NORTHROP GRUMMAN DEFINING THE FUTURE

Mission Systems

An Effective and Efficient Approach to ARC C Appraisals

CMMI Technology Conference & User Group
17-20 November 2003

Madhu Parella, Satyam
msraoparella@yahoo.co.in
Janice Tauser, Northrop Grumman
janice.tauser@ngc.com
Rick Hefner, Northrop Grumman
rick.hefner@ngc.com

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

Agenda

- Appraisal Classes
- Why ARC C?
- Our Approach
- ARC C Tools
- Measured Benefits

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

Appraisal Method Classes

- **Appraisal Requirements for CMMI (ARC) introduction**
- **Various requirements for ARC Classes**

Characteristics	Class A	Class B	Class C
Amount of Objective Evidence Gathered (relative)	High	Medium	Low
Ratings Generated	Yes	No	No
Resource Needs (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

Source: CMU/SEI-2001-TR-034

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

Why ARC C?

- Baseline CMMI implementation status for less resources and time than SCAMPI
- Establish a common internal benchmarking method
- Provide a Go/No Go decision for SCAMPI
- Formalized method minimizes the subjectivity associated with different appraisers, different projects

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

Six Sigma

- **Six Sigma methodology was used to analyze the entire CMMI appraisal process – preparation, onsite**
  - Based on 20+ SCAMPIs conducted to date
- **Goal was to reduce the overall time spent**
  - Projects preparing for the appraisal
  - Appraisers conducting the appraisal
- **Also used to increase the stability (predictability) and effectiveness of the appraisal process**
- **Appraisal is viewed as a process that must be measured and continuously improved**

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

Our Approach

- **Documented process – an ARC C requirement!**
- **Used to verify gaps at the start of the improvement, and to verify readiness for SCAMPI A**
- **Performed by 1 or 2 qualified appraisers, collaborating with key project personnel**
- **Uses the same evidence notebooks used for SCAMPI A, although may include helping to identify the evidence**
- **Uses our SCAMPI A consolidation and rating tools**

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

Using the Results for Appraisal Readiness

- **Typically conducted for appraisal readiness 2 months prior to the SCAMPI A**
- **Have found that if more than 40 practices have insufficient evidence, should delay the appraisal**
  - Should conduct another ARC C appraisal prior to new appraisal date
- **The number of practices that have insufficient evidence greatly impacts SCAMPI A duration**
  - Schedules are built expected 20 or fewer evidence requests

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

Infrastructure to Support ARC C Appraisals

Qualified People – SCAMPI Lead Appraisers

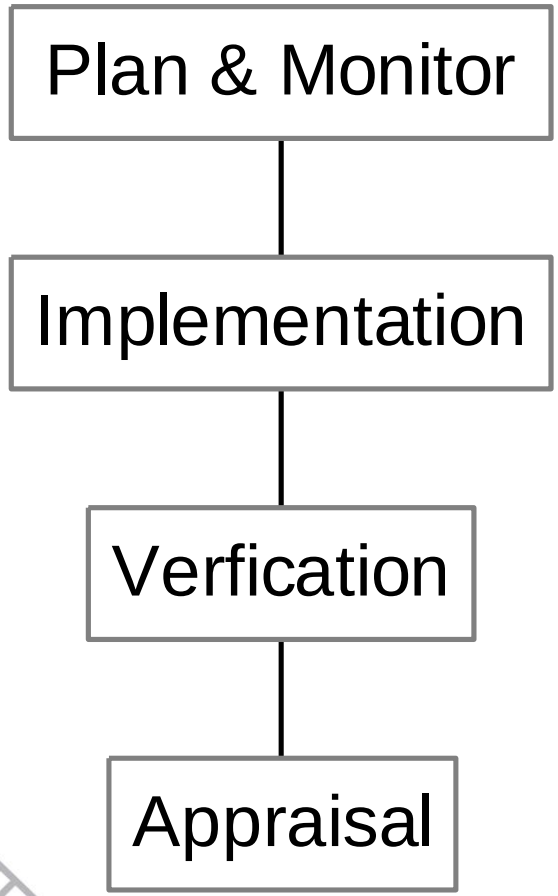
SCAMPI ATM trained

Integrated set of tools for evidence gathering, reviews, and reporting

Common documented procedures, standards and templates

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

Integrated Set of Tools



- **Self Assessment Tool (SAT)**
  - Projects record gaps against CMMI practices
- **Policy Compliance and Tailoring Report Tool (PCTR)**
  - New projects document intended compliance
- **Audit Checklists**
  - QA verifies compliance with policy & process
- **Appraisal Findings Tool**
  - Appraisers record compliance with CMMI practices

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

Benefits of Using Tools

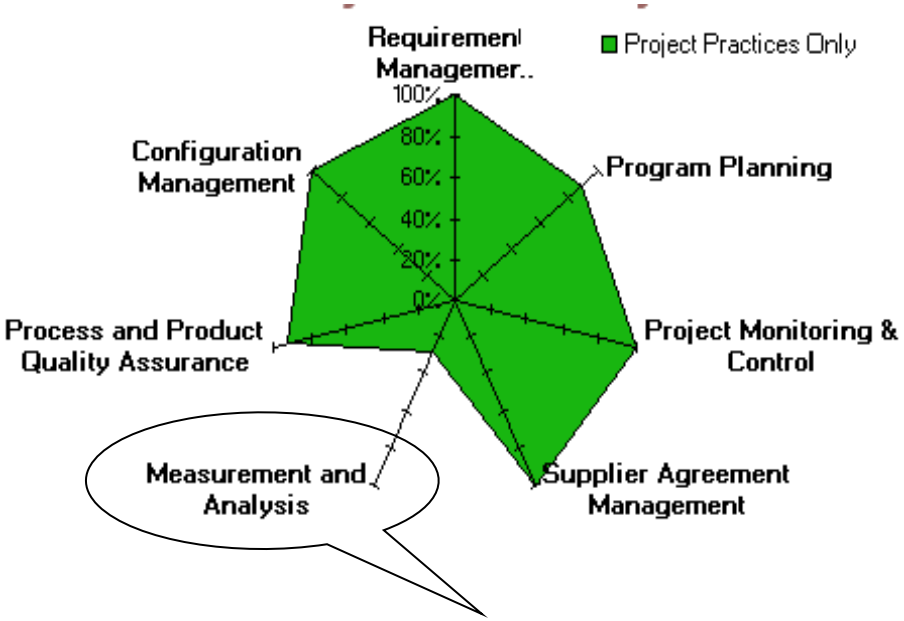
- Project road map (prepared and owned by project)
- Roll up to multiple levels in the organization (aligned with organizational goals)
- Common measurement system across the projects
- Quantitative – no intuition or judgments
- Provides indirect evidence
- Clearly defined responsibility for each activity

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

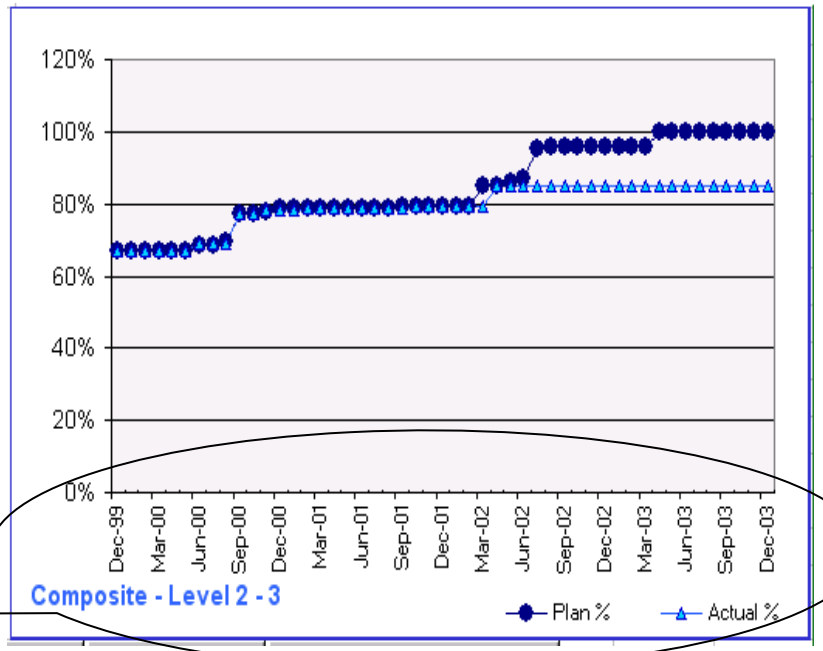
NORTHROP GRUMMAN
Mission Systems

Quantitative Measurement for CMMI Compliance

Self Assessment Tool (SAT)



