



ACOSM 2007

Australian Conference on Software Measurement



What makes a successful Measurement Program?

- a case study

Presented by: Pam Morris

(CEO)

TOTAL METRICS

November 2007



Presenter - Pam Morris

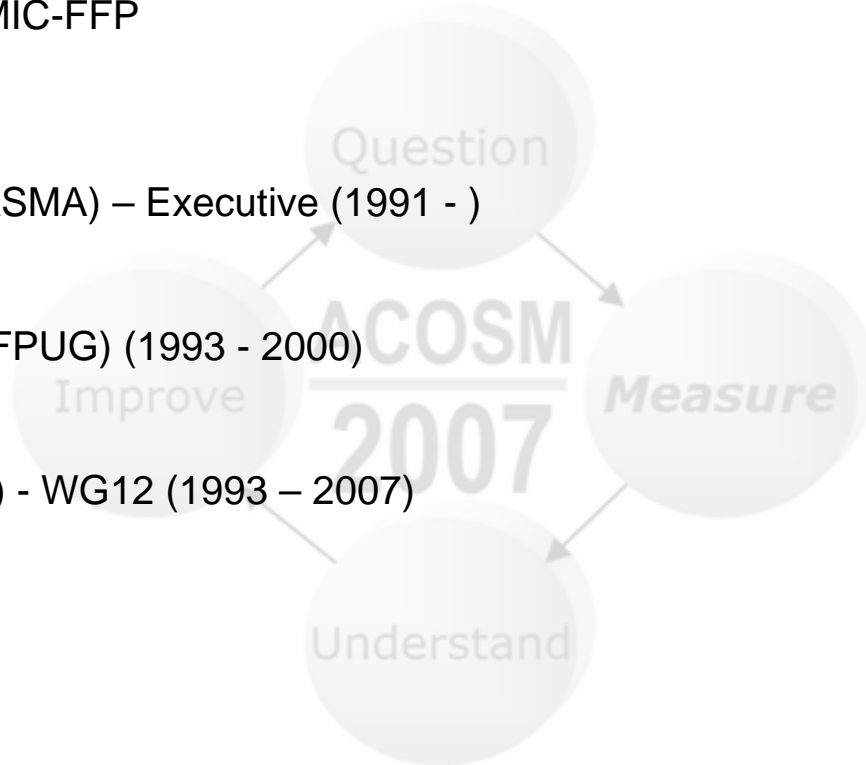
□ CEO - TOTAL METRICS

□ Consulting, Training Tools and Standards

- Certified IFPUG (CFPS, CSMS - 3), COSMIC-FFP

□ Committee Member of:

- Australian Software Metrics Association (ASMA) – Executive (1991 -)
- ISBSG – Executive (2000 -)
- International Function Point User Group (IFPUG) (1993 - 2000)
- COSMIC-FFP Core Committee – (1997 -)
- International Standards Organisation (ISO) - WG12 (1993 – 2007)
- Standards Australia - IT15 (1993 -)



ASMA/SQA (NSW)



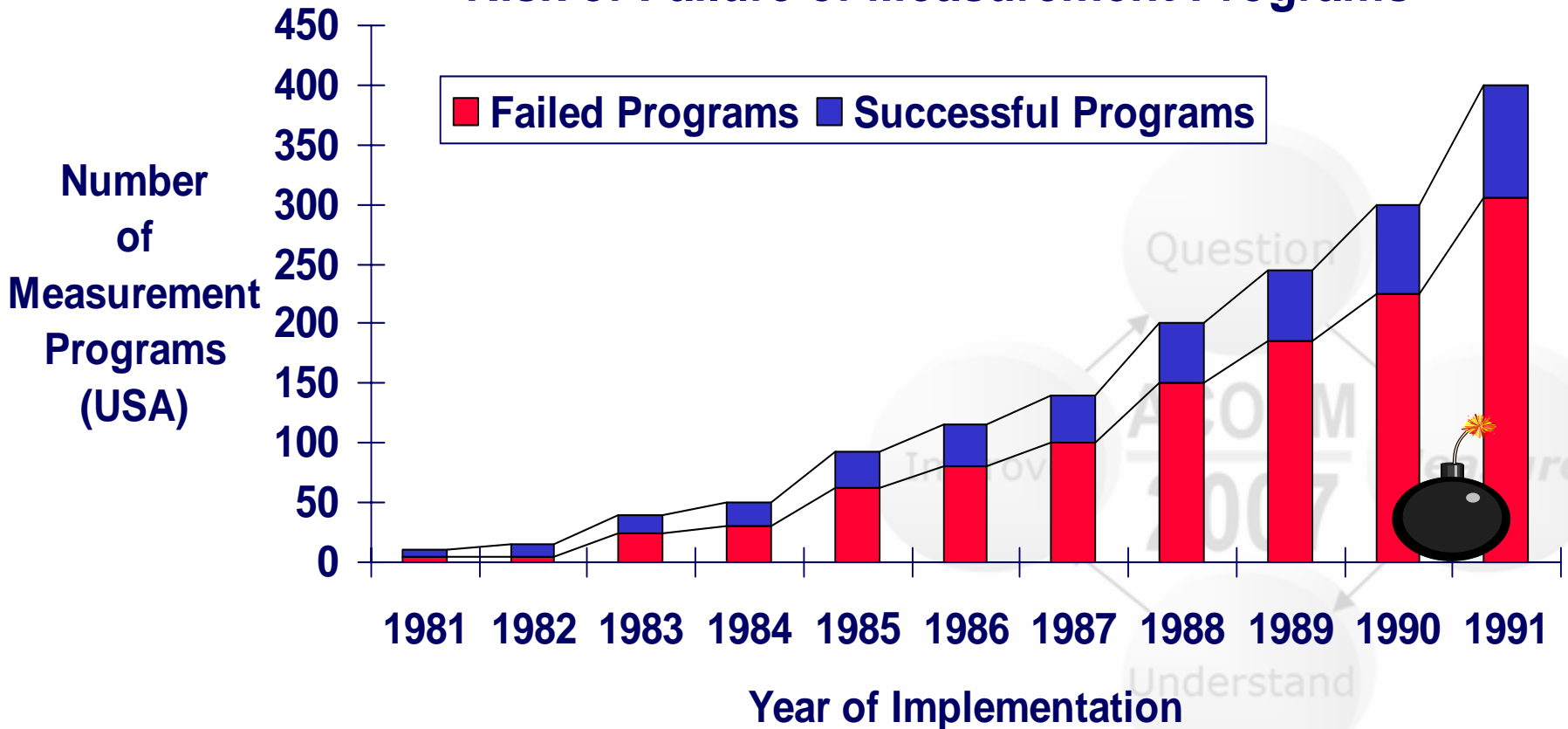
PRICEWATERHOUSECOOPERS 

Has anything changed?

- **“80% of all measurement programs fail”**

Source : Howard Ruben Associates 1994

Risk of Failure of Measurement Programs



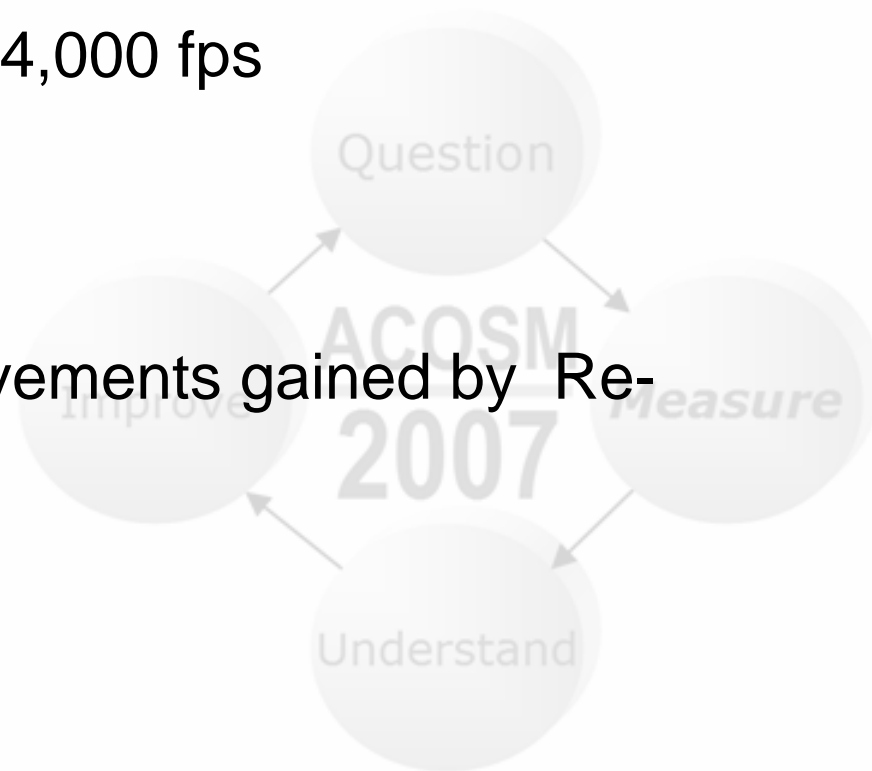
Overview of Topics

- **Background**
- **Measurement Process**
- **Lessons Learned**
- **Critical Success Factors**



Background

- Australian Government Department
- Large Legacy Application - ~14,000 fps
- Mid-range – Cool:Gen, Java
- 60 developers
- Initial Objective : Verify improvements gained by Re-factoring activity



Measurement Process – ISO/IEC 15939:2007

© ISO/IEC 2007 – All rights reserved

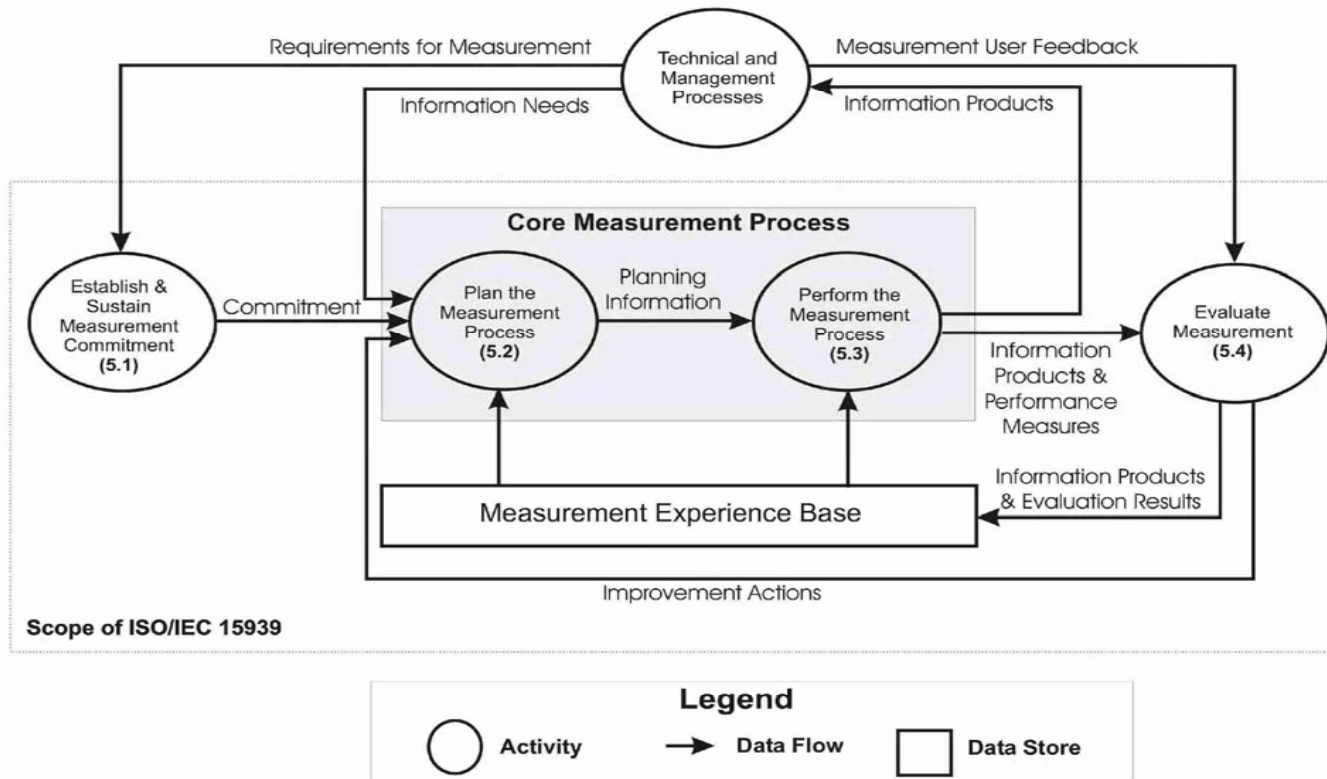


Figure 1: Measurement Process Model.

ISO/IEC FDIS 15939:2007(E)

1. *Establish and Sustain Measurement and Management Commitment*

- Management had clear stated objectives
- 4 Year commitment
- Buy in from CIO to Project Team Leaders



2. Plan the Measurement Process

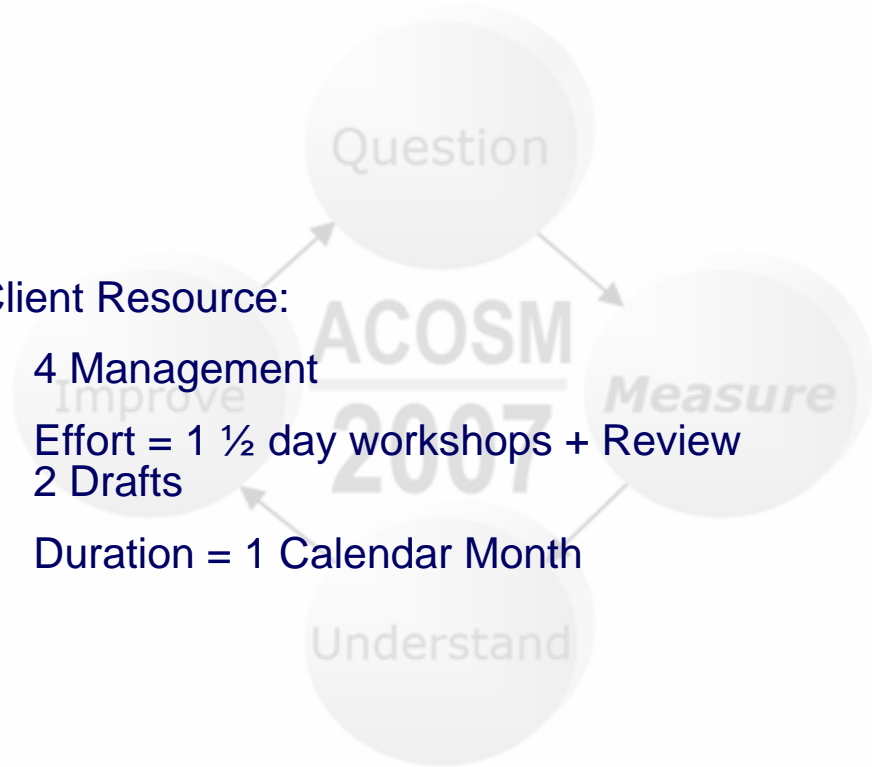
- Workshops to agree:
 - KRA, KPIs
 - Report Templates
 - Data Collection Templates
 - Tools

Metrics Consultant Resource:

- 1 consultant
- Effort = 22 days
- Duration = 1 Calendar Month

Client Resource:

- 4 Management
- Effort = 1 ½ day workshops + Review
2 Drafts
- Duration = 1 Calendar Month

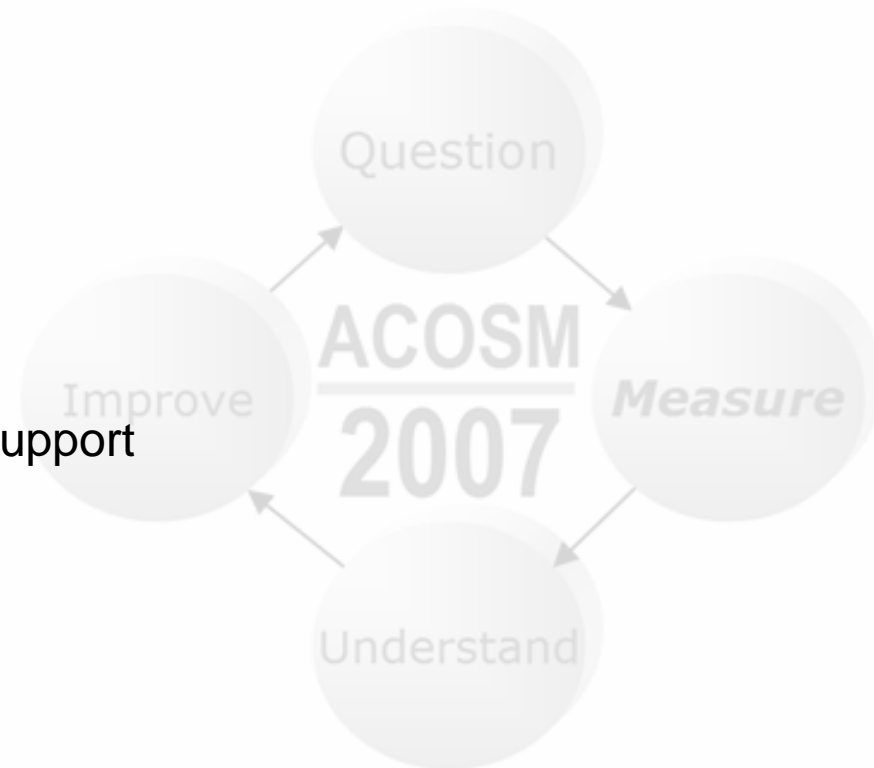


Reporting Structures

Report		Key Result Area	Report Level	Target Audience		
No.	Name			IT Steering Committee	Team Leaders Project Board	QC Mngment
Main Reports						
1	ARLS Productivity and Quality	Cost & Quality	Release / Cumulative	√	√	
2	ARLS Productivity and Release Size	Cost	Release / Cumulative	√	√	
3	ARLS Release Quality and Testing Effectiveness	Quality	Release / Cumulative	√	√	√
4	ARLS Baseline Growth	Cost (Investment)	Application / Cumulative	√	√	
Supplementary Reports						
5	ARLS Project Productivity and Quality	Cost & Quality	Project / 6 month snapshot		√	√
6	ARLS Project Quality and Testing Effectiveness	Quality	Project / 6 month snapshot		√	√
7	ARLS Analysis of Defects – by Severity	Quality	Release / 6 month snapshot		√	√
8	ARLS Analysis of Defects – by Source of Origin	Quality	Release / 6 month snapshot		√	√
9	ARLS Development Stage Analysis	Quality / Cost	Project / 6 month snapshot		√	√
10	ARLS Time Spent in Testing	Cost / Quality	Release / 6 month snapshot		√	√
11	ARLS Rework Analysis - Summary	Cost / Quality	Release / Cumulative		√	√
12	ARLS Rework Analysis - Detail	Cost / Quality	Project / 6 month snapshot		√	√
13	ARLS Maintenance Intensity	Cost	Application Cumulative		√	√

Report Templates

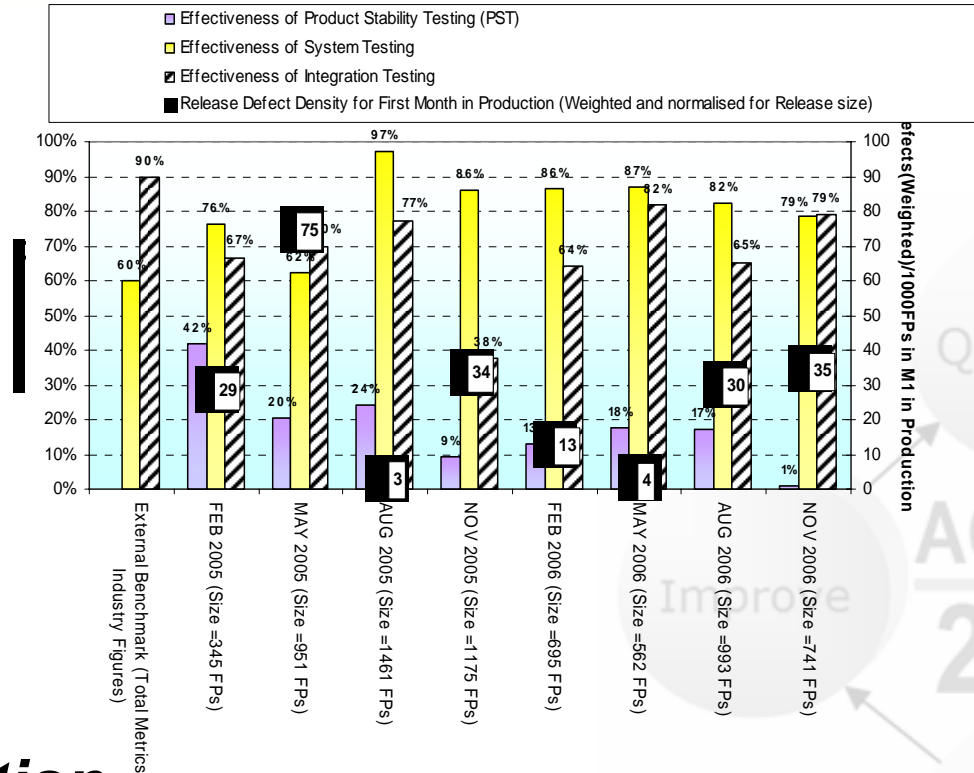
- Each Report had agreed:
 - Purpose
 - Target Audience
 - Frequency / Level
 - Rules for Calculation
 - Description :
 - how to read the report
 - What it was demonstrating
 - the types of decisions it would support



Report Templates

ARLS Release Test Effectiveness

Note: Testing Effectiveness compares the number of defects found at a particular stage of testing against how many defects were actually le



Eg Description

This report shows the overall quality of the ARLS development process since the degree to which defects are released into production are a good indication of the maturity of software development.

Data Collection Templates

- 5 Base Measures and Tools Agreed:
 - Functional Size (fps)
 - IFPUG 4.2
 - *SCOPE Project Sizing Software™*
 - Effort (hours)
 - ISBSG Definitions Level 2
 - *NIKU™*
 - Defects (number)
 - origin, severity
 - ISBSG Customised
 - *Test Track Pro™*
 - Duration (Calendar Days)
 - ISBSG Definitions
 - *NIKU™* Rules for Calculation
 - Full-time Equivalentents (people)
 - ISBSG Definitions



3. Perform Measurement Process

■ Establish Baseline

Metrics Consultant Resource:

- 1 consultant
- Effort = 33 days
- Duration = 2 Calendar Months

Client Resource:

- 8 application experts
- Effort = ~1/2 day each
- Duration = 2 Calendar Months

■ Ongoing Measurement

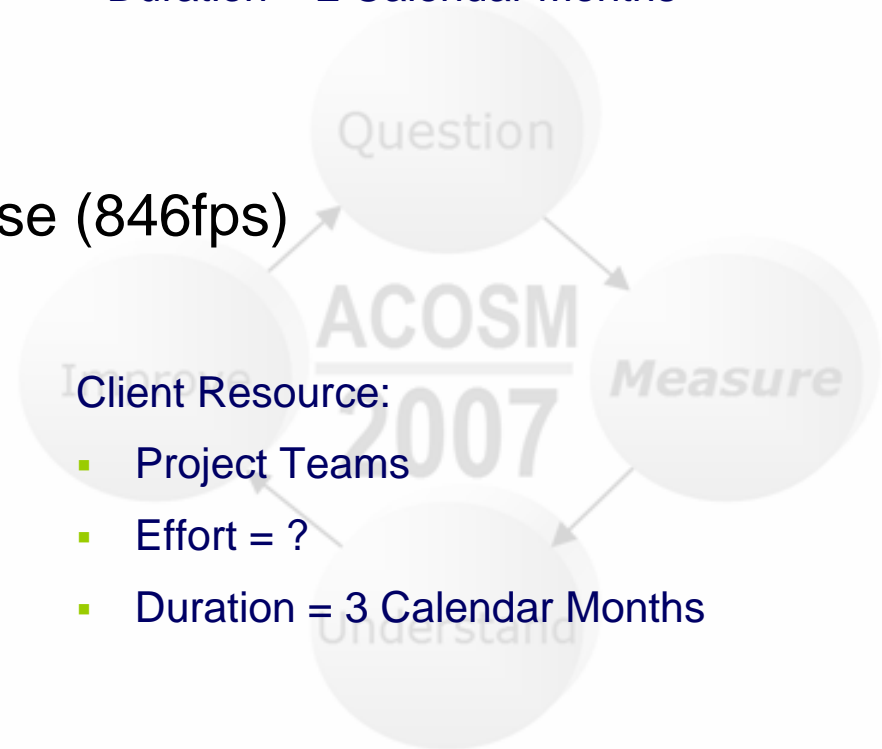
- ~ 6 projects every 3 month Release (846fps)

Metrics Consultant Resource:

- 1 consultant
- Effort = 5 days
- Duration = 1 Calendar week

Client Resource:

- Project Teams
- Effort = ?
- Duration = 3 Calendar Months



3. Perform Measurement Process

- Analysis of the Results – 52 KPIs

Metrics Consultant Resource:

- 1 consultant
- Effort = 5 days
- Duration = 1 Calendar week

Client Resource:

- 1 Metrics Analyst
- Effort = 10 days
- Duration = 1 Calendar Month

- Reporting the Results

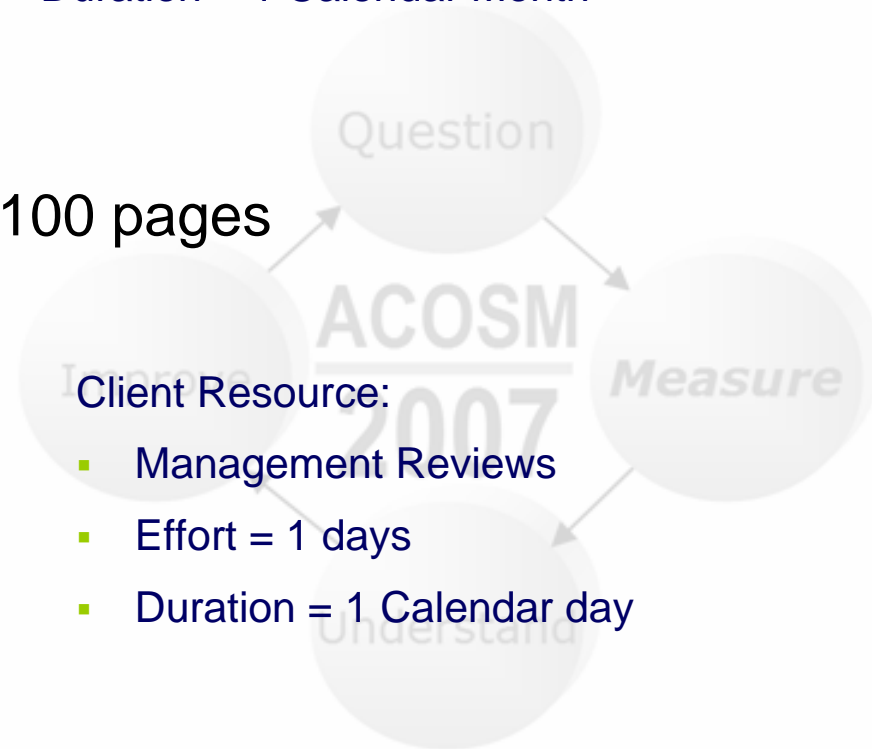
- Benchmark Report (6 monthly) – 100 pages

Metrics Consultant Resource:

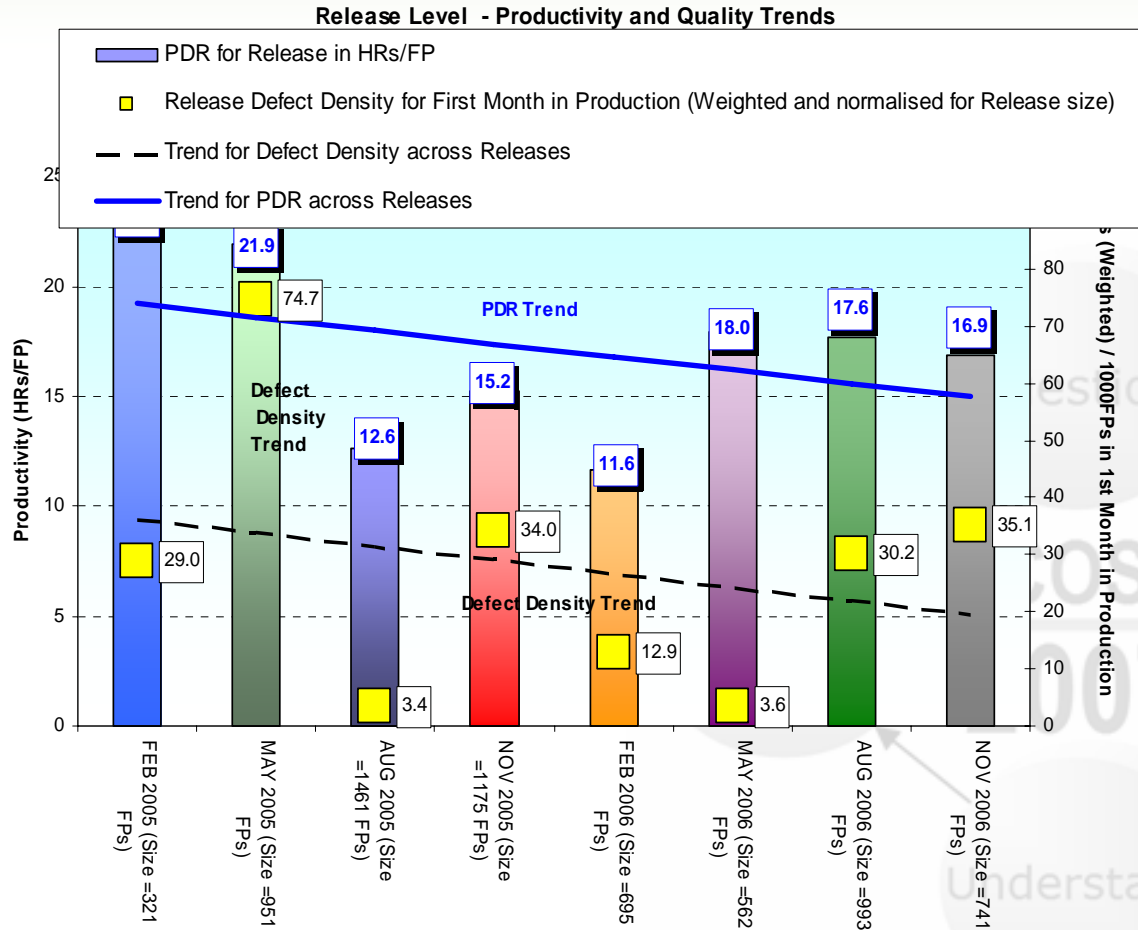
- 1 consultant
- Effort = 10 - 15 days
- Duration = 3 Calendar weeks

Client Resource:

- Management Reviews
- Effort = 1 days
- Duration = 1 Calendar day

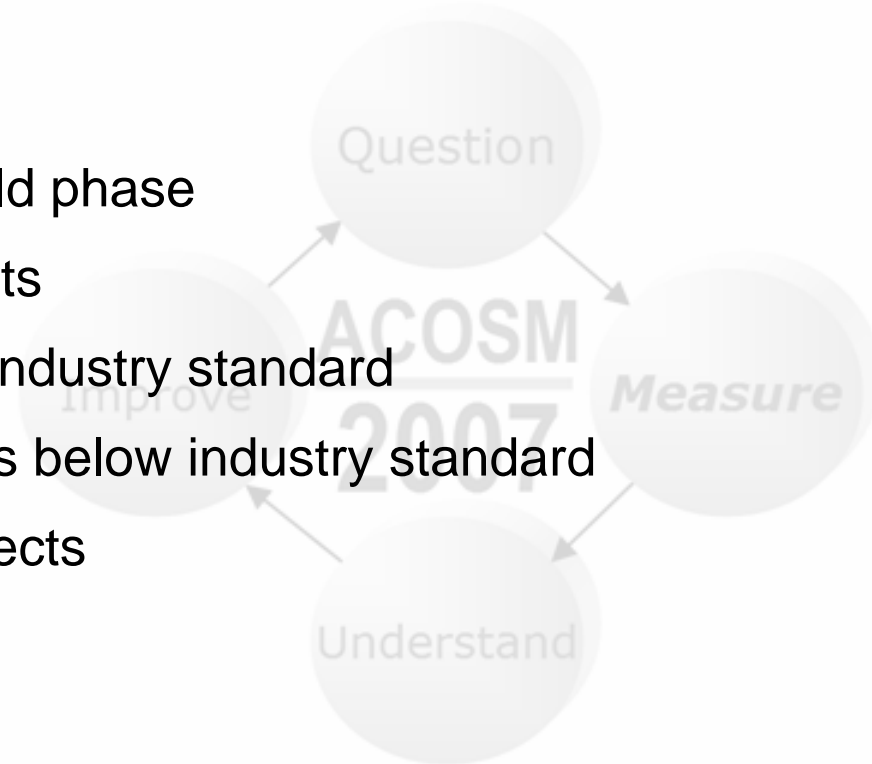


4. Feedback into Technical and Management Processes



4. Feedback into Technical and Management Processes

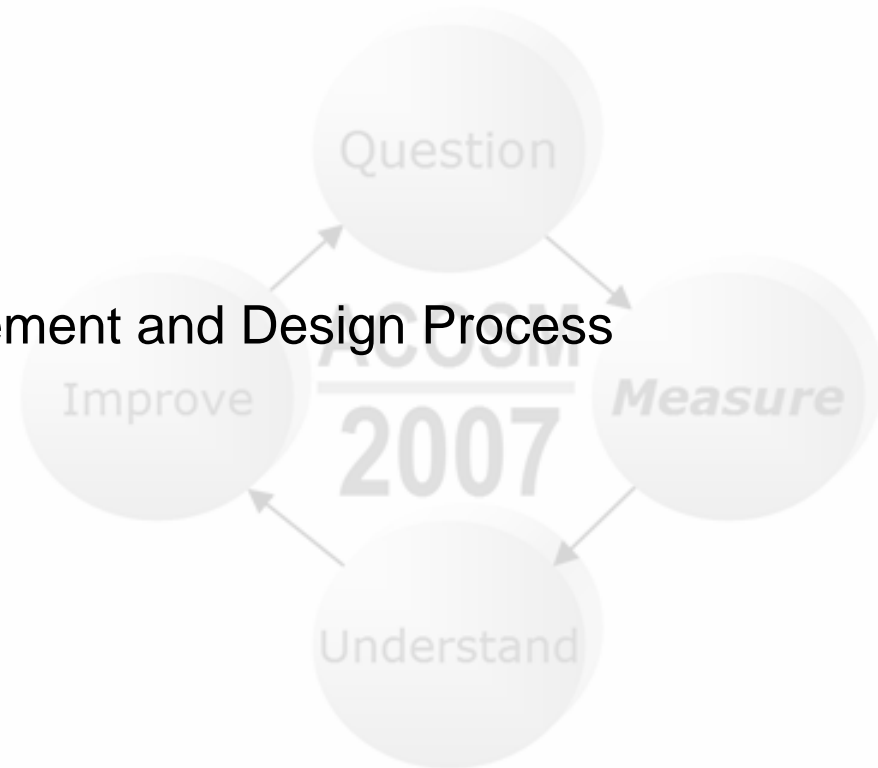
- Product Quality
 - Observations
 - Most defects originated in Build phase
 - Testing was introducing defects
 - Testing efficiency was below industry standard
 - Time spent early life cycle was below industry standard
 - Large variability between projects



- Product Quality

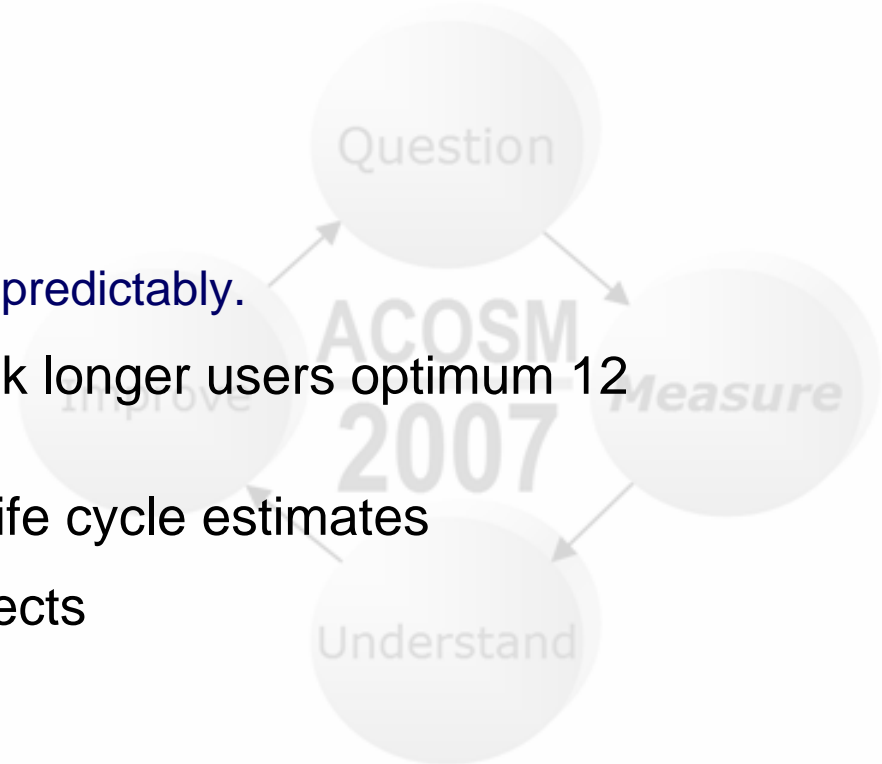
- Improvements Introduced

- Peer Reviews
- Formal Unit Test process
- Focus on System Testing
- Formal Requirements Management and Design Process



4. Feedback into Technical and Management Processes

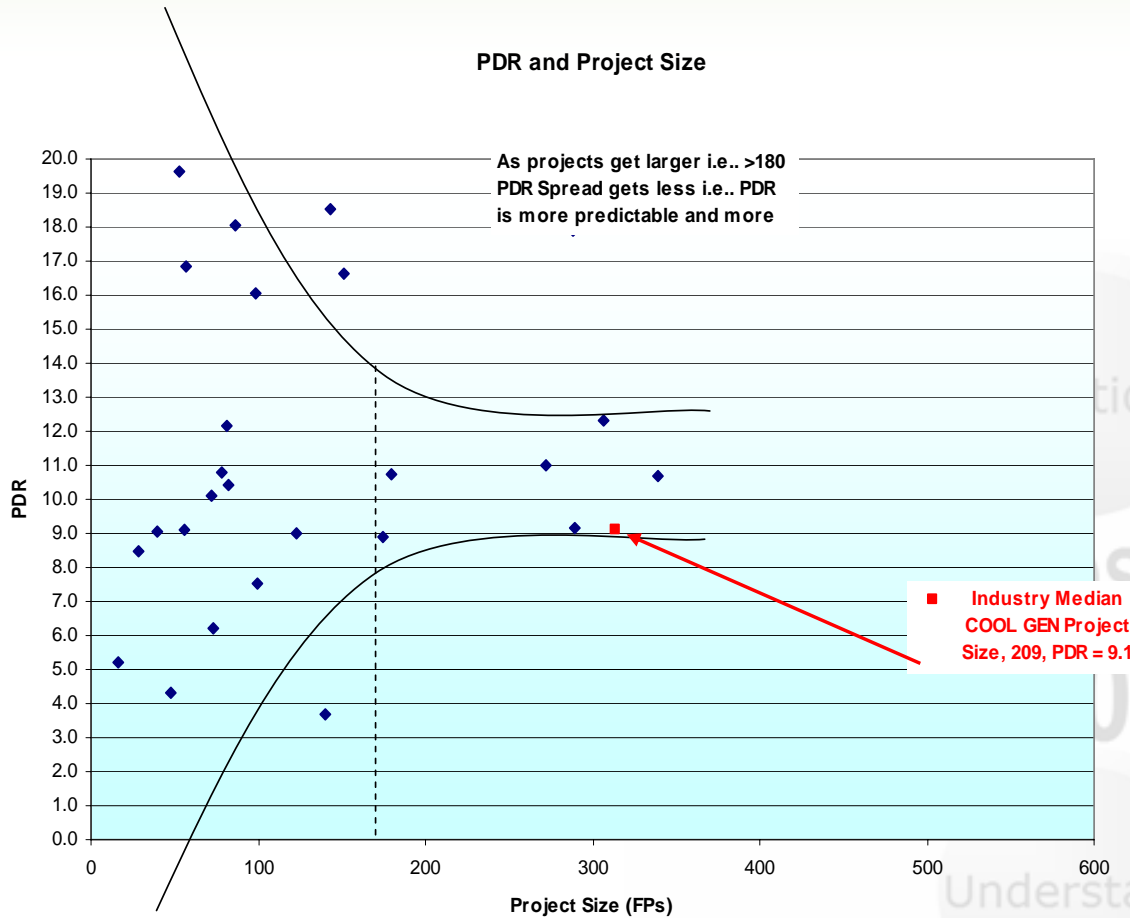
- Productivity
 - Observations
 - Less productive than Industry
 - Small projects (<100fps):
 - have lower productivity
 - Small projects behave unpredictably.
 - Larger Projects (>250 fps) took longer users optimum 12 months
 - FP size gave accurate early life cycle estimates
 - Large variability between projects



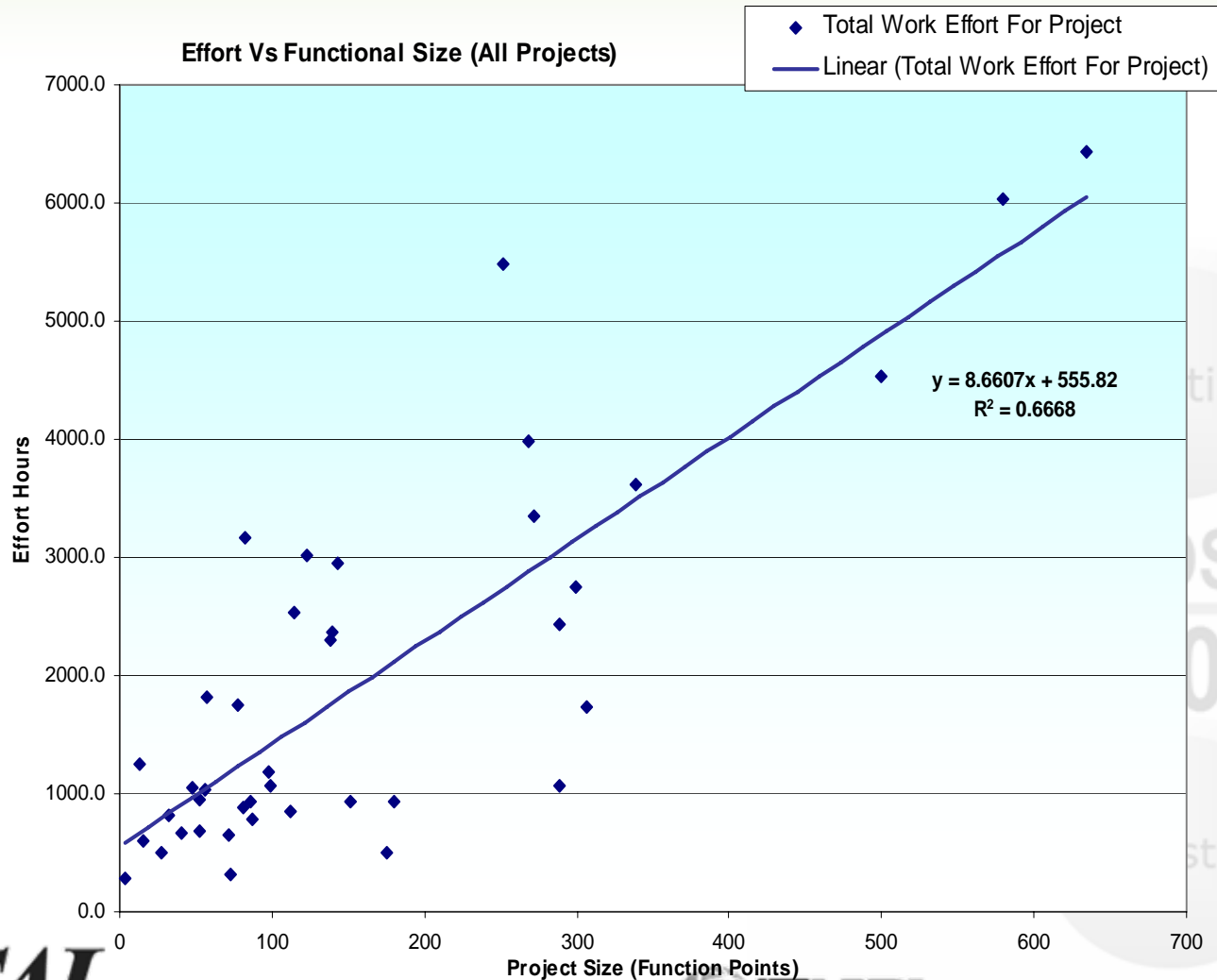
Less Productive than Industry Median

Position	Project Median PDR Comparison to Industry by Release								Industry Values (R10 - 2007)		
	Feb-05	May-05	Aug-05	Nov-05	Feb-06	May-06	Aug-06	Nov-06	Cool:GEN	4 GL Projects	Case Tools
Minimum value									2.7	0.9	1.8
Top 25% of productivity					7.5				6.8	3.7	6.5
Median rate		12.2	12.1				10.1		9.1	6.7	14.4
Bottom 25% of Productivity	21.1			16.8		18.1		23.4	12.5	12.4	30.0
Maximum Value									56.1	40.5	80.7
Number in sample	2	4	8	6	7	7	5	4	28	89	81

Small Project are more unpredictable

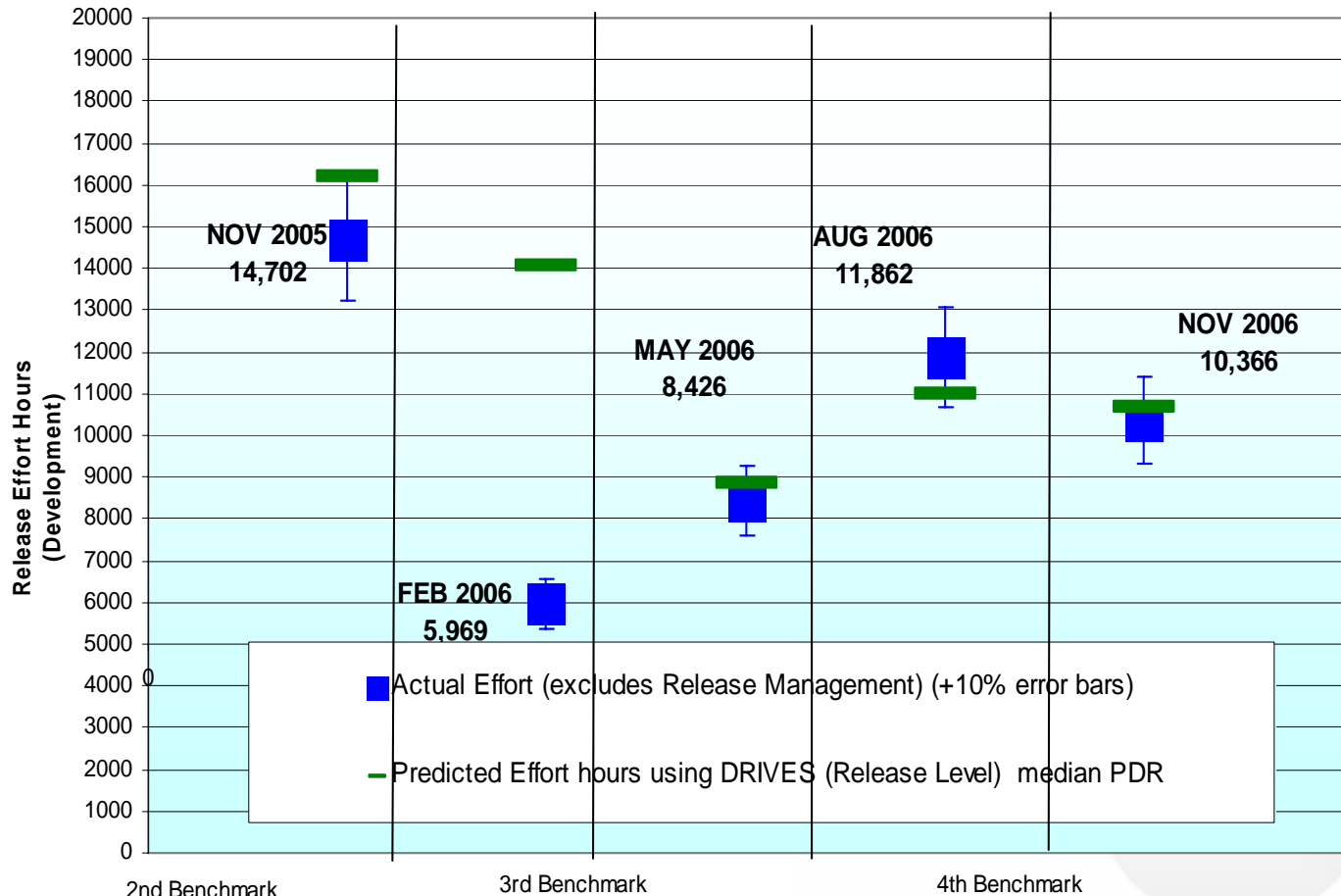


FP Size has good correlation with effort



Estimated FP Size Produced Accurate Effort Estimates

ARLS Release Effort Estimates Vs Actual Release (Project) Effort in Hours

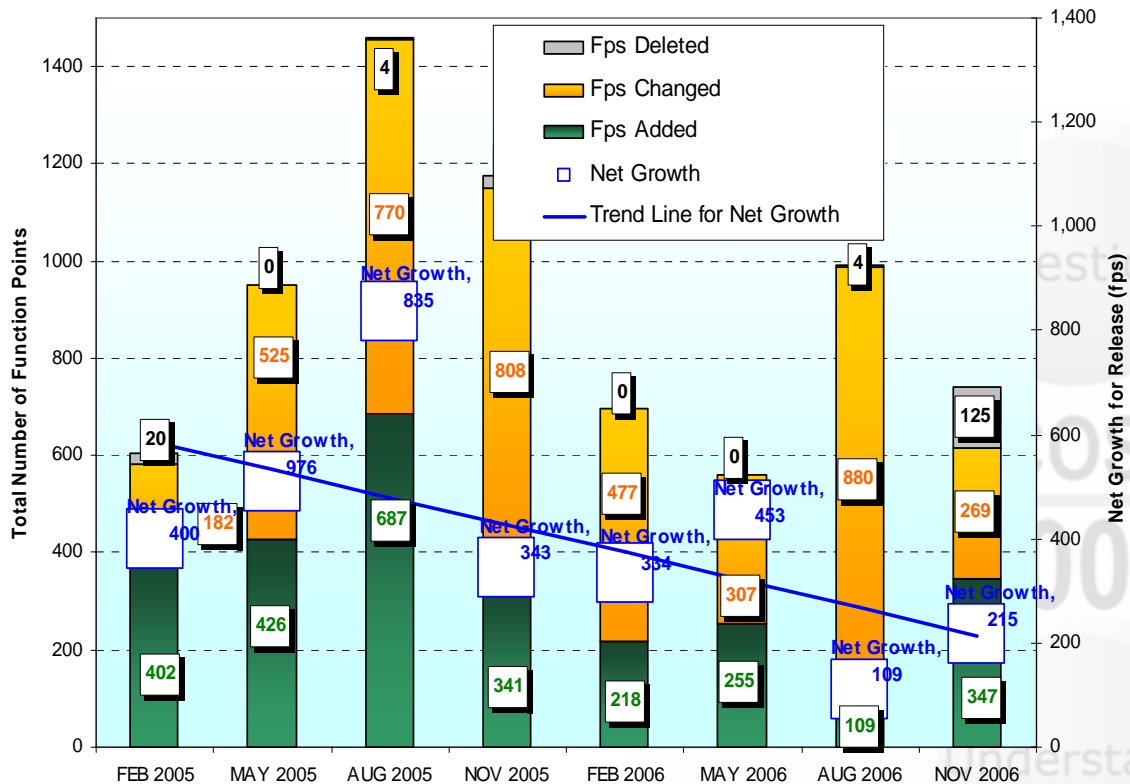


Measure

Only 33% of Projects delivering New functionality to the Business and Net Growth is decreasing

Release Functional Impact Analysis - Summary

$$\text{Net Growth For Release} = (\text{Added Fps}) + (\text{Changed After size} - \text{Changed Before Size}) - (\text{Deleted})$$



5. Evaluate Measurement

■ Metrics Review Workshop – 2 hours

Metrics Consultant Resource:

- 1 consultant
- Effort = 2 hours
- Duration = 1 Calendar day

Client Resource:

- 5 Management team
- Effort = 1 day
- Duration = 1 Calendar day

■ Implementing Changes

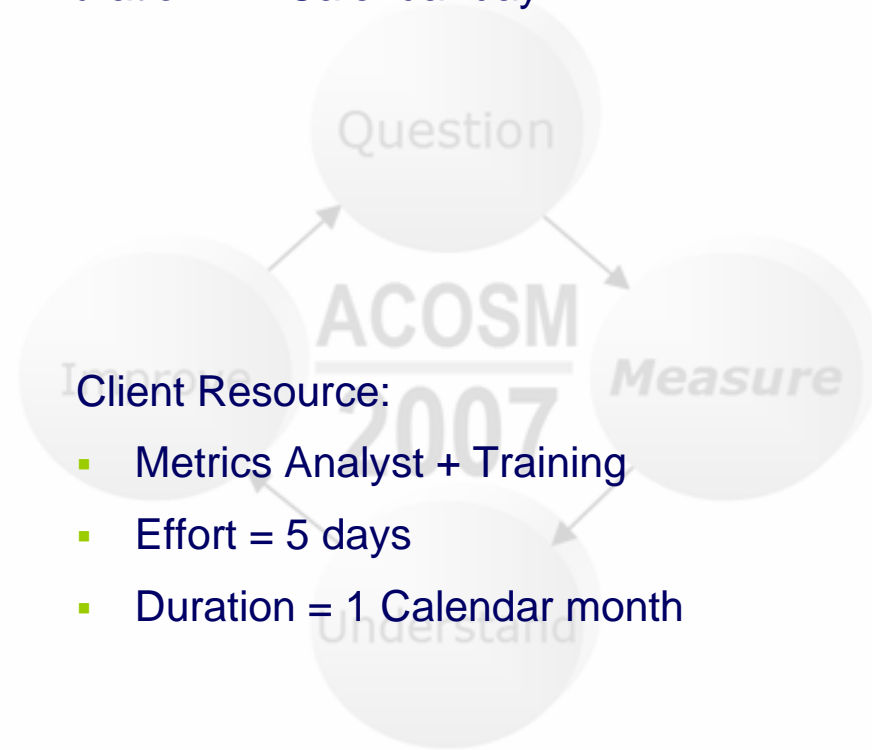
■ Data Collection and Recording

Metrics Consultant Resource:

- 1 consultant
- Effort = 3 days
- Duration = 1 Calendar week

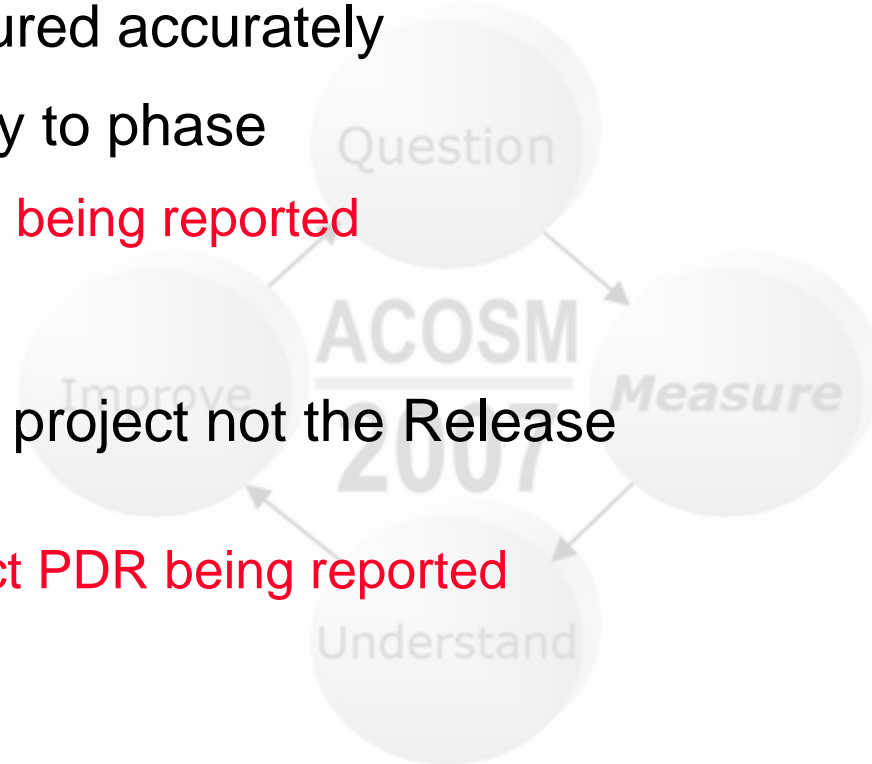
Client Resource:

- Metrics Analyst + Training
- Effort = 5 days
- Duration = 1 Calendar month

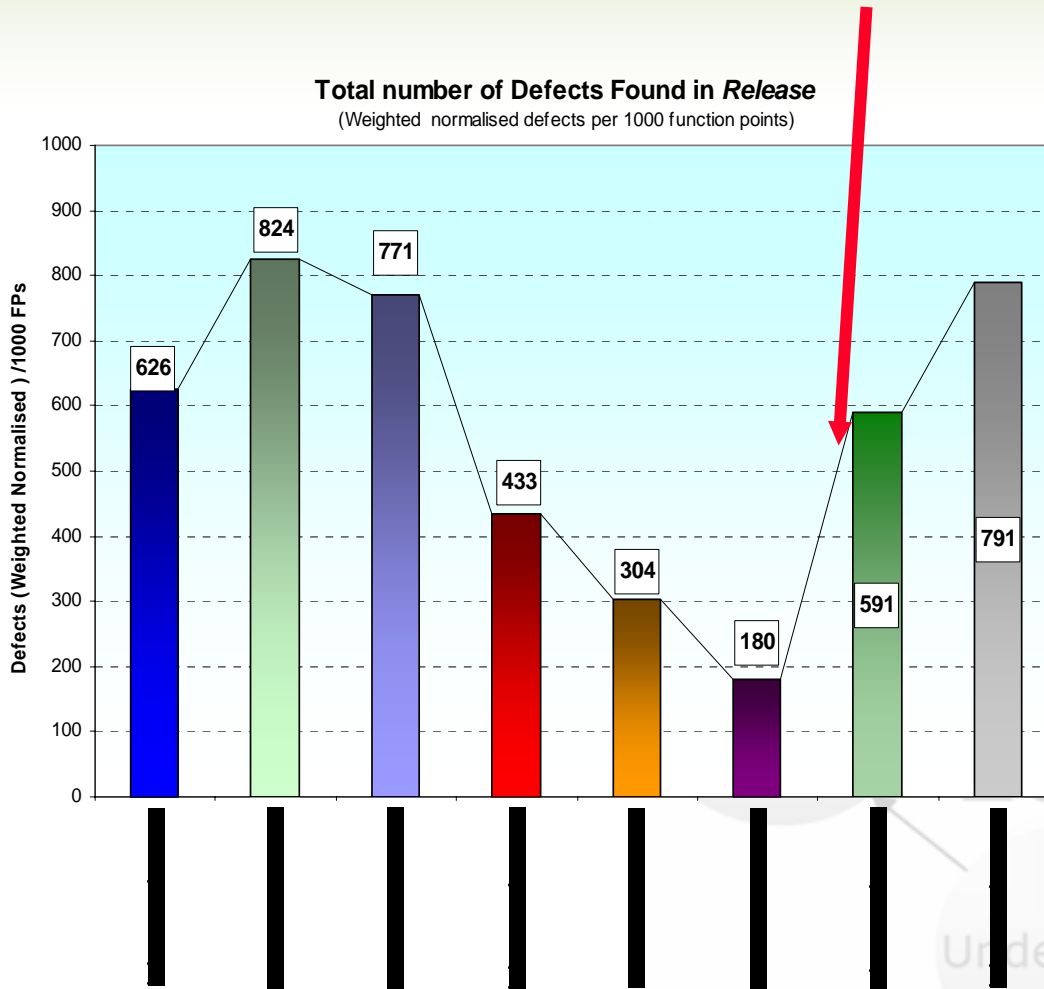


Changes Introduced

- Defects
 - All defects now captured – early life cycle
 - Unit Testing defects now captured accurately
 - Defects now allocated correctly to phase
 - ➔ 4th Benchmark more defects being reported
- Effort
 - QC Effort now allocated to the project not the Release overhead.
 - ➔ 4th Benchmark higher Project PDR being reported



