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# ***2003 Software Engineering Process Group (SEPG) Conference***

***CMMI: If You Don't Know Where You Stand,  
You're Not Ready For An Internal Appraisal***

**Presented to:**

SEPG Attendees

February 26, 2003

**Presented by:**

Andy Willums

RJ Marks

CMMI Program Office (CPO)

TYBRIN Corporation



Independently Assessed SEI CMM Level 3  
1997 Florida Governor's Business Leadership Award Winner  
1996 Small Business Administration National Prime Contractor of Year

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# Overview

- ❑ Background on TYBRIN
- ❑ Organizational Definition
- ❑ Work Groups
- ❑ Appraisal Method
- ❑ Measurement
- ❑ Lessons Learned
- ❑ Summary

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## ***Background on TYBRIN***



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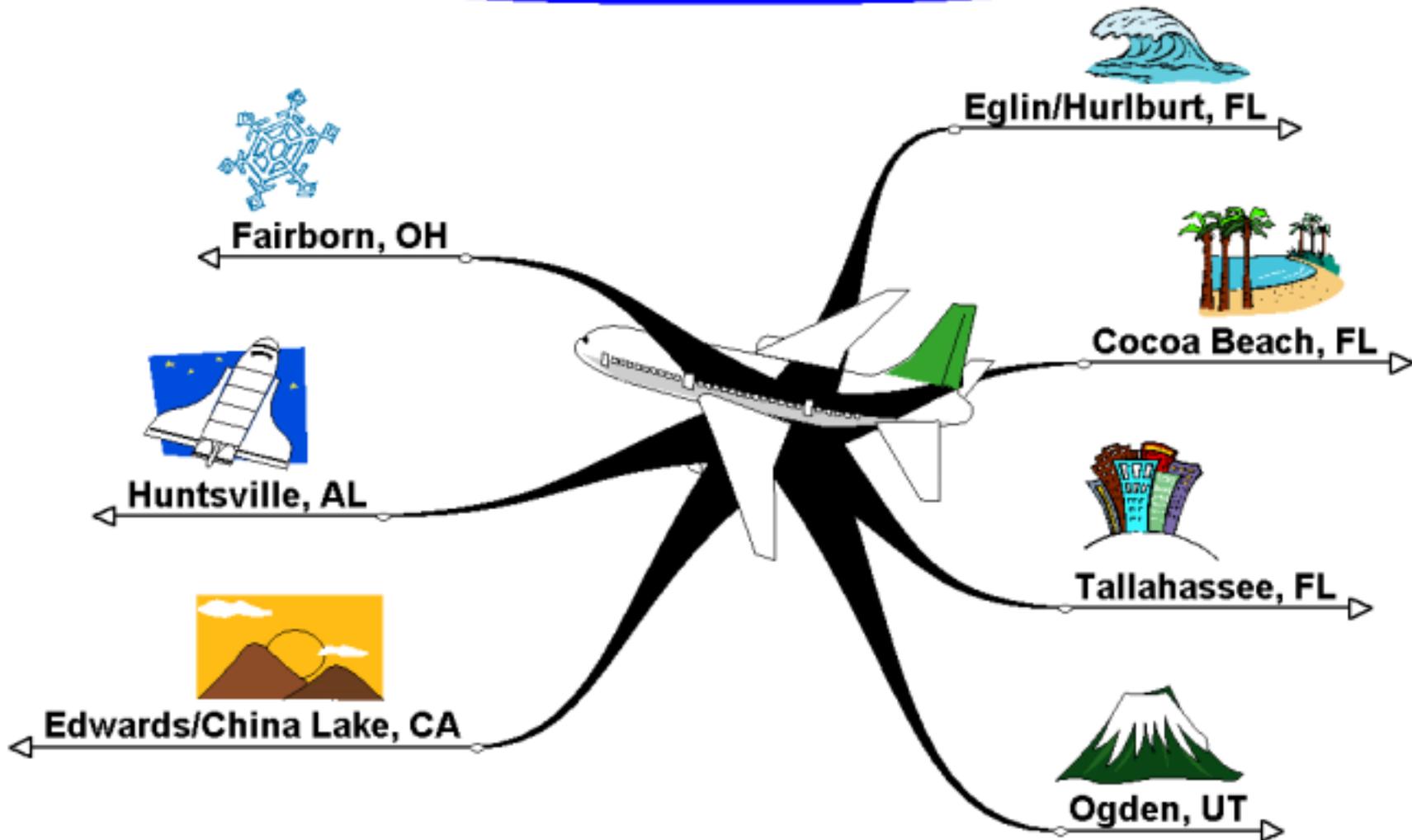
## **Overview of TYBRIN**

