

# Studying the A in VV&A

Briefing for:

VV&A Technical Working Group

March 3, 2004

Naval Postgraduate School, Monterey, CA

# Research team

- ◆ Advisors
- ◆ Students

# This presentation covers

- ◆ The research team
- ◆ Research motivation
- ◆ Background
- ◆ Research question
- ◆ Methodology
- ◆ Future steps

# You need to test wing strength, what do you do?

- ◆ Send pilots up in untested airplanes

- Too risky!

- ◆ Build a giant wind tunnel

- Too expensive!

- ◆ Or Simulate!

- Tests capabilities with less risk and cost.

# But, how do you know this simulation will work?

- ◆ Personal experience
- ◆ Information from the developer
- ◆ Stories from others who have used it
- ◆ Published materials
  - But none of these may be available!
- ◆ Accreditation!

# Accreditation is ...

- ◆ The official certification that a model or simulation is acceptable for use for a specific purpose.
- ◆ Objective: Simulation reuse
- ◆ Goal: Determine simulation credibility
  - Capabilities relative to applications
  - Accuracy for intended use
- ◆ “Should this simulation be used for this purpose”?

DoD Verification, Validation, and Accreditation (VV&A)  
Recommended Practices Guide (RPG), 15 August 2001

# Accreditation helps users by

- ◆ Providing information
- ◆ Identifying suitable simulations
- ◆ Facilitating the choice of a simulation
- ◆ Creating greater confidence
- ◆ Providing greater security

# Accreditation helps developers

- ◆ Increasing use of their simulation
- ◆ Identifying limitations that can be fixed

# But everyone does accreditation differently

- ◆ Different Services
- ◆ Different application areas
- ◆ Different procedures & policies

= Less credibility

- ◆ For example Navy Surface Warfare OT&E (OPTEVFOR)

# Navy Surface Warfare OT&E

- ◆ SAN ANTONIO Class (LDP-17)  
Amphibious Transport
- ◆ ARLEIGH BURKE Class (DDG-51) of  
multi-mission, battle force capable  
guided missile destroyers
- ◆ DD-21 (DD-X) family of advanced  
technology SURFACE combatants

# LDP-17's VV&A

- ◆ Adapted from the DMSO VV&A Recommended Practices Guide
- ◆ Provides a process framework and a set of minimum requirements for each M&S activity family
- ◆ Takes a “reasonable” approach to establishing an M&S application’s credibility

“The Modeling and Simulation Program,” San Antonio Class 21<sup>st</sup> Century Amphibious Assault Ships, January 2003

# LDP-17's VV&A Goals:

- ◆ M&S requirements are well defined and understood
- ◆ Capabilities, limitations, assumptions, and approximations of the application are documented and understood
- ◆ Performance of the application meets the M&S requirements of the task
- ◆ Input data used is correct and sufficiently accurate.

# VV&A in DDG-51

- ◆ Plan to accredit all M&S used in the Flight IIA Live Fire Test & Evaluation (LFT&E)
  - Identify LFT&E critical issues that will be answered through the use of M&S
  - Identify the specific M&S that will be used
  - Describe how M&S will be used to address the LFT&E critical issues.

“Assessing the Adequacy of Models and Simulations used for Ship LFT&E,” power point slides, October 2002

# DD-21 (DD-X) Smart Product Model (SPM)

- ◆ Weapon system will be conceived, designed, built, tested, training and operation would be provided in a computer before cutting metal and through the life cycle.

“DD (X) Class multimission destroyer, USA,” The website for Defence Industries – Navy, 2003

# SPM Phases

- ◆ Phase I – Develop a Capability Specification (C-Spec)
- ◆ Phase II – Develop and deliver a DD-21 system prototype
- ◆ Phase III – Industry team will tailor SPM for use in manufacturing and life cycle support.

