



# ***Using PSM at All Levels in an Organization***



***6 June 2002***

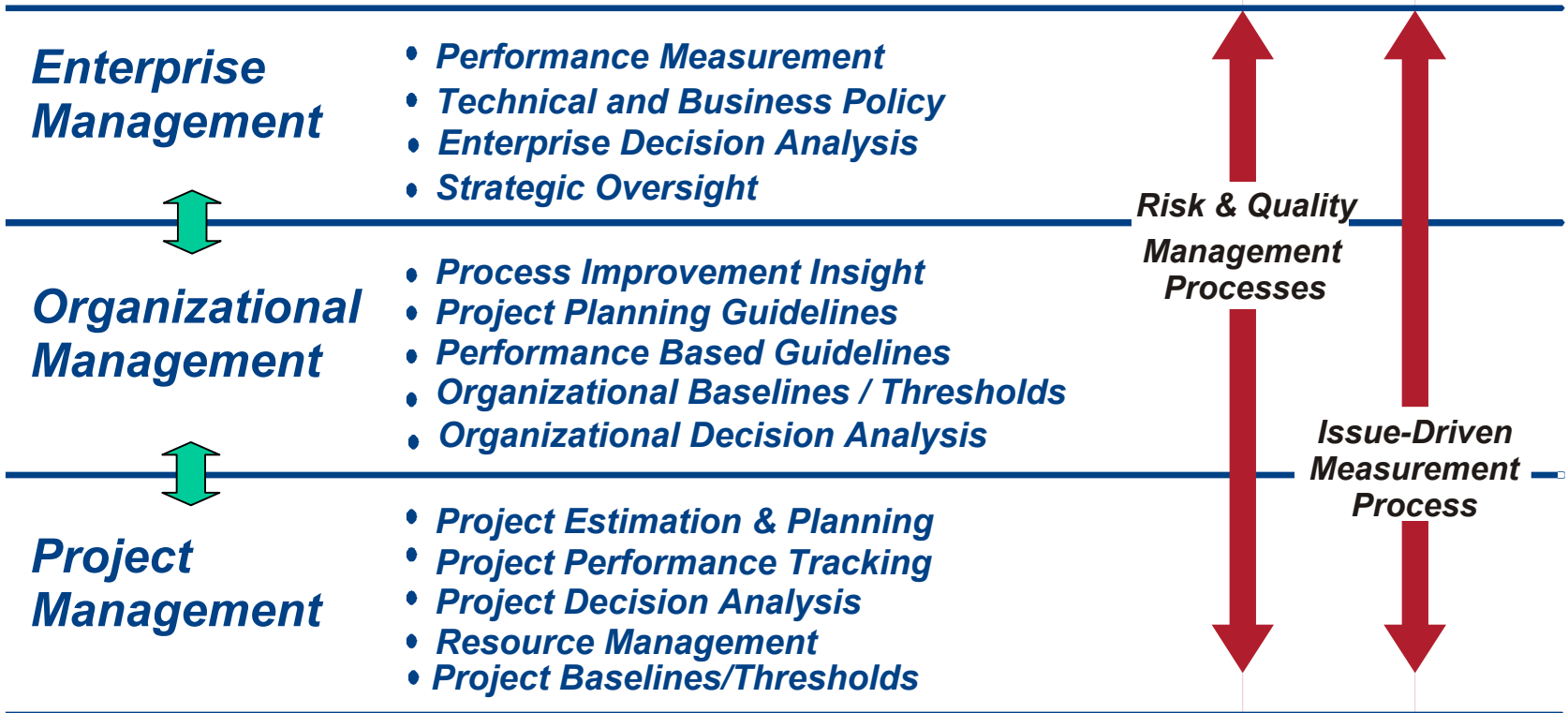
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Lockheed Martin  
Management and Data Systems  
Systems Integration***

## **Agenda**

- **Enterprise level**
  - **Guidance development**
  - **Application**
- **Business unit level**
  - **Guidance development**
  - **Application**
- **Project level**
  - **Guidance development**
  - **Application**



