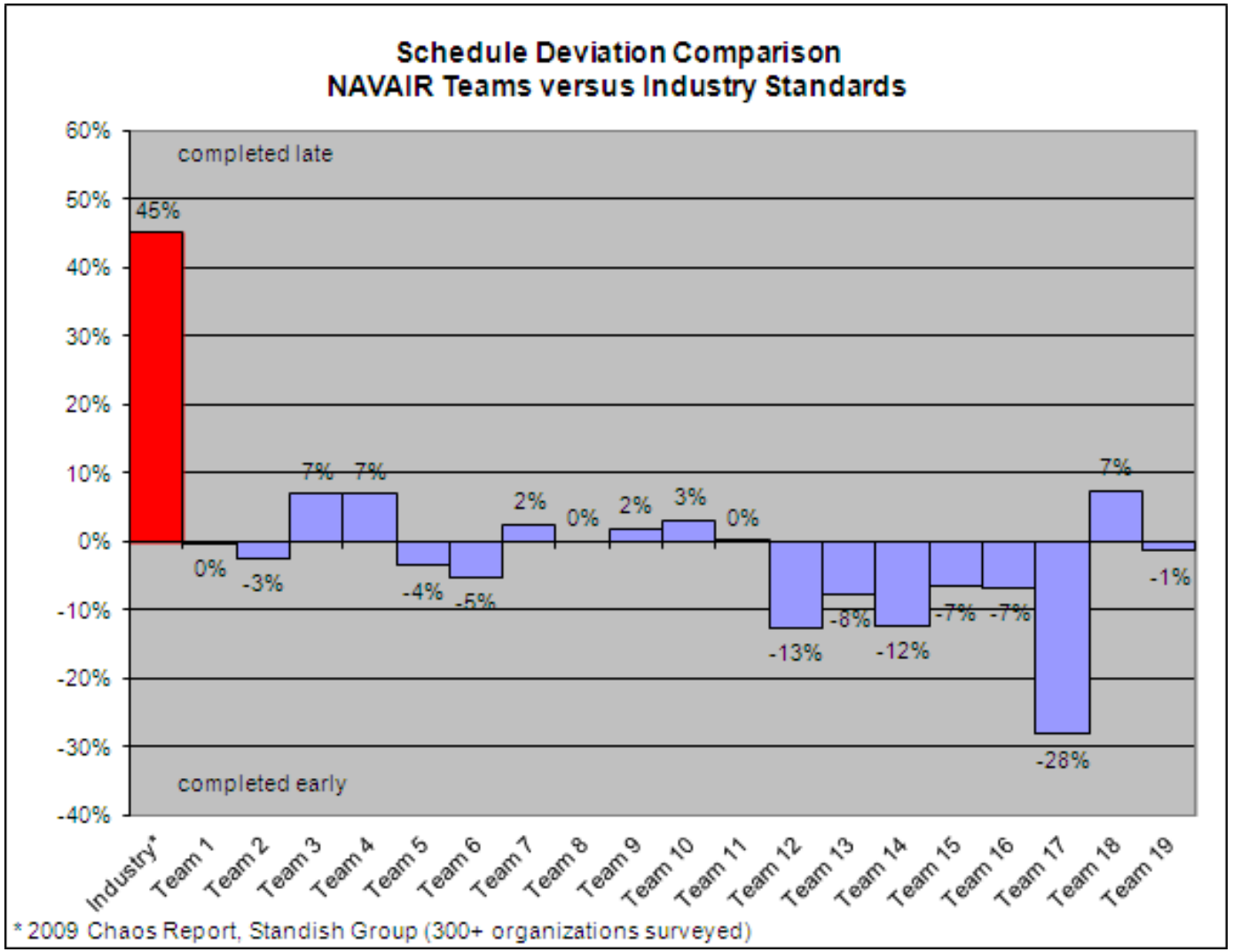
NAVAIR Team Data Profiles FY10-FY11

Num of Teams	19
Num of Teams (by type of work performed)	
Tactical/Embedded Software Dev	12
Desktop Software Dev	6
Systems Integration	1

	Min	Avg	Max
Num of Team Members	2	6	12
Performance Period (months)	4	9	18

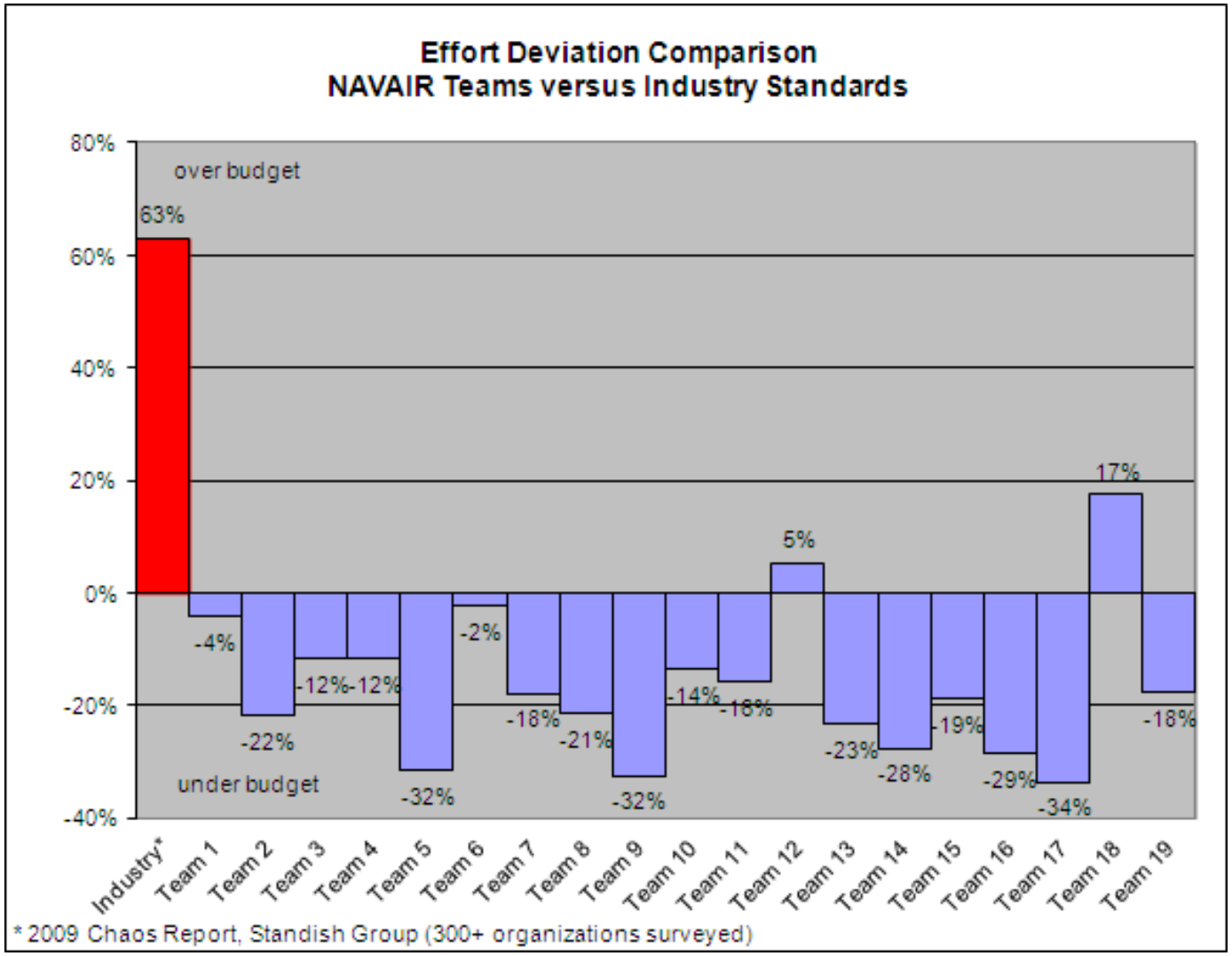
NAVAIR Teams

Schedule



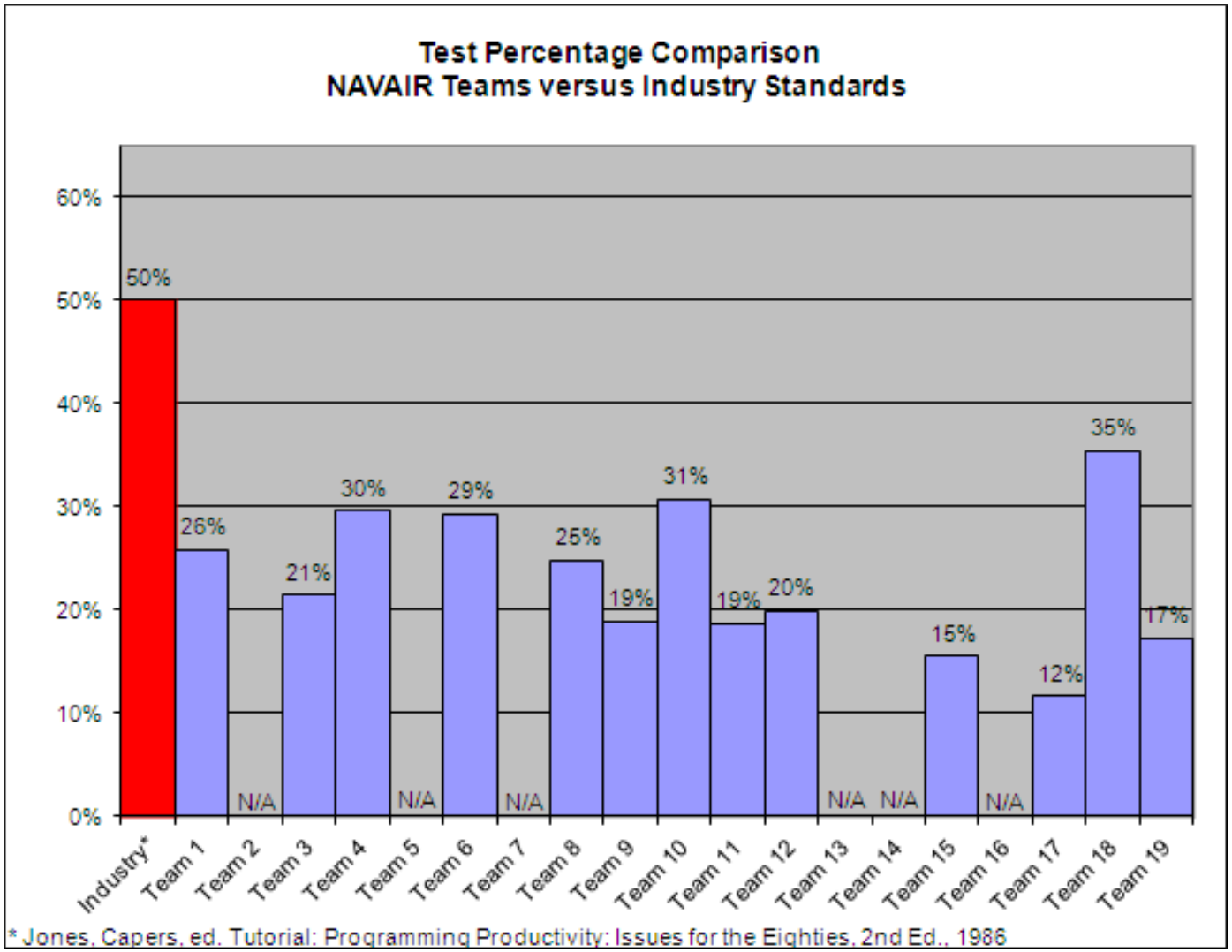
NAVAIR Teams

Effort Performance



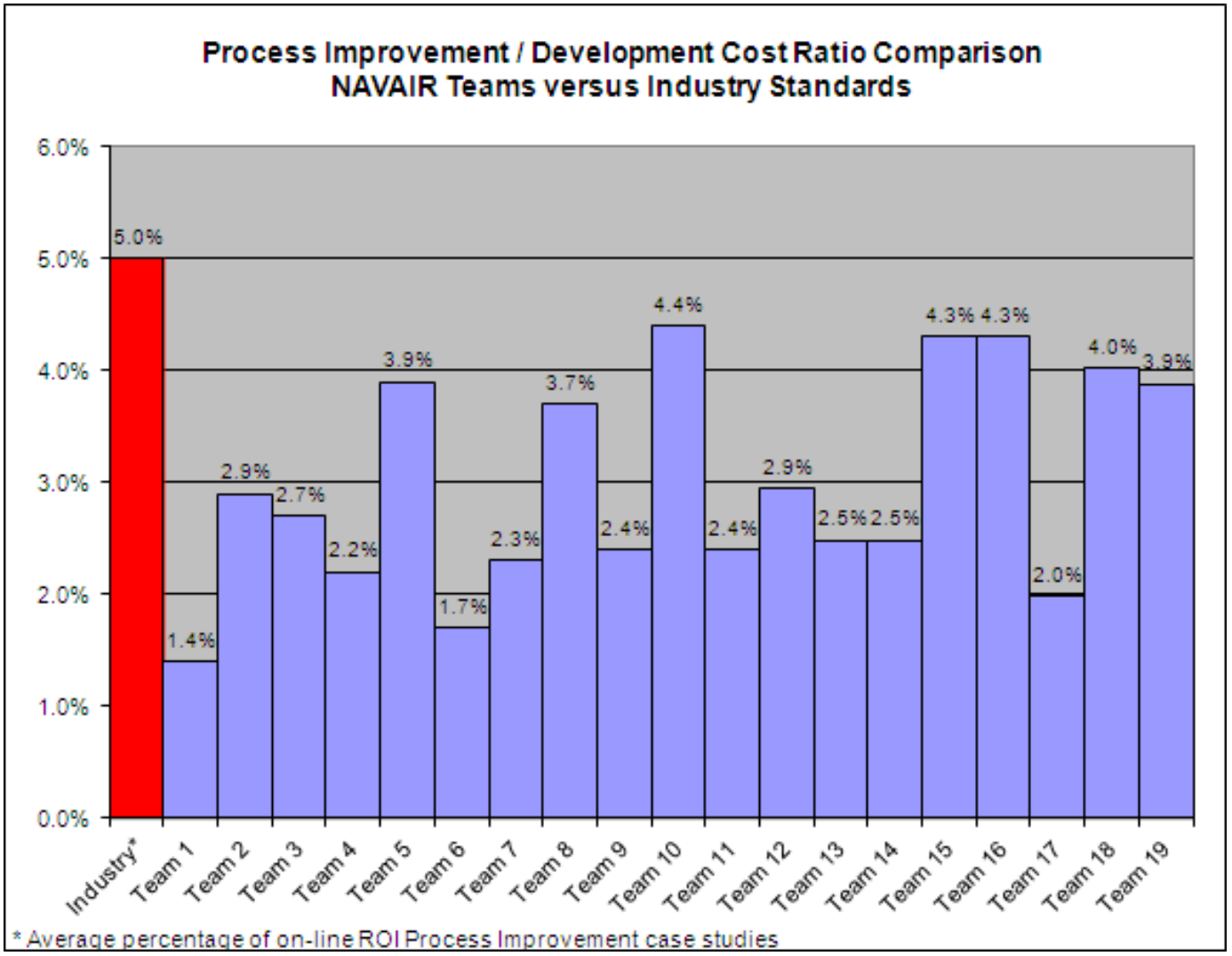
NAVAIR Teams

Quality in Test Time



NAVAIR Teams

Cost of Improvement



Things to Remember

- TPI may be applied to any team that has recurring work to perform
- These teams should plan their work, work to those plans, and collect data to track progress
- This gives them insight into the quality of the processes used to produce the products and the services they deliver

Questions?

NAVAIR PRT

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