“DD-21 Modeling and Simulation Vision (Smart Product Model),” power point slides, 7 March 2000

# COMOPTEVFORINST 5000.1

- ◆ Build quality in at the beginning, don't rely on screening out at the end
- 1. Responsibilities – OTD/OTC, PM
- 2. Documentation
- 3. Observation & review
- 4. Accreditation process flow chart
- 5. OPTEVFOR Formalization

# Documentation

- ◆ Model Management Plan
- ◆ Version control
- ◆ Configuration control
- ◆ Validation report

# Observation & review

## ◆ Management

- Simulation Management Board (SMB)

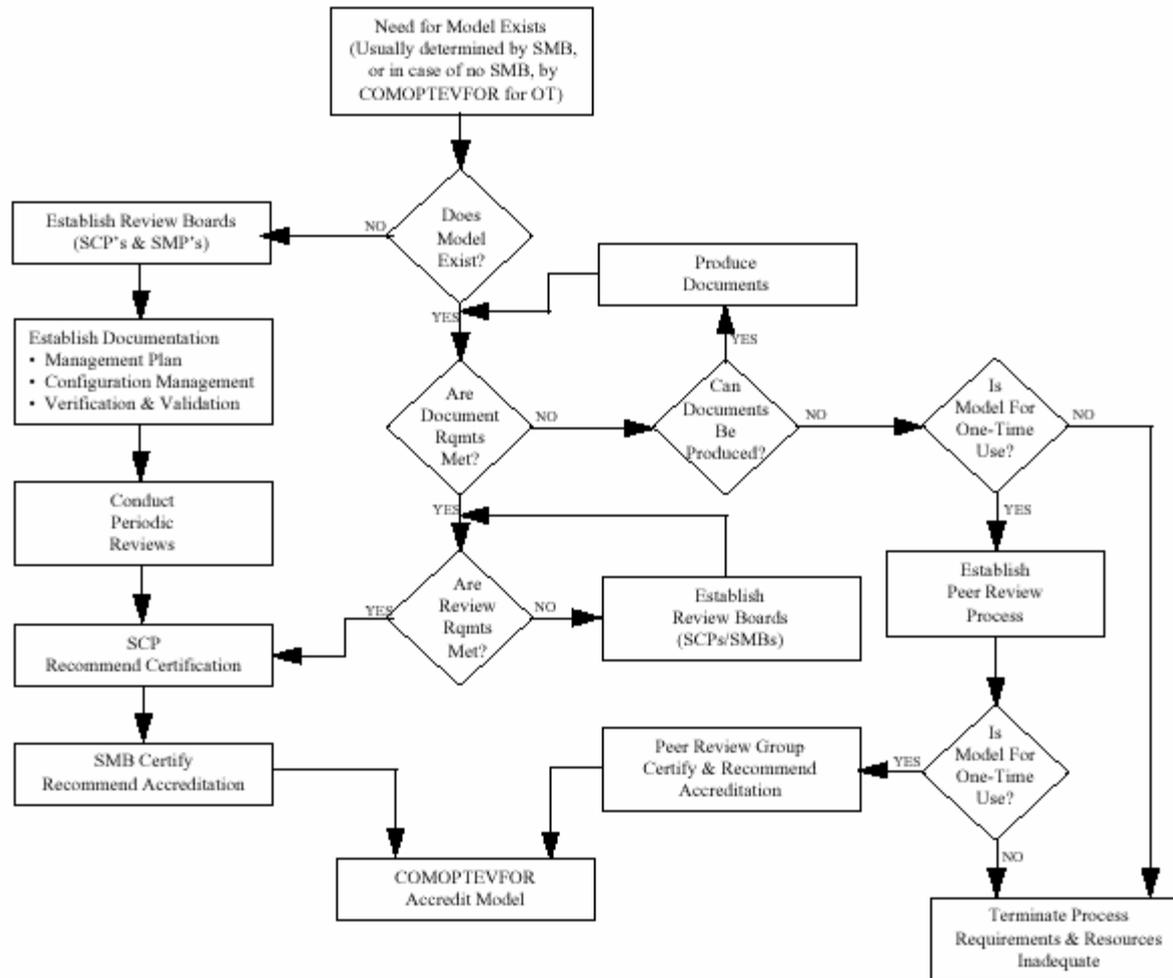
## ◆ Technical

- Simulation Control Board (SCB)

## ◆ “Maintenance of model discipline”

- “Partnership in Quality Models & Simulations”

# Accreditation process flow chart



# OPTEVFOR Formalization

- ◆ Annual OT M&S Plan
- ◆ M&S Board

# Our research question

- ◆ Would making COMOPTTEVFORINST 5000.1 a required procedure improve the VV&A process in the U.S Navy's surface ship T&E acquisition processes?
- