

# Applying CMMI® Generic Practices with Good Judgment

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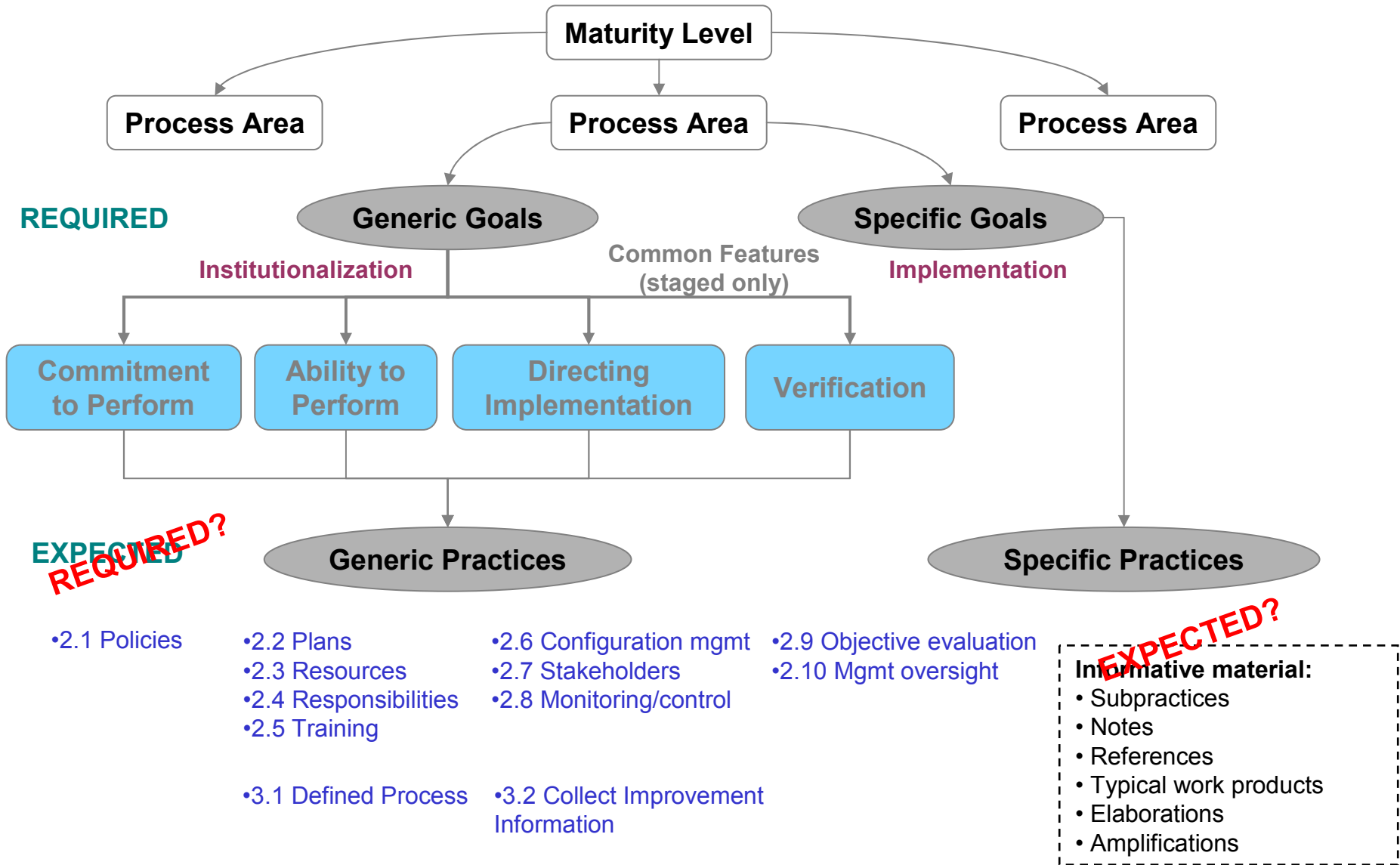
**Rick Hefner, Ph.D.  
Northrop Grumman**

**Geoff Draper  
Harris Corporation**

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# CMMI Model Structure



# Implementing the Generic Practices



For the Project Mgmt, Engineering, and Support process areas, the generic practice may be implemented by:

- Projects
- Organization
- Either
- Both

(details in later charts)

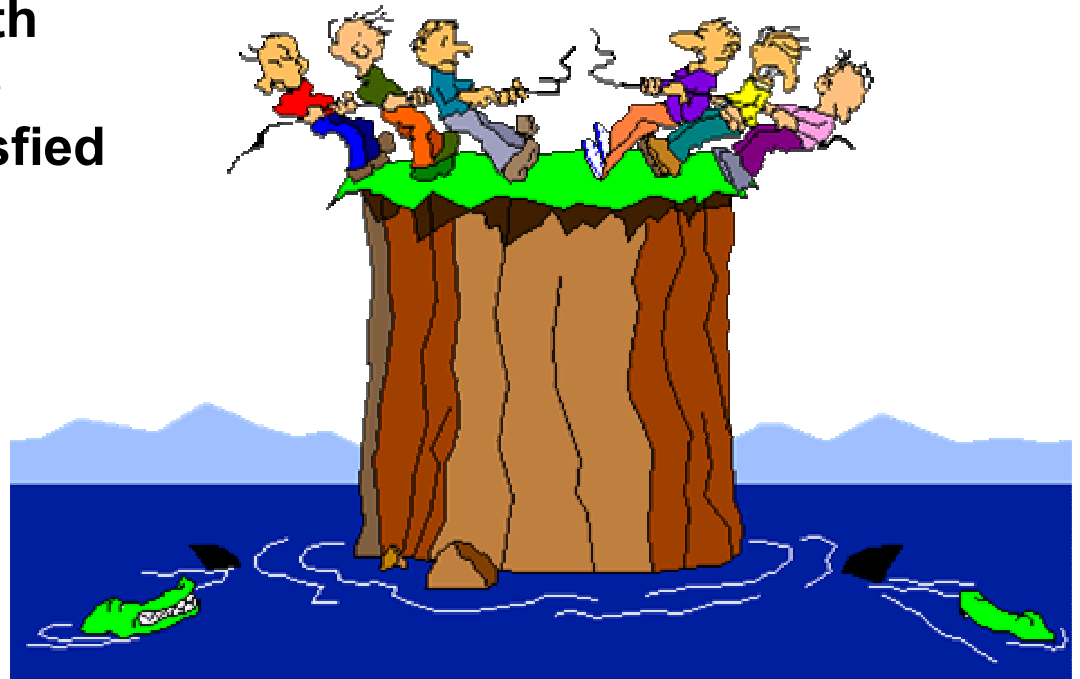
## Example Implementation

Generic Practice	Project	Organization
GP2.1 Policy	X ← BOTH →	X
GP2.2 Plan	X	
GP2.3 Resources	X	
GP2.4 Responsibility	X	
GP2.5 Training	X ← BOTH →	X
GP2.6 Manage Configurations	X	
GP2.7 Stakeholders	X	
GP2.8 Monitor & Control	X	
GP2.9 Objective Evaluation	X	
GP2.10 Management Review		X
GP3.1 Defined Process	X ← BOTH →	X
GP3.2 Improvement Info		X

# Reaching Appraiser Consensus

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- Many parts of the CMMI can be interpreted in multiple ways
  - Generic practices are especially difficult
- Must reach consensus on how the organization and projects will implement the generic practices
  - E.g., split of responsibilities between organization and projects
- Must reach consensus with the appraisers on how the generic practices are satisfied
  - Must be done long in advance of the actual appraisal
  - Following charts suggest a starting point for the discussion



# CMMI Generic Practices



## Capability Level

### 0. Incomplete

1. Performed      GP 1.1      Perform Base Practices

### 2. Managed

GP 2.1      Establish an Organizational Policy

GP 2.2      Plan the Process

GP 2.3      Provide Resources

GP 2.4      Assign Responsibility

GP 2.5      Train People

GP 2.6      Manage Configurations

GP 2.7      Identify and Involve Relevant Stakeholders

GP 2.8      Monitor and Control the Process

GP 2.9      Objectively Evaluate Adherence

GP 2.10      Review Status with Higher Level Management

### 3. Defined

GP 3.1      Establish a Defined Process

GP 3.2      Collect Improvement Information

### 4. Quantitatively Managed

GP 4.1      Establish Quantitative Objectives for the Process

GP 4.2      Stabilize Subprocess Performance

### 5. Optimizing

GP 5.1      Ensure Continuous Process Improvement

GP 5.2      Correct Root Causes of Problems

Continuous representation only

## **GP 2.1 – Establish an Organizational Policy**

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*Establish and maintain an organizational policy for planning and performing the process.*

### **Implementation Guidance**

- **Policies provide clear senior management direction**
- **Must be implemented by the organization, but at any level or multiple levels of the organization**
  - E.g., policies at both the Corporate and Division level

### **Appraisal Guidance**

- **“Establish and maintain” implies creation, maintenance, and usage (see CMMI Chapter 3)**
- **Appraisers must see evidence of the policy being used**
  - E.g., audits, mapping policies to processes used

## **GP 2.2 – Plan the Process**

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*Establish and maintain the plan for performing the process.*

### **Implementation Guidance**

- **Plan = description of activities + budget + schedule**
  - Includes other generic practices (e.g., process descriptions, resources, responsibilities, CM)
- **Must distinguish between plans (GP 2.2) and process descriptions (GP 3.1)**
  - Much of the plan is replaced by the process description

### **Appraisal Guidance**

- **Schedules may be tied to program events as opposed to shown on a Gantt chart**
  - E.g., DAR events
  - Plans should make clear the conditions under which a DAR is to be conducted

## **GP 2.3 – Provide Resources**

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*Provide adequate resources for performing the process, developing the work products, and providing the services of the processes.*

### **Implementation Guidance**

- **Resources = budget + facilities + tools + skilled people**
- **All activities should be budgeted, but budget categories may be organized around the organization’s process architecture, not CMMI process areas**

### **Appraisal Guidance**

- **“Adequate” must be interpreted as sufficient to execute the plan and schedule**
  - **Not based on asking performers whether they have adequate resources (everybody wants more time to do their work)**



## **GP 2.4 – Assign Responsibility**

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*Assign responsibility and authority for performing the process, developing the work products, and providing the services of the process.*

### **Implementation Guidance**

- **Responsibility assigned in various ways**
  - E.g., project plans, process descriptions, job descriptions, work authorizations, stakeholder matrix, team charter
- **May have multiple roles assigned for portions of a PA**
- **Must have authority to take appropriate action**

### **Appraisal Guidance**

- **Job assignments may be to functions (e.g., systems engineering)**
  - Can judge “reasonableness” of the approach by whether performers must understand who is responsible to perform each task

## **GP 2.5 – Provide Training**

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*Train the people performing or supporting the process as needed.*

### **Implementation Guidance**

- **Training proactively ensures that individuals possess the minimum skills and knowledge to perform their job competently**
  - The organization should address training for all process areas and job functions
  - Projects are responsible for project-specific training, if needed

### **Appraisal Guidance**

- **Must establish appraiser consensus on how this practice is interpreted**
  - Also on how to judge partial satisfaction, e.g., if XX% of the people are trained
- **Need to determine how “instantiations” will be counted**
  - E.g., in a particular process area, there may be organizational and some project-specific training

## GP 2.6 – Manage Configurations

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*Place designated work products of the process under appropriate levels of configuration management.*

### Implementation Guidance

- **Must identify which work products are to be controlled and how they will be controlled (level of formality)**
  - It is **NOT** necessary to designate and control every work product; omission implies “not controlled”

### Appraisal Guidance

- **A list of what is being controlled (e.g., a DM master document list) is not sufficient**
  - Must understand what is planned to be controlled

## **GP 2.7 – Identify and Involve Relevant Stakeholders**

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*Identify and involve relevant stakeholders of the process as planned.*

### **Implementation Guidance**

- **Relevant stakeholders must be identified, along with their planned involvement**
  - Typically done as a stakeholder plan or matrix
  - Might also be used to document responsibilities (GP 2.4)

### **Appraisal Guidance**

- **Evidence of “involvement” could easily get overwhelming (e.g., attendance at meetings, review signoffs)**
  - Must establish appraiser consensus on what constitutes a reasonable sampling

## **GP 2.8 – Monitor and Control the Process**

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*Monitor and control the process against the plan for performing the process and take appropriate corrective action.*

### **Implementation Guidance**

- **Activities must be reviewed against plan, budget, and schedule**
  - Typically performed in staff meetings, cost/schedule reviews, variance reports
  - Detailed review of the process performed against the process description is performed in the QA audits

### **Appraisal Guidance**

- **Must establish appraiser consensus**
  - Frequency, formality of review
  - Budgets need not be tracked to individual process areas, but each process area must be covered in some budget
- **Often difficult to find direct evidence that something is tracked**
  - E.g., tracking of Project Management PAs

## **GP 2.9 – Objectively Evaluate Adherence**

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***Objectively evaluate adherence of the process and the work products and services of the process to the applicable requirements, objectives, and standards, and address noncompliance***

### **Implementation Guidance**

- **Process audits determine whether the project performs each process, as documented in the plans or tailoring report**
  - Not just audits against policy
  - Also against the appropriate procedure and work product standards, if they exist
- **Must be objective, but not necessarily QA**

### **Appraisal Guidance**

- **Must establish appraiser consensus on how to handle work products for which no standard exists, procedures used as “guidance”**

## **GP 2.10 – Review Status with Higher Level Management**

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***Objectively evaluate adherence of the process and the work products and services of the process to the applicable requirements, objectives, and standards, and address noncompliance***

### **Implementation Guidance**

- **Must decide who is designated as the “senior management” reviewer**
  - Must be above the project level
  - Concern should be long term health of the organization; sometimes in conflict with short-term project goals
- **Reviews are not necessarily face-to-face (e.g., status reports)**