Identify areas requiring special attention

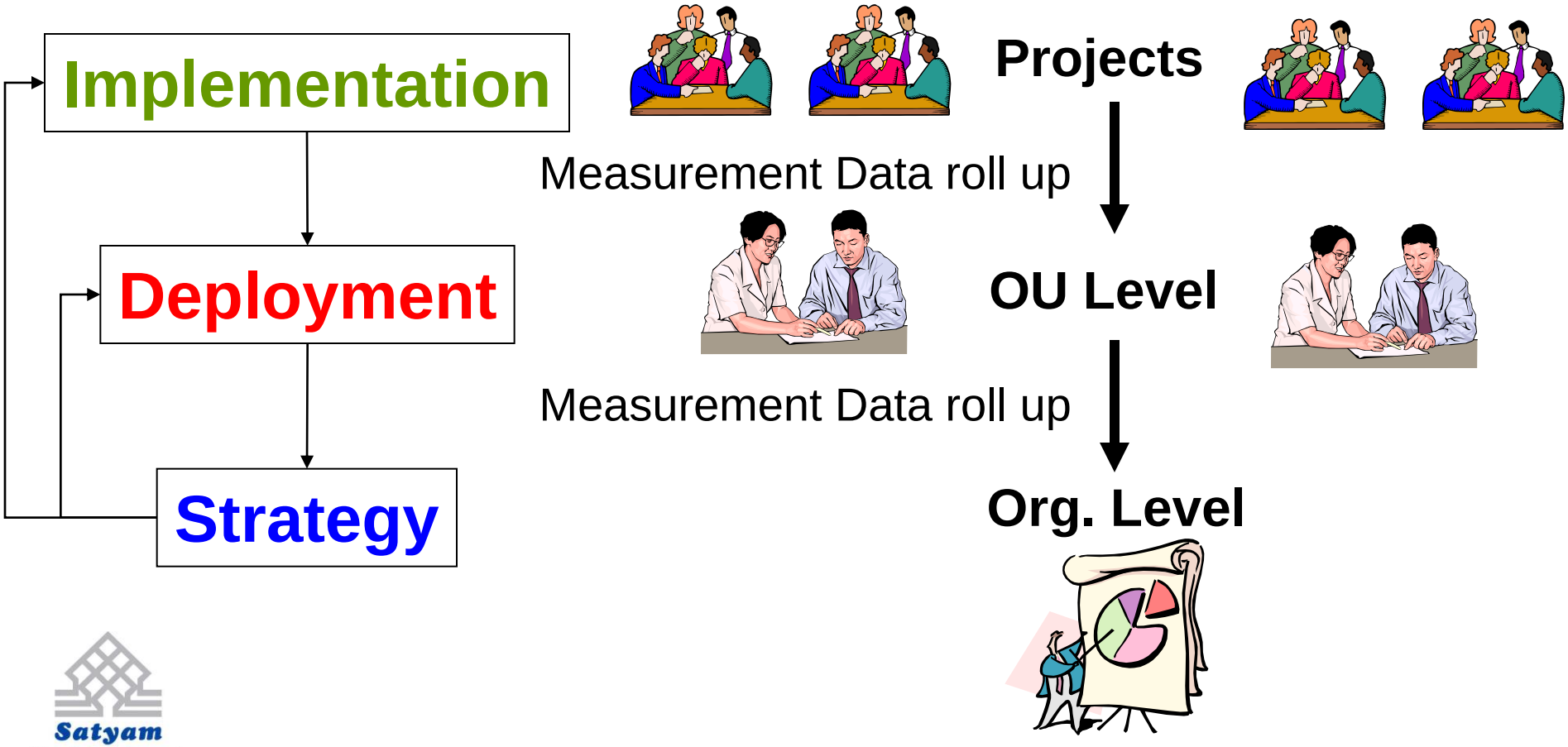


Planned Vs Actual Progress

Satyam
What Business Demands.

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

Measurement Data Flow



Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

Organization Support

- Defined & documented method for ARC C appraisal at organizational level
- Management tracked quantitative measures of CMMI compliance across all levels of the organization
- Made ARC C a prerequisite for SCAMPI A
- Provided an CMMI interpretations document to ensure common understanding
- Provided expert advise, where required
- Shared lessons learned through SSEPG meetings, etc.