- ❑ Family Owned
- ❑ Founded in 1972
- ❑ Corporate office in Fort Walton Beach, FL
- ❑ 820+ employees
- ❑ 100% growth over 2001-2002
- ❑ Specializes in providing systems and software engineering services to the DOD
- ❑ More than 95% of our employees support Test and Evaluation (T&E), C4I, Acquisition, and Operations/Intelligence activities



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## CMMI Program Office (CPO) Team Assignments



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# ***TYBRIN's CMM Journey***

- ❑ TYBRIN's commitment to CMM started in 1993
- ❑ Internally assessed at Level 1 in August 1993
- ❑ Externally assessed at Level 2 in March 1995
- ❑ Externally assessed at Level 3 in March 1997
- ❑ Externally re-assessed at Level 3 in June 1999
- ❑ Externally re-assessed at Level 3 in May 2001



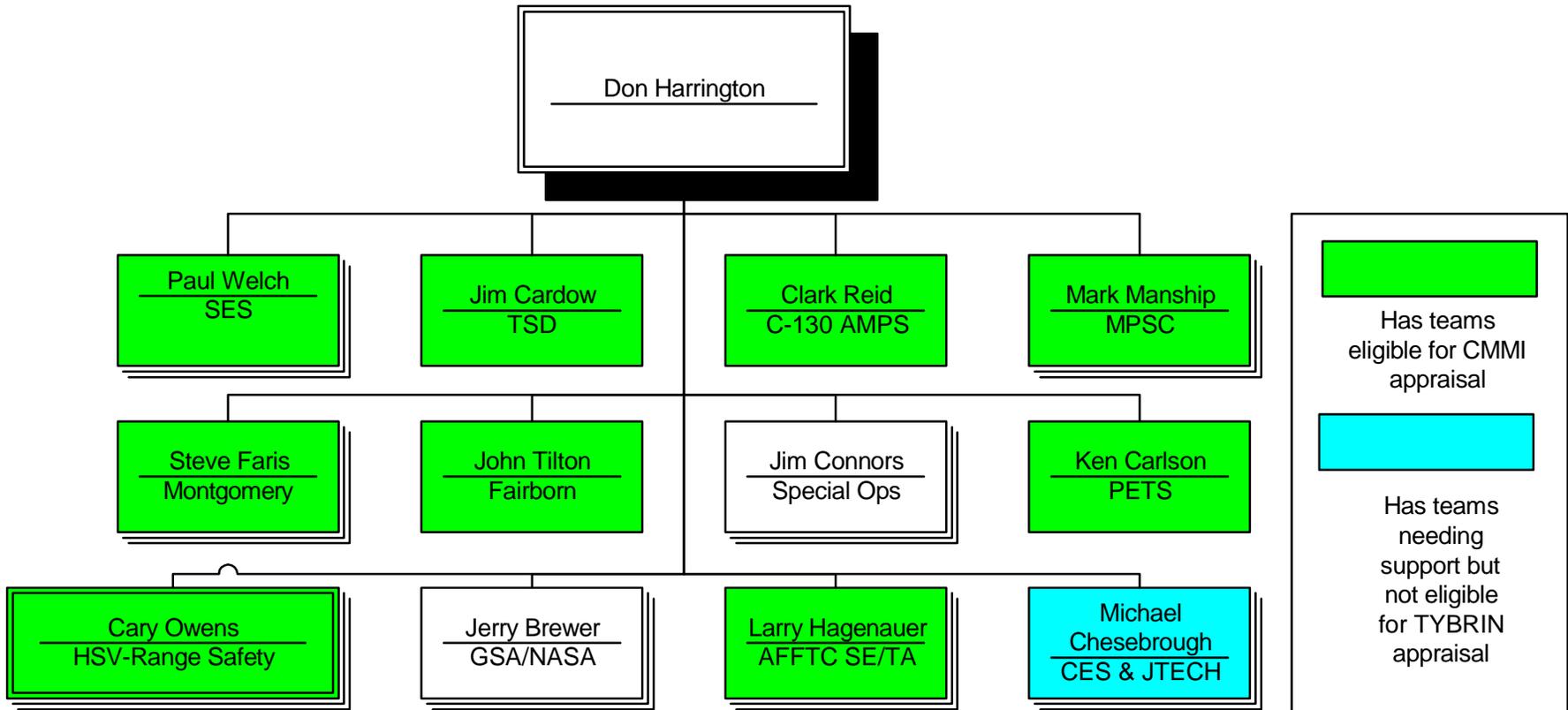
## ***Organizational Definition***

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# ***Organization Definition***

- ❑ Single comprehensive Organization Chart created to show all major areas of TYBRIN
- ❑ Team Profile spreadsheet filled out with information provided by all areas of TYBRIN
- ❑ Information collected included data on size of team, duration of contract, type of contract, location, etc.
- ❑ Teams that fit criteria will need EPG representation, Self-Appraisals, CPO Appraisals, and are eligible for external appraisal

# Organization Definition (continued)



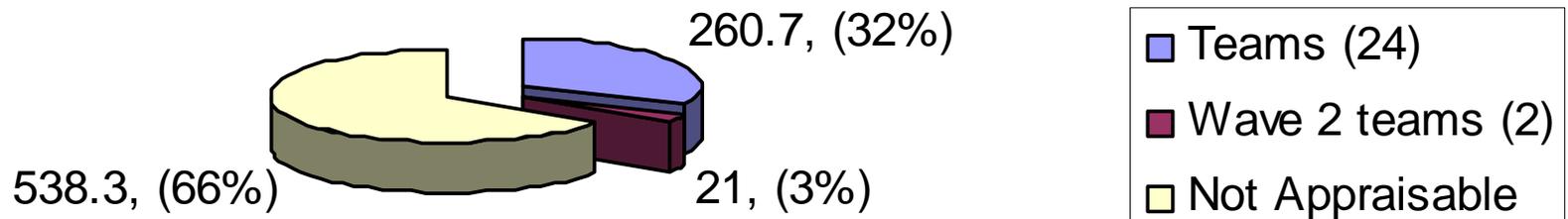
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## ***CMMI Policy***

- ❑ Signed by company President, posted on CMMI Central (intranet), covered in training with new employees
- ❑ TYBRIN teams that must follow the Organizational Set of Standard Processes (OSSP) are those that:
  - Are providing Software, Systems Engineering and/or Integrated Product and Process Development products or services; and
  - The team employs more than two TYBRIN Full Time Equivalents; and
  - The Project duration exceeds 12 months; and
  - The team exercises ownership or management responsibility for project processes
- ❑ All other teams are highly encouraged to make use of CMMI Program assets and help improve our TYBRIN corporate knowledge base wherever possible

# Changes to Team Profile Listing, version 1.2

## TYBRIN People on Appraisable Teams



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## *Work Groups*



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# Overview of Work Group Concept

- ❑ Work Groups (WGs) made up of 1 CPO facilitator, 1 WG Leader, and approximately 4 members from different teams
- ❑ WGs are part time, with estimated duration based on complexity and new requirements; careful not to have too many open at once and that each closes in timely manner
- ❑ Each WG will address changes to OSSP, PAL, training, and whatever else to ensure compliance with each Process Area is defined
- ❑ Overall approach is for WGs to tackle Process Areas in Maturity Level order; order selected by EPG
- ❑ There are 7 Process Areas in Maturity Level 2, 13 for ML3

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## *Appraisal Method*



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# Appraisal Purpose

*Appraisal – “An examination of one or more processes by a trained team of professionals using an appraisal model as a basis for determining strengths and weaknesses.”*

*CMMI SE/SW/IPPD, V1.1*

An appraisal:

- ❑ Is an objective snapshot against the model
- ❑ Supports process improvement
- ❑ Is confidential and collaborative
- ❑ Provides organizational focus for improvement
  - Identifies strengths and weaknesses
  - Identifies and allows for mitigation of risks

# Appraisal Characteristics

*“There is no requirement for a CMMI appraisal method to fall exactly into one class ...”*

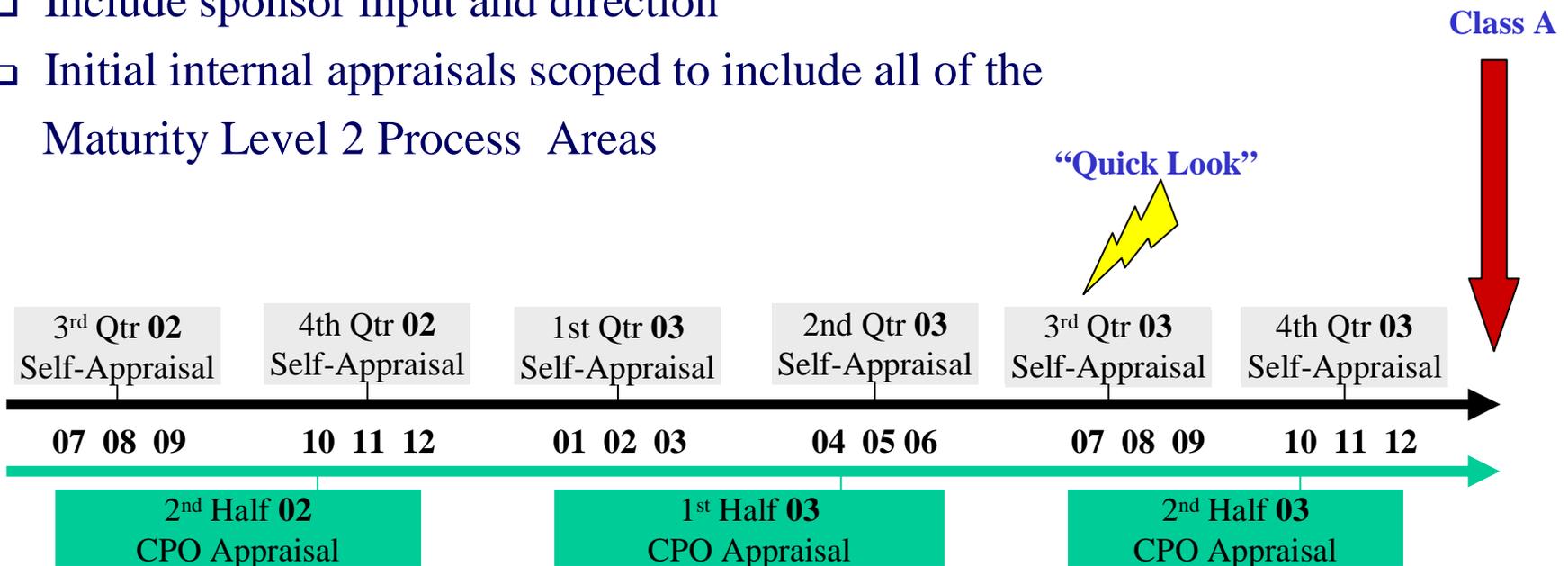
## ARC V1.1

Characteristics	Class A	Class B (CPO)	Class C (Self)
Amount of Objective Evidence Gathered (Relative)	High	Medium	Low
Rating Generated	Yes	No	No
Resources Needed (Relative)	High	Medium	Low
Team Size (Relative)	Large	Medium	Small
Appraisal Team Leader Requirements	Lead Appraiser	Lead appraiser or person trained and experienced	Person trained and experienced

# Appraisal Approach

Appraisals:

- ❑ Are conducted quarterly & semi-annually (see illustration below)
- ❑ Are updated in conjunction with new releases of the OSSP and local implementations (broaden scope as Process Areas are addressed)
- ❑ Include updates and progress adjustments from Self and CPO findings
- ❑ Include sponsor input and direction
- ❑ Initial internal appraisals scoped to include all of the Maturity Level 2 Process Areas



# Appraisal Approach (CMMI/OSSP Matrix)

Maturity Level	Process Area	Goals & Practices	Description	Expected Organization Process or Procedure  (Descriptions and/or outputs)	Common Project Process or Procedure  (Descriptions and/or outputs)	Common Evidence or Outputs  (Descriptions and/or outputs)	TYBRIN OSSP areas, PAL items, training items, OMR items, or "other areas"  (Descriptions and/or outputs)	Goal Satisfaction Rating ( <i>Color</i> ) OR Project Evidence/Artifacts
2	RD	SG 1	<b>Develop Customer Requirements</b> Stakeholder needs, expectations, constraints, and interfaces are collected and translated into customer					<u>GOAL RATING:</u> <<put color code here>>
2	RD	SP 1.1	Elicit stakeholder needs, expectations, constraints, and interfaces for all phases of the product life cycle.	<ul style="list-style-type: none"> <li>· Org Policy</li> <li>· OSSP Reqs</li> <li>· Development process</li> <li>· OSSP procedure detailing methods and techniques used to elicit needs.</li> </ul>	<ul style="list-style-type: none"> <li>· Project plan identifying tailored OSSP, and project specific processes and procedures</li> </ul>	<ul style="list-style-type: none"> <li>· Results of requirements collection methods, such as:                             <ul style="list-style-type: none"> <li>· Technical demonstrations or prototypes</li> <li>· Meeting minutes</li> <li>· Interview or Survey results</li> <li>· Business case analysis results</li> <li>· Requirements analysis</li> <li>· Use case analysis</li> <li>· Product domain analysis</li> <li>· Evidence of customer</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>· (S)RS Template</li> <li>· Minutes of meetings, interviews</li> <li>· OSSP</li> <li>· Scenarios, diagrams</li> <li>· Project Plan, Schedule, Tailoring Worksheet</li> </ul>	<u>Project Evidence/Artifacts:</u> <ul style="list-style-type: none"> <li>·</li> <li>·</li> </ul>

# Appraisal Approach (Reporting)

Self-Appraisal - MetricCenter Example Screen Shot

Sample Self Appraisal Quilt Chart								
Process Area	ML	02Q3 Self	02Q4 Self	03Q1 Self	03Q2 Self	03Q3 Self	03Q4 Self	04Q1 Self
RM SG1	2	RED	RED	ORANGE	YELLOW	GREEN	GREEN	GREEN
RM GG2	2	WHITE	ORANGE	RED	RED	YELLOW	GREEN	GREEN
PP SG1	2	WHITE	ORANGE	GREEN	GREEN	GREEN	GREEN	GREEN
PP SG2	2	ORANGE	ORANGE	ORANGE	ORANGE	ORANGE	GREEN	GREEN
PP SG3	2	RED	RED	RED	RED	ORANGE	YELLOW	GREEN
PP GG1	2	WHITE	WHITE	YELLOW	YELLOW	YELLOW	GREEN	GREEN
PMC SG1	2	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN
PMC SG2	2	RED	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN
PMC GG2	2	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN	GREEN
SAM SG1	2	BLACK	BLACK	BLACK	BLACK	BLACK	BLACK	BLACK
SAM SG2	2	BLACK	BLACK	BLACK	BLACK	BLACK	BLACK	BLACK
SAM GG2	2	BLACK	BLACK	BLACK	BLACK	BLACK	BLACK	BLACK
MA SG1	2							
MA SG2	2							
MA GG2	2							
PPQA SG1	2							
PPQA SG2	2							
PPQA GG2	2							

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# Appraisal Approach (Scoring Scheme)

Score	Indicators
Black	Not Applicable
White	No data reported – Process Area not addressed by TYBRIN yet, no appraisal performed on this Process Area yet
Red	Goal Not Met, insufficient evidence of practices supporting the goal
Orange	Goal Not Met, some practices supporting the goal in evidence
Yellow	Goal Not Met, most practices supporting the goal in evidence
Green	Goal Met, all practices supporting the goal in evidence

# Appraisal Approach (Corporate Reporting)

Corporate Rollup - MetricCenter Example Screen Shot

Final Corporate Rollup Quilt Chart							
Process Area	ML	WHITE	RED	ORANGE	YELLOW	GREEN	BLACK
RM SG1	2						
RM GG2	2						
PP SG1	2						
PP SG2	2						
PP SG3	2						
PP GG1	2						
PMC SG1	2						
PMC SG2	2						
PMC GG2	2						
SAM SG1	2						
SAM SG2	2						
SAM GG2	2						
MA SG1	2						
MA SG2	2						
MA GG2	2						
PPQA SG1	2						
PPQA SG2	2						
PPQA GG2	2						

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# Appraisal Approach (Principles)

An appraisal must:

- ❑ Provide an objective snapshot against the CMMI Model
- ❑ Support process improvement action plans and program goals
- ❑ Be confidential, non-attributable, collaborative, and complementary
- ❑ Follow rules of evidence: accuracy, validation, consensus, corroboration, sufficiency
- ❑ Provide organizational focus for current and planned improvement

**Relax**

CMMI is a new model:

- ❑ All teams are expected to have deficiencies
- ❑ Scores are meant for improvement purposes, not punitive
- ❑ As a company, we'll continue to strive to interpret what CMMI means to our business and our individual project teams

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# ***Major Activities and Deliverables***

- Pre-Onsite
  - Contact Program Manager, get a coordinator
  - Schedule facilities and travel, set scope
  - Determine training needs
  - Document review
- Onsite
  - Conduct Kick Off presentation
  - Conduct Interviews
  - Consolidate and analyze data
  - Provide training
  - Present findings

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## ***Major Activities and Deliverables (continued)***

- Post-Onsite
  - Develop final report
  - Record metrics
  - Elicit any written comments from affected Team Lead to add to final report
  - Forward final report to affected Program Manager

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# Reporting

- Appraisal reports serve as records of progress and/or improvement milestone achievements over time
- Reports must be clear, concise, and stand on their own
- Report content must include:
  - Date
  - Purpose/scope
  - Appraisal participants
  - Schedule of events
  - Organizational unit(s) appraised
  - Process Areas appraised
  - Data and/or evidence reviewed
  - Results - strengths, weaknesses, opportunities, repeat findings, and next planned iteration

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# *Appraisal Summary*

- TYBRIN Internal Appraisals occur in two forms:
  - Self-Appraisals – Quarterly Class C Appraisal
  - CPO Appraisals - Semi-annual Class B Appraisal
- Appraisals are adaptable, economical, and complementary
- Appraisals provide snapshots in time showing:
  - Process improvement progress
  - Process improvement milestone achievement
  - External appraisal readiness
- Appraisals are confidential and collaborative
- The appraisal process employs preparation and process
- Appraisals generate reports, status, follow-up actions for next iteration

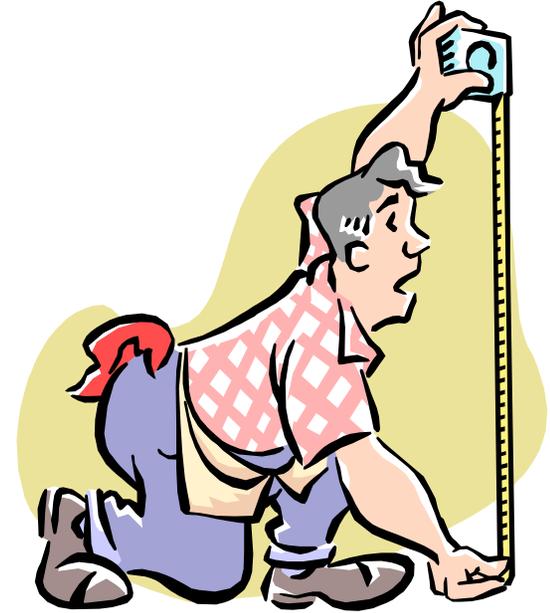
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## ***Internal Appraiser's Start Kit***

- ❑ Interview agenda
- ❑ Checklist of pre-onsite, onsite, and post-onsite activities
  - Use to record travel arrangements, dates, names
  - Include site-specific agenda
- ❑ Kick Off presentation
- ❑ Appraisal results presentation template
- ❑ Question set, sort/filter by role
- ❑ Template for notes on Goal findings
- ❑ CMMI to OSSP matrix
- ❑ Hard copy of CMMI model

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# Measurement



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# ***Measurement Approach Under CMMI***

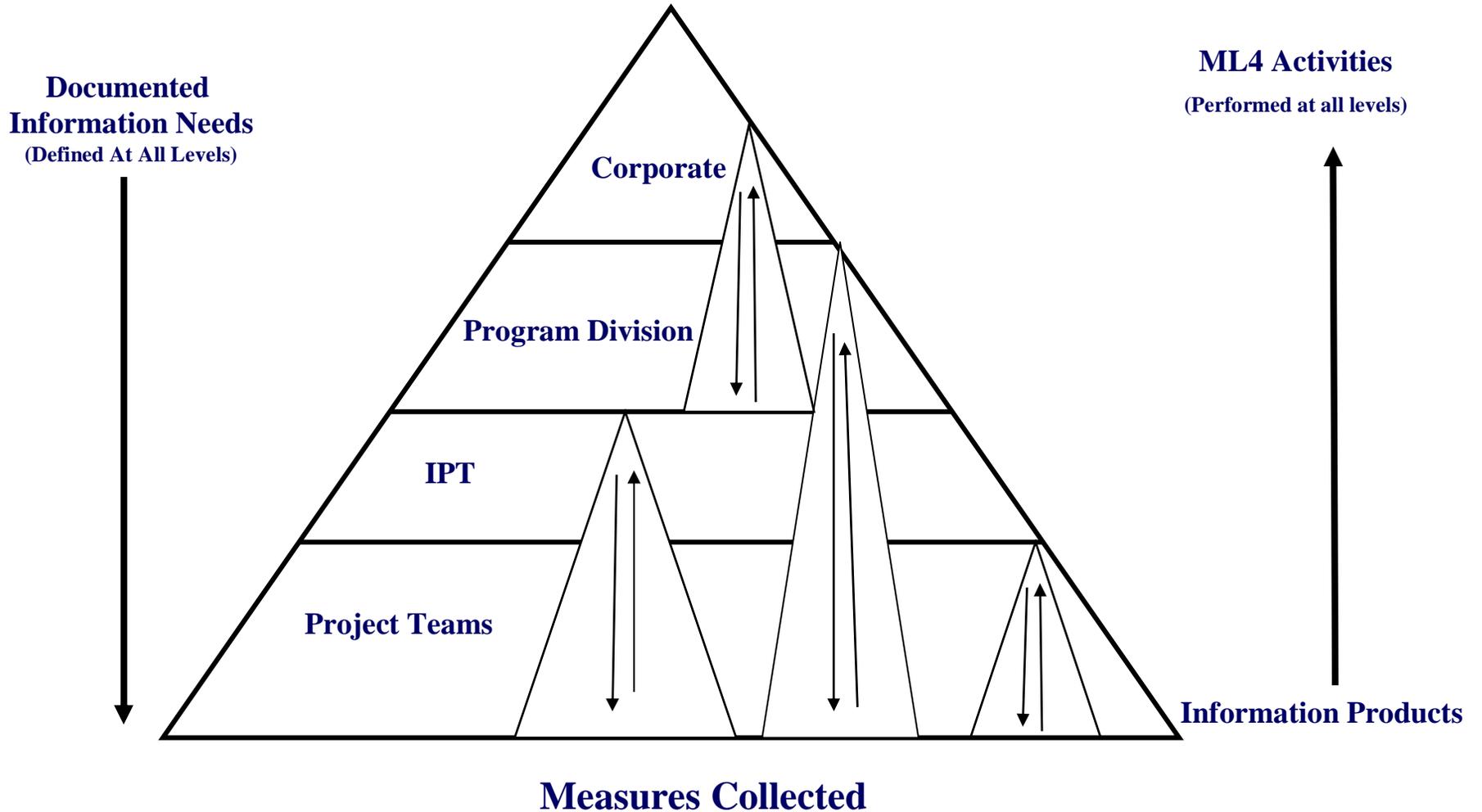
- Industry Convergence on:
  - CMMI (Model)
  - ISO 15939 Software Measurement (Standard)
  - PSM: Practical Software Measurement (Process)
- M&A Work Group results
  - Level 2 – focus on project needs first
  - Will mature with successive releases
  - Tailor to TYBRIN experience and needs
  - Stakeholders should determine their information needs
- Requires documented traceability from “information need” to collection performed
  - Based on needs and objectives
  - Measurement plan required

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# **MetricCenter**

- ❑ Accessible from TYBRINet, CMMI Central, OMR Page (Organizational Measurement Repository).
- ❑ Accounts and Project information access requested through OMR Page.
- ❑ Hierarchical-based for rollup and aggregation within management levels.
- ❑ OMR contains measures at project, corporate and senior management levels (maintained in MetricCenter)

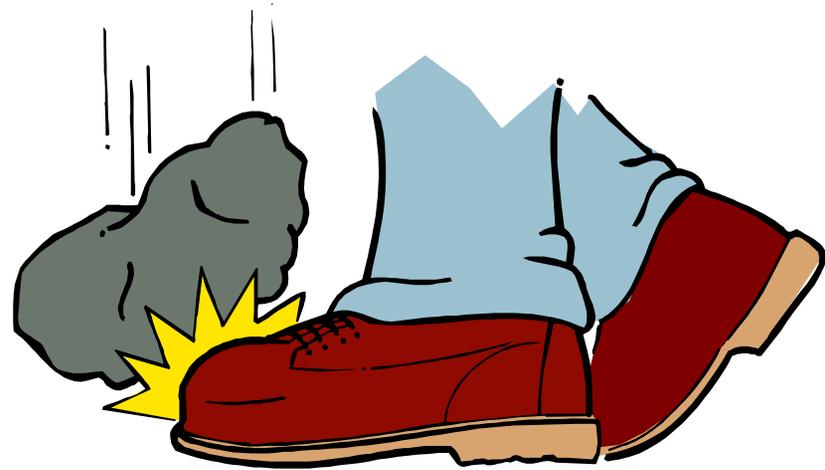
# Measurement/Metric Center Management Hierarchy



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# ***CMMI Process Improvement Progress Measurement (Documented and Traceable)***

- ❑ Objective: Senior Management has the measurement objective of determining how ready TYBRIN project teams are for the CMMI external appraisal in January 2004.
- ❑ Information Need: Degree of compliance of each project team against each applicable Process Area (PA) of the CMMI SE/SW/IPPD V 1.1 model.
- ❑ Measures: Percentage of verifiable artifacts produced by a project team that indicate compliance with each of 84 Specific and Generic Goals for all applicable PAs.
- ❑ Information Product: CPO Appraisal Quilt Chart (completed after each CPO Internal Appraisal; aggregated and rolled up to a Corporate-level TYBRIN Readiness Quilt Chart).



## ***Lessons Learned***

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## ***Ow-ies and Wow-ies***

- ❑ The first round of Self-Appraisals are a bear; they
  - Point out training needs, takes much more time than planned
  - Are really good for teams to learn model and about themselves
- ❑ Have a good, but simple, Organizational Definition and Team Profile List and keep them under tight Configuration Management
- ❑ Some level of subjectivity will always apply in appraisals; be tough the first time
- ❑ When you promise confidentiality and non-attribution, do it

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## ***Ow-ies and Wow-ies (continued)***

- Approach internal teams as providing service to a customer
  - Works much better than black hat and clipboard mentality
  - Services include training, mentoring, follow up support
- After presenting the Draft Findings to an appraisable team, immediately leave a copy of the presentation with the Team Lead while you work on the final report
- Allow appraised Team Lead to reply with written comments to the final report for review by their affected Program Manager (reinforces objective method, encourages management reviews)

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## ***Tools Used***

- ❑ MindManager
  - Brainstorming, planning, facilitation, presentation
  - [www.mindjet.com](http://www.mindjet.com)
- ❑ MetricCenter
  - Collecting, aggregating, reporting of measurements
  - [www.distributive.com](http://www.distributive.com)
- ❑ Bugzilla
  - Open-source change request tracker
  - [www.mozilla.org](http://www.mozilla.org)
- ❑ Corporate Intranet
  - OSSP, PAL, Links & Resources
  - Lessons Learned, Training, WG Sites

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# Summary

- ❑ Background on TYBRIN
- ❑ Organizational Definition
- ❑ Work Groups
- ❑ Appraisal Method
- ❑ Measurement
- ❑ Lessons Learned

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# Questions?



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