### **Appraisal Guidance**

- **Must establish appraiser consensus on:**
  - Who acts as “senior management”
  - Depth of review
- **Evidence must show review of each process area**
  - Not every PA will be covered at every review
  - May review by business process, not by PA

## **GP 3.1 – Establish a Defined Process**

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*Establish and maintain the description of a defined process.*

### **Implementation Guidance**

- Includes organizational standard process + tailoring by project or organization (tailoring report)
- May establish a family of process descriptions
- The enterprise should also consider tailoring for their organizational processes (OPF, OPD, OT, OPP, OID)
  - Organizational processes may be implemented differently at multiple levels of the enterprise

### **Appraisal Guidance**

- Standard process may be organized by business process, not by PA
- Must establish appraiser consensus on what constitutes tailoring



## GP 3.2 – Collect Improvement Information

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*Collect work products, measures, measurement results, and improvement information derived from planning and performing the process to support the future use and improvement of the organization's processes and process assets.*

### Implementation Guidance

- **Includes**
  - Process Asset Library (work products)
  - Measurement repository (measures, results)
  - Improvement information database or feedback
- **Connected to**
  - IPM SP 1.5 Contribute to the Organizational Process Assets
  - OPD SP 1.4 (Measurement repository) and SP 1.5 (PAL)

### Appraisal Guidance

- **“Collect” implies an organizational responsibility (not “submit”, which is a project responsibility)**
  - Organization must collect in all PAs, but projects are not expected to submit in all PAs
  - Not all items submitted must be made available to all projects

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Continuous representation only

# **GP 4.1 – Establish Quantitative Objectives for the Process**

CONTINUOUS REPRESENTATION ONLY



*Establish and maintain quantitative objectives for the process that address quality and process performance based on customer needs and business objectives.*

## **Elaborations**

- None (except subpractices in Chapter 4)

## **Implementation Guidance**

- Objectives apply either to a specific subprocess (e.g., peer review) or a set of processes (e.g., the entire development process)
- Should relate to the customer's and users' perception of "quality" and "performance"

## **Appraisal Guidance**

- Should agree whether both quality (e.g., defects) and process performance (e.g., productivity, effectiveness) are needed to meet the intent of the practice

## **GP 4.2 – Stabilize Subprocess Performance**

CONTINUOUS REPRESENTATION ONLY

***Stabilize the performance of one or more subprocesses to determine the ability of the process to achieve the established quantitative quality and process-performance objectives.***

### **Elaborations**

- **None (except subpractices in Chapter 4)**

### **Implementation Guidance**

- **“Stabilize” refers to removing special causes of variation until the resulting subprocess is predicable (within a computable variation)**
  - **Either a specific subprocess or a set of processes**
  - **Some subprocesses are inherently not stabilizable**
- **Can stabilize by:**
  - **Modifying the subprocess to eliminate special causes**
  - **Stratifying data to separate special causes**
  - **Eliminating explainable data points**

### **Appraisal Guidance**

- **Must agree on:**
  - **How much variation is acceptable in a “stable” process**
  - **How much data is required for a meaningful calculation of variation**

# **GP 5.1 – Ensure Continuous Process Improvement**

CONTINUOUS REPRESENTATION ONLY



*Ensure continuous improvement of the process in fulfilling the relevant business objectives of the organization.*

## **Elaborations**

- None (except subpractices in Chapter 4)

## **Implementation Guidance**

- Organization must define quantitative process improvement objectives, identify improvements, define strategies, and manage improvements
- Improvement should be measurable quantitatively (note change in mean and variation), not just qualitatively

## **Appraisal Guidance**

- An organizational responsibility; must agree on how project PAs (e.g., Project Planning) are to be interpreted and instantiated

## **GP 5.2 – Correct Root Causes of Problems**

CONTINUOUS REPRESENTATION ONLY

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*Identify and correct the root causes of defects and other problems in the process.*

### **Elaborations**

- **None**

### **Implementation Guidance**

- **Analyze defects and other problems (characteristics) that were encountered**
  - Identify/correct the root causes
  - Prevent them from occurring in the future

### **Appraisal Guidance**

- **Must agree on how sophisticated the analysis must be (e.g., Pareto chart, fishbone diagram)**
- **Must agree on the extent of defect prevention required**

# Contact Information

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**Dr. Rick Hefner, Ph.D.**  
**Northrop Grumman**  
**Mission Systems**  
**One Space Park - R2/2144**  
**Redondo Beach, CA 90278**  
**310.812.7290**  
**[rick.hefner@ngc.com](mailto:rick.hefner@ngc.com)**

**Geoff Draper**  
**Harris Corporation**  
**Government Communications**  
**Systems Division**  
**P.O. Box 37**  
**Melbourne, Florida 32902**  
**321.727.5617**  
**[gdraper@harris.com](mailto:gdraper@harris.com)**