# Multi-Level Measurement Application





# ***Measurement at the Enterprise Level***



## Enterprise Level Process Asset Hierarchy



Top Level  
←

Standards



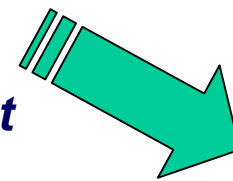
Measurement Working Group



↓ Detail

### Lockheed Martin Integrated Engineering Process Standard

- *Measurement integrated throughout*
- *Activities integral to the whole set of processes rather than a separate process*



### Lockheed Martin Integrated Measurement Guidebook

- *Has a broader scope than PSM*
- *Includes candidate measures that have been successfully applied in Lockheed Martin*





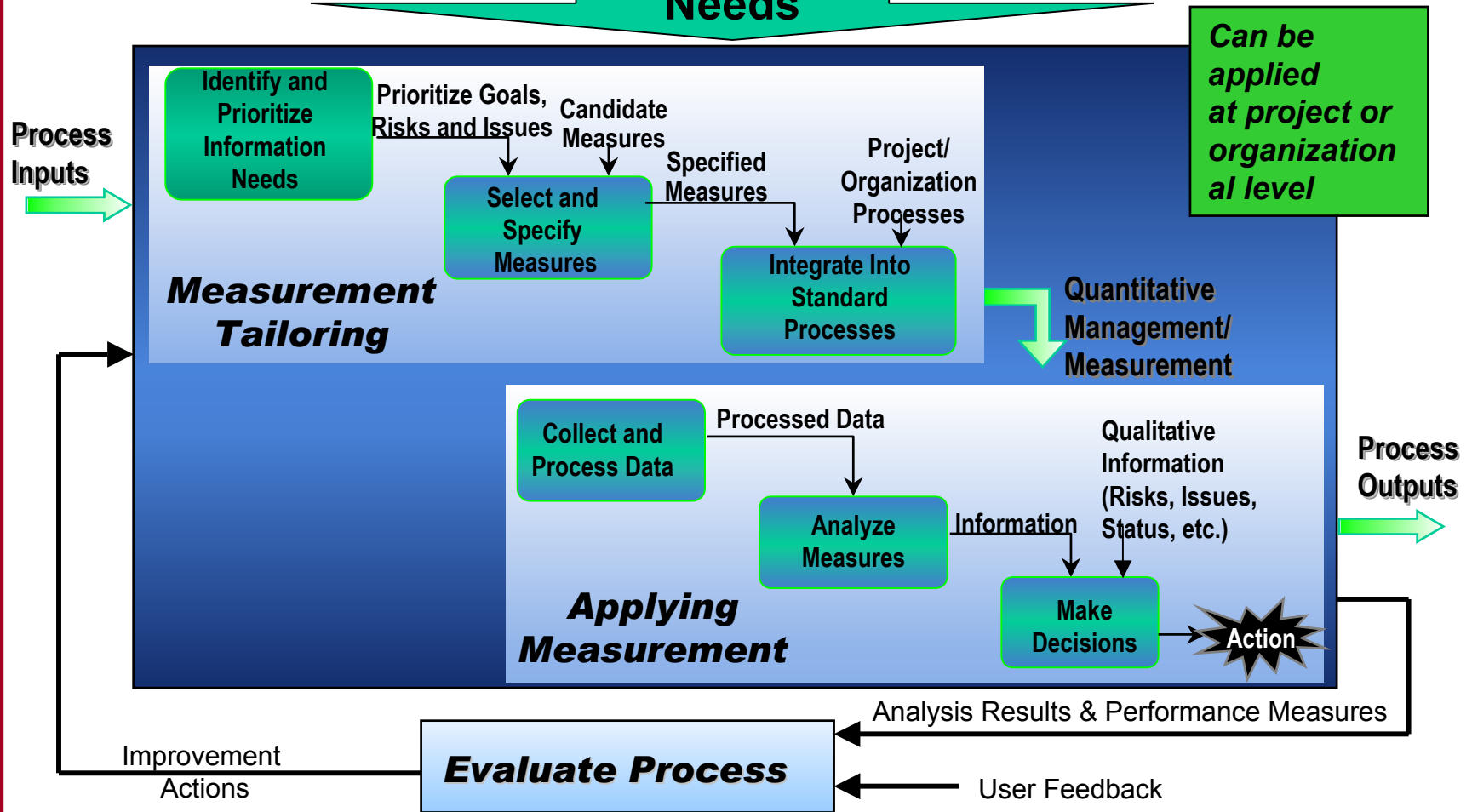
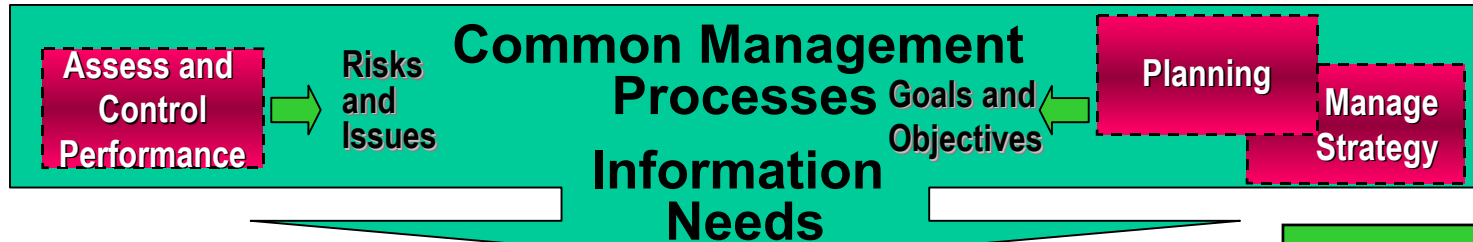
## ***Integrated Measurement Guidebook Purpose***

***The purpose of the Integrated Measurement Guidebook is to define a common, integrated measurement methodology that:***

- ***Provides pragmatic and proven guidance and candidate measures to effectively implement and use measurement***
  - ***Fundamental practices and provide references to more detailed information***
- ***Is consistent with standards and leverages leading guidance***
- ***Provides candidate measures that have been applied successfully within LMC for insight into the LM-IEP processes and products***
- ***Supports all capability levels and enables quantitative mgt***
- ***Provides traceability and relationship to LM-IEP and CMMI<sup>SM</sup>***
- ***Can be applied to any life cycle, phase, or project type***
- ***Can be applied to subcontracts to improve consistency in addressing information needs***

<sup>SM</sup> - CMMI is a service mark of Carnegie Mellon University

# LM Integrated Measurement Activities





# Candidate Measures

Common Issue Areas/ Information Needs Addressed	Measure Name
Schedule and Progress	Action Items Profile Requirements Verification Risk Profile Schedule Performance
Resources and Cost	Cost Performance Effort Profile Risk Profile Staffing Needs Profile Staff Turnover Profile
Product Size and Stability	Baseline Growth and Stability End Product Size Profile Requirements Traceability TBD /TBR Profile
Product Quality	Cost of Quality Index Defect Profile Requirements Traceability Requirements Verification Rework Effort Save-Escape Cost Profile Technical Performance Measures (TPMs)

**Each measure is chosen based on the Common Issue Area focus and specific information needs.**



## **Candidate Measures (cont'd)**

C o m m o n I s s u e A r e a s / I n f o r m a t i o n N e e d s A d d r e s s e d	M e a s u r e N a m e
P r o c e s s P e r f o r m a n c e	A w a r d F e e P e r c e n t C y c l e T i m e P r o f i l e P e e r R e v i e w P e r f o r m a n c e P r o c e s s C h a r a c t e r i s t i c s P r o f i l e P r o c e s s C o m p l i a n c e P r o f i l e P r o c e s s E v a l u a t i o n F i n d i n g s P r o d u c t i v i t y R e w o r k E f f o r t S a v e - E s c a p e C o s t P r o f i l e T r a i n i n g C o u r s e P r o f i l e T r a i n i n g P l a n P r o f i l e
T e c h n o l o g y E f f e c t i v e n e s s	P r o d u c t i v i t y T e c h n i c a l P e r f o r m a n c e M e a s u r e s ( T P M s )
C u s t o m e r S a t i s f a c t i o n	A w a r d F e e C o m m e n t s A w a r d F e e P e r c e n t

***Plus all PSM candidate measures are referenced***



## **Other Measurement Guidance**

- **Quantitative Management**
  - **Provides both project and organizational level guidance**
  - **Statistical approaches (SPC and other) for thresholds/control limits**
  - **Use in decision making**
- **Technical Performance**
  - **Provides detailed selection and analysis information for these measures**
- **Relationship of Measurement to Risk Management and Quality Management**



# **Other Measurement Guidance**

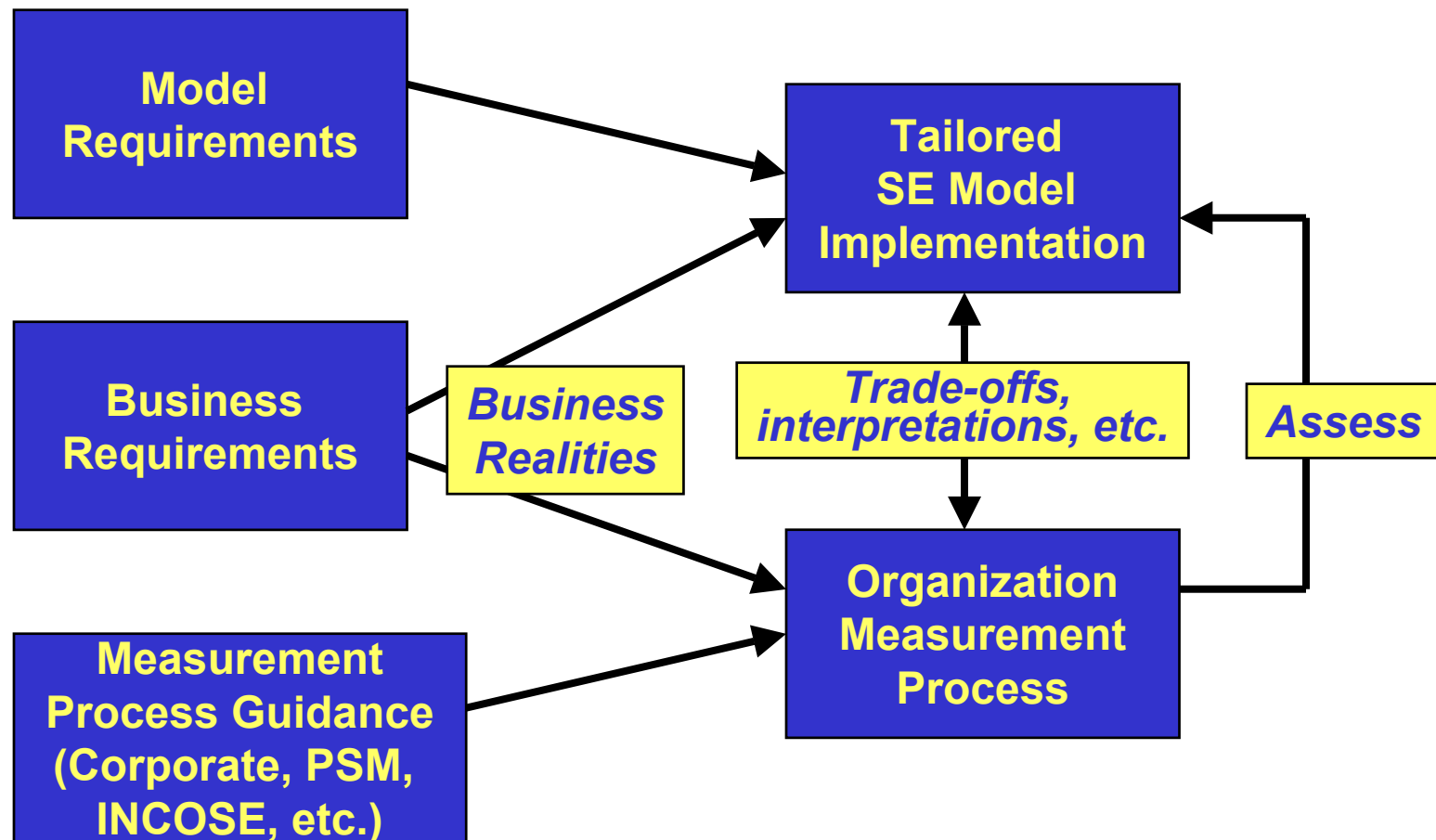
- **Enterprise Measurement**
  - **Provides guidance on addressing the enterprise perspectives**
    - **Obtain information to better enable strategic decision making for business, systems and software development, and process Improvement**
    - **Balanced Scorecard instruction**
    - **Each candidate measure has enterprise perspective and business focus identified, as applicable**

Enterprise Perspective	Business Focus
Project Oversight Perspective	Project Performance
Business Perspective	Financial Performance
	Customer Satisfaction
Organization Perspective	Organizational Process Performance
	Organizational Health, Innovation, and Learning

# ***Measurement at the Business Unit Level***



# Aligning Measurement to Meet Both Model & Business Requirements





# **Implementation and Tailoring**

- **Measurement Infrastructure and Commitment**
  - **Commitment from the top down**
  - **Collection capability spanning organization and projects**
  - **Measurement team with members from the org & projects**
  - **Stakeholder involvement at all levels helps buy-in, consistency, and improvement**
  - **Automation is a key factor for maximizing the utility, but can start without it (Level 5 is achievable with just an office suite)**
- **Measurement Tailoring**
  - **Key to achieving a manageable set of measures**
  - **Based on issues/objectives/business needs at appropriate level**
    - **Company/Line of Business/Functional Org. Measures**
    - **Project Specific Measures**
  - **Quantity of measures and data availability are major considerations**
  - **Specify and document in Measurement Plans**



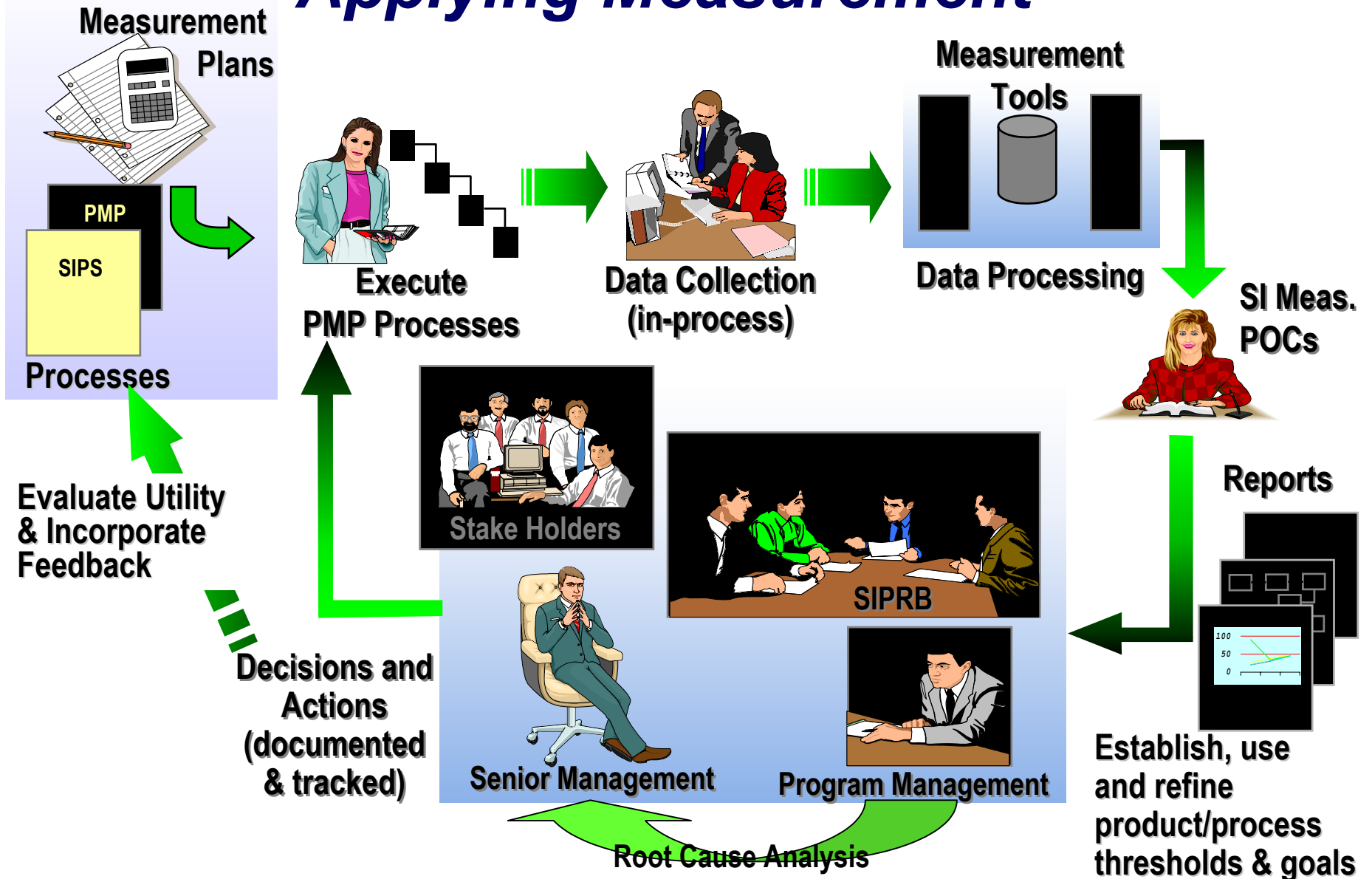
## **Business Unit Standard Measures**

<b>Issue</b>	<b>Category</b>	<b>Measure</b>
Customer Satisfaction	Customer Feedback	Award Fee Percent *#
Process Performance	Process Compliance	Award Fee Comments *# Program/Process Tailoring # Self-Audit Findings *#
	Process Effectiveness	Rework Effort Percent *#
	Process Efficiency	Cycle Time Variance *# System Engineering # Productivity *#
Product Quality	Functional Correctness	Approval Rates #
Product Size and Stability	Functional Size and Stability	TBD/TBR (Percent Overdue) #
Resources and Cost	Financial Performance	Cost Variance *#
	Personnel	Effort *# Staffing *#
Schedule and Progress	Work Unit Progress	Requirements Verification (Percent Overdue) # Self-Audit Progress # Milestone Performance *