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

Feedback Input to Organizational Strategy

Conduct ARC C appraisals

↓

Collect appraisal results at org. level

↓

Identify common problem areas

→

Provide additional guidance

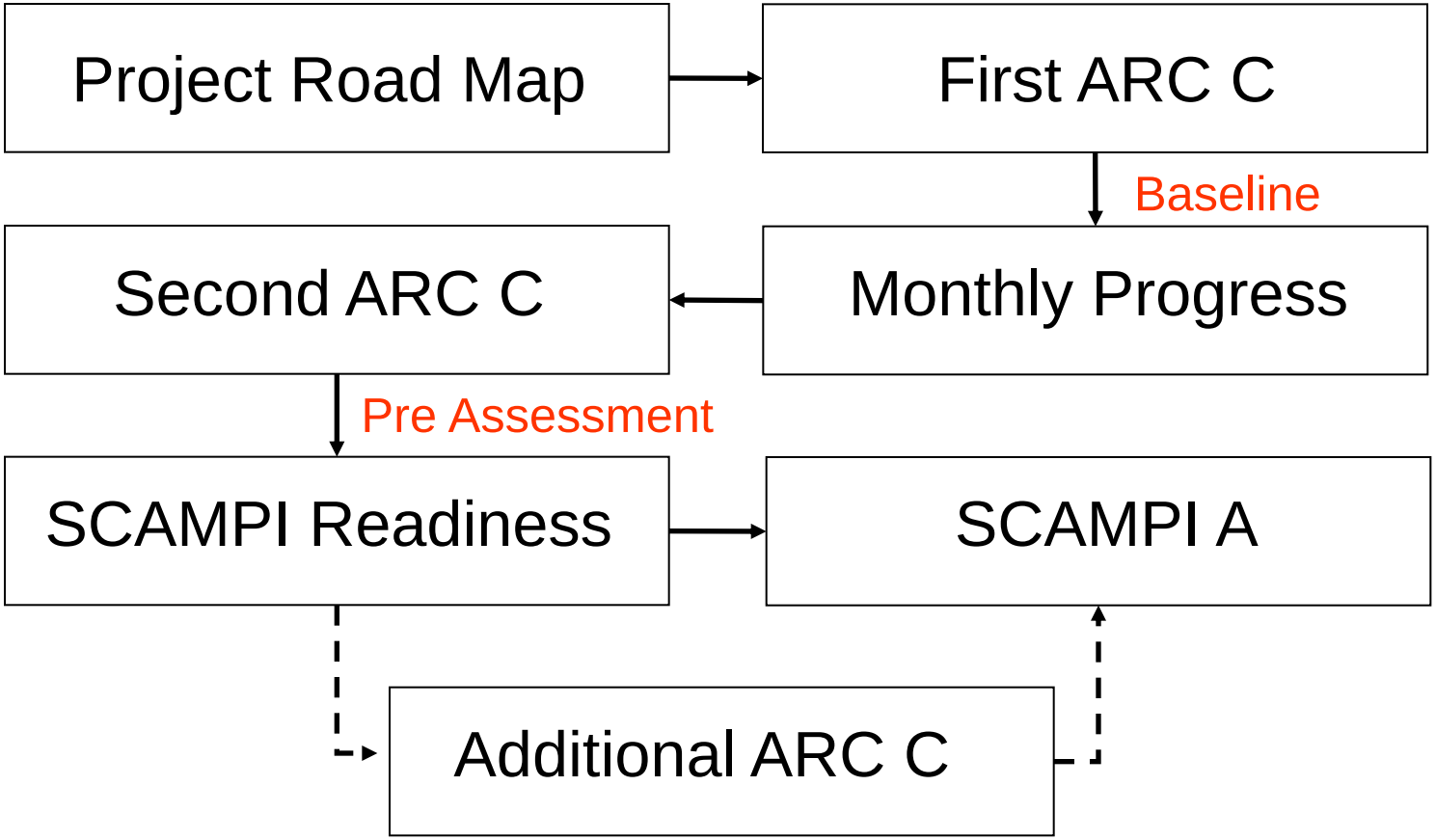
↓

Projects use the additional guidance

What happens if organizations depend only on SCAMPI to provide this feedback to strategy?