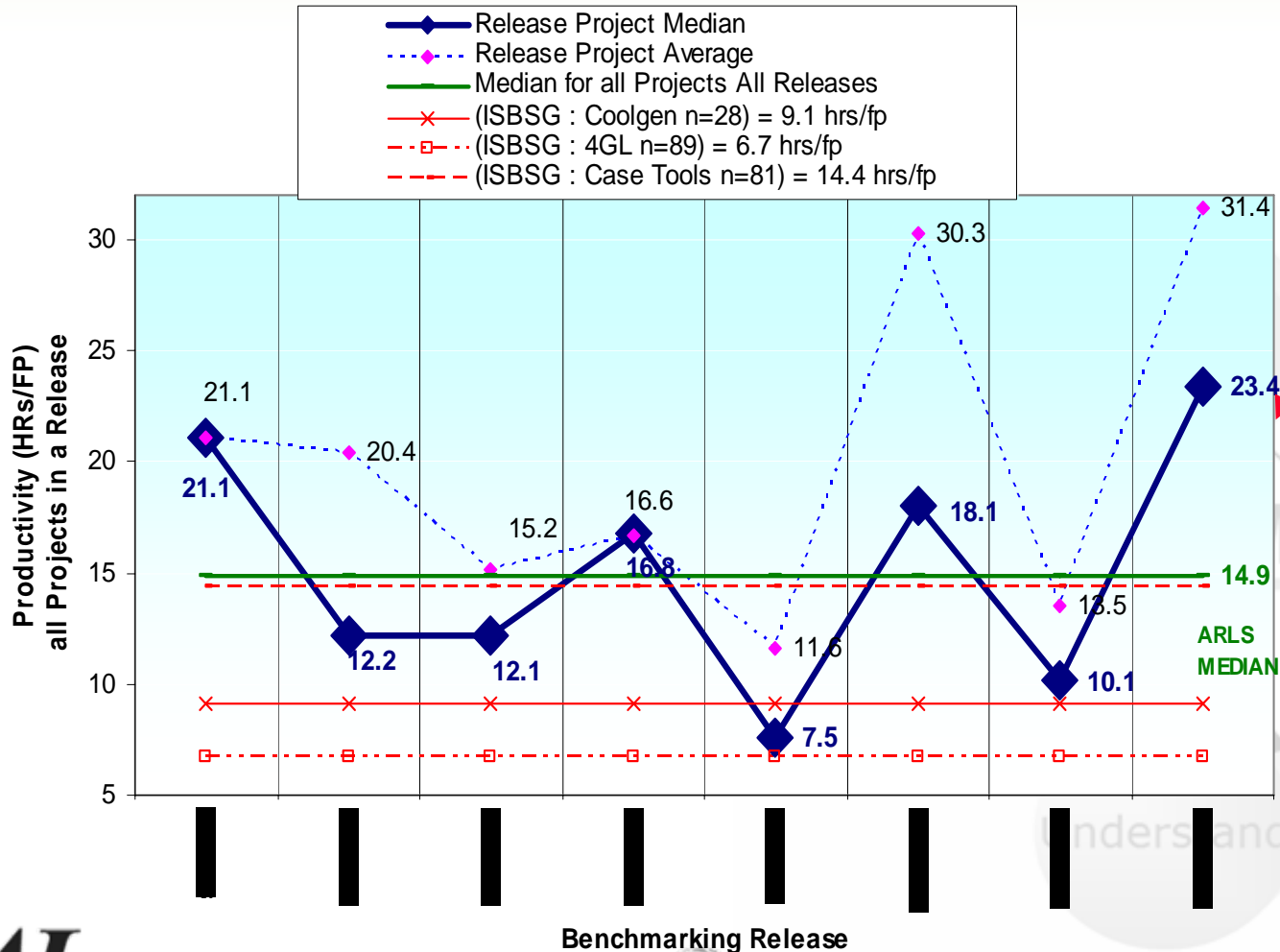
More Defects being Reported



Lower Project Productivity (higher PDR) Reported



Comparison ALL PROJECT PDR to Industry Medians



Measure

Understand



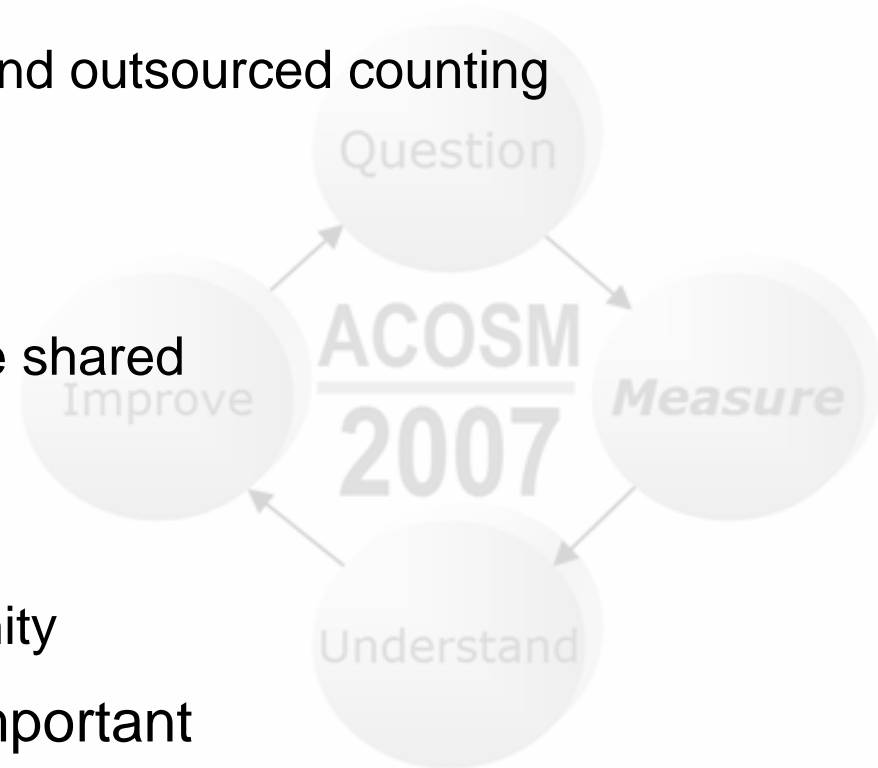
ASMA/SQA (NSW)



Critical Success Factors



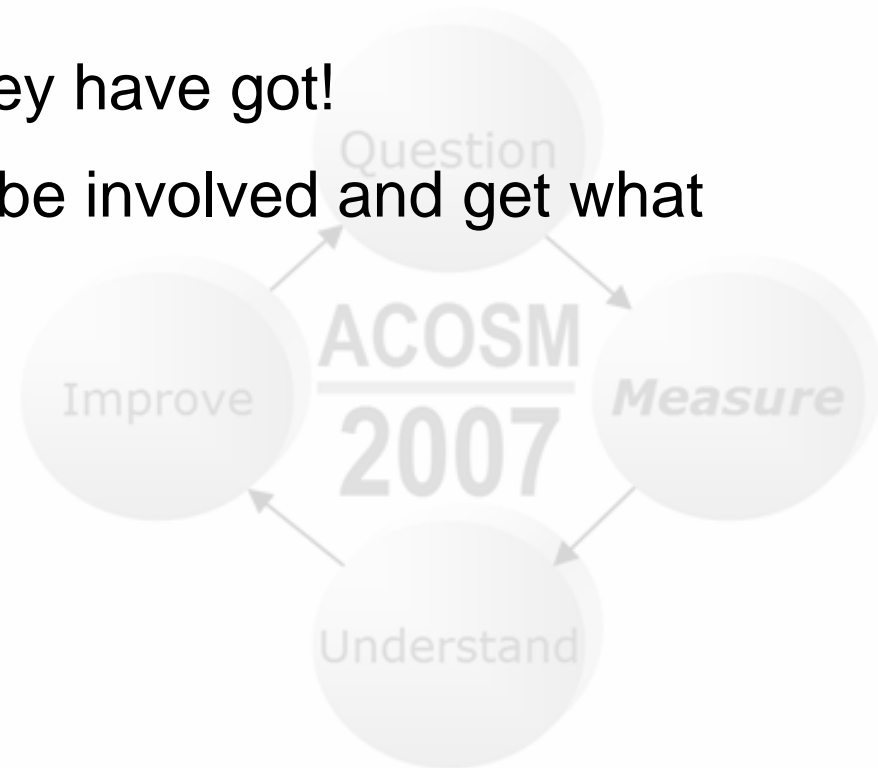
- Formal Process
 - Clear Stated objectives
 - Vision – long term commitment
 - Adequate Budget and Resources
 - Used skilled Metrics personnel
 - Used specialist tools for FPA and outsourced counting
- Management
 - Realistic expectations
 - All levels interested, results are shared
 - Acts on the results
 - Open to change
 - Sees bad news as an opportunity
 - Measurement is viewed as important



News Flash - May 2007

True Measure of Success!

- Other IT Areas want what they have got!
- 8 other Applications want to be involved and get what the ARLS team are getting!





ACOSM 2007

Australian Conference on Software Measurement



At Last Success !

Total Metrics Pty Ltd
667 Burke Road
Camberwell
Victoria 3124 Australia

Phone +613 9882 7611

Fax +613 9882 7633

admin@Totalmetrics.com
www.totalmetrics.com