\* Tailored variation of measure in PSM

# Tailored variation of measure in LM Integrated Measurement Gdbk

# Applying Measurement





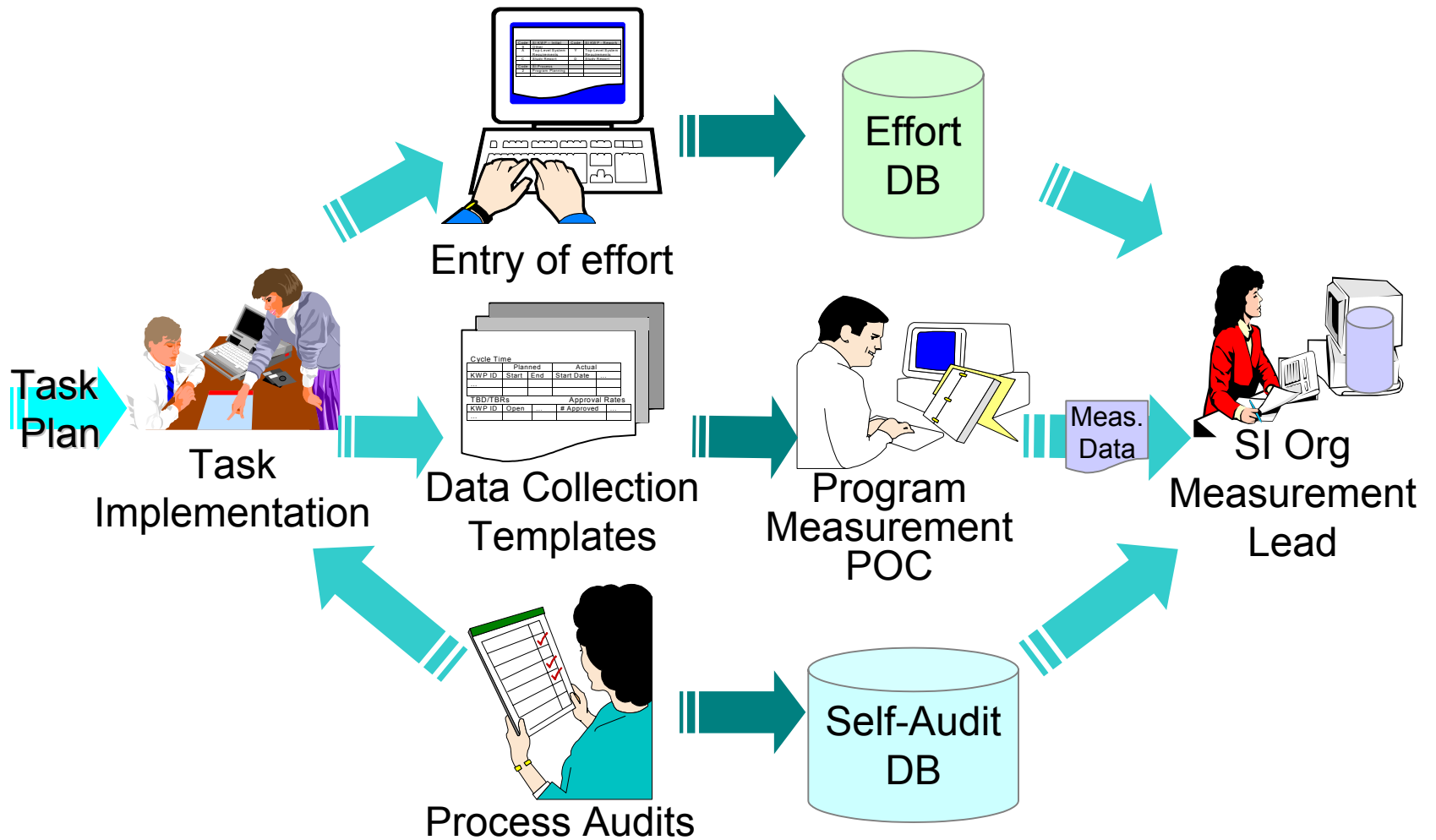
# ***Measurement at the Project Level***



## ***Project Tailoring***

- ***Identify information needs/issues***
- ***Start from Organization Standard measures as candidates***
  - ***Deviation from standard measures requires rationale based on information needs and SOW***
  - ***Documented in measurement compliance matrix (part of measurement plan)***
  - ***Project-specific measures identified and defined***
- ***Document measure definitions and project implementation in measurement plan***
- ***Approval by project manager and concurrence by process review board***

# Data Collection



**Measurement data collection and reporting on monthly basis**



## **Analysis Considerations**

- ***Most measures are analyzed monthly***
- ***Measurement results are based on current month, except as specified otherwise:***
  - ***Rework Effort Percent is based on rolling quarter***
  - ***System Engineering Productivity and Award Fee Percent are based on rolling annual***
  - ***Award Fee Percent and Award Fee Comments are based on individual program Award Fee schedules on a semi-annual basis***
- ***Measurement results are summarized as red, yellow or green based on thresholds and goals***

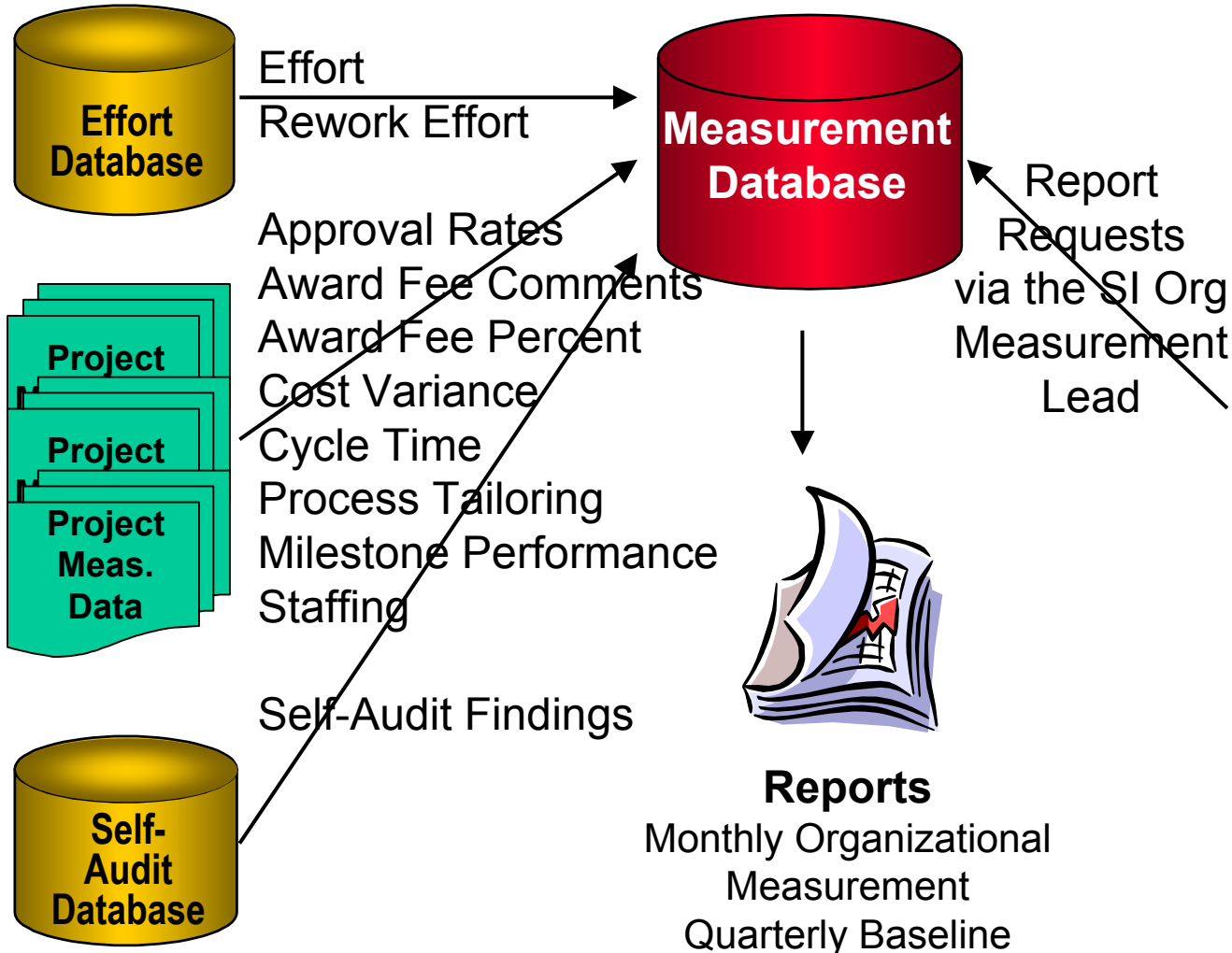


## **Process Thresholds**

- **Management alert limits that indicate the range of expected results**
- **Thresholds based on historical data or business needs**
  - **Historical data thresholds establish upper and lower thresholds around 80% - 90% of the data points**
    - **There should be at least twelve data points**
    - **Thresholds depend on the stability of the process**
  - **Business needs thresholds are based on business goals**
    - **Thresholds should fall within established historical data thresholds**
    - **If not within historical data thresholds, improve process so that process capability and business needs fall within same range**
- **The range between the upper and lower thresholds is the process capability**
- **Additional performance goals may be added**



# Data Analysis and Reporting



Proposal Operations



Program Manager



SIPRB



## **Summary**

- ***PSM has successfully been used as the foundation of the measurement process at all levels***
  - ***Provides a pragmatic approach***
  - ***Extensible to all disciplines***
  - ***Tailorable to address organization and enterprise needs***
- ***Supplemented PSM to provide measurement guidance to meet all needs***
  - ***Quantitative management***
  - ***Enterprise measurement***
  - ***Technical performance***