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

How ARC C Supports our SCAMPIs



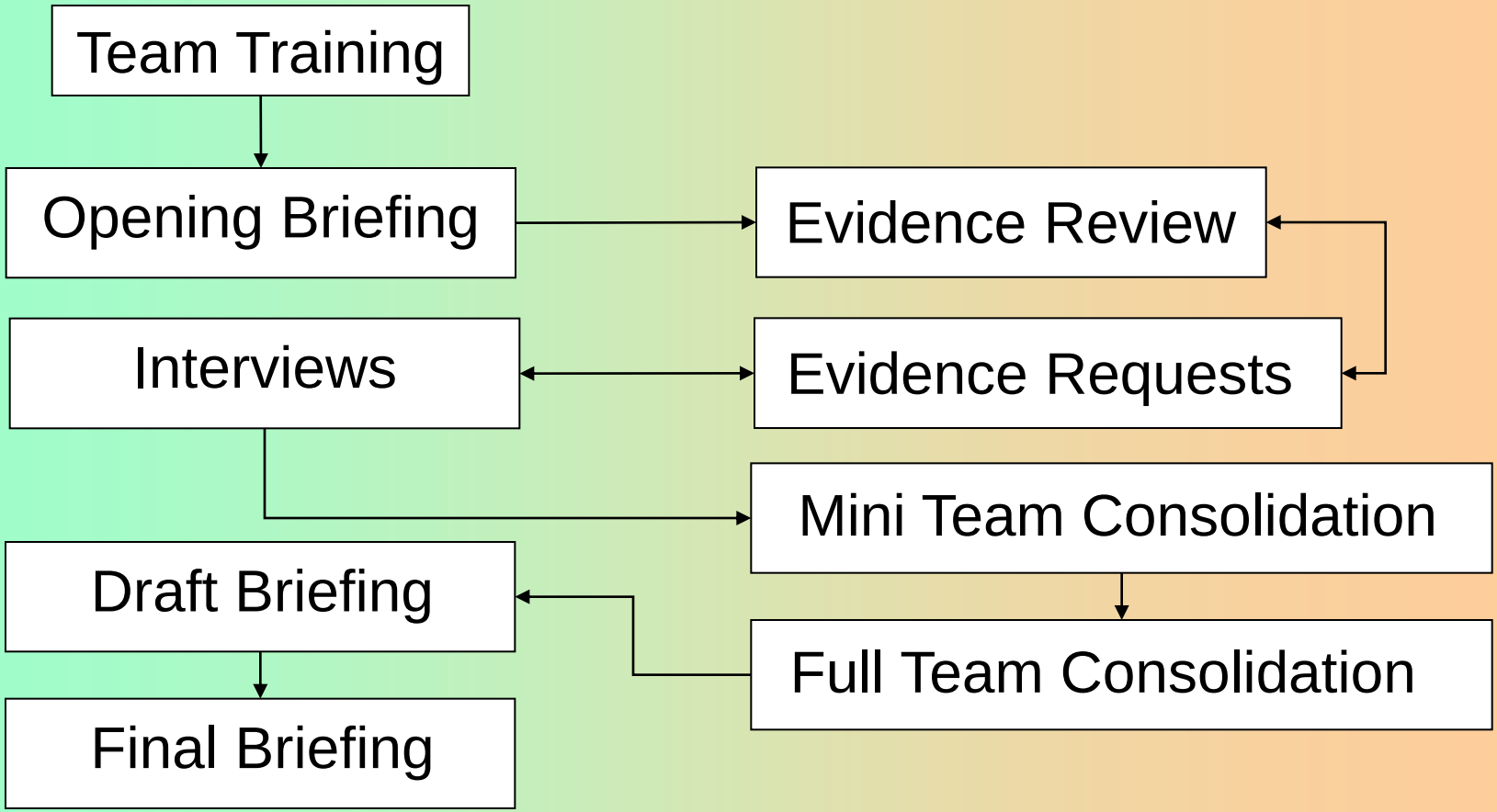
Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

NORTHROP GRUMMAN
Mission Systems

ARC C: Effect on SCAMPI A

Activities with minor or no Impact

Activities significantly Impacted



Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

ARC C: Effect on SCAMPI A (continued)

- **Keeps SCAMPI A in 'verification' mode**
  - Where was maximum time spent in a CBA IPI assessment?
- **Control gate for SCAMPI A – Saves resources (and agony?)**
- **Familiarized project/organization with appraisal process**
- **Majority of model interpretation issues dealt already**
- **Obvious weaknesses are minimized**

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

SCAMPI Effort With and Without ARC C

For a Level 3 organization with 3 medium to large projects, and a 10 person SCAMPI A team

SCAMPI with ARC C

- **4 member ARC C team typically spent 150 hours**
- **SCAMPI A appraisal team spent 450 hours**

SCAMPI without ARC C

- **SCAMPI A appraisal team spent 600 hours**

Total Effort 600 Hrs

Copyright 2003 Northrop Grumman Space and Mission Systems Corp. All Rights Reserved.

Conclusions

ARC C:

- **Provides an efficient and affordable verification approach**
- **Helps identify areas of improvement early**
- **Supports entire CMMI implementation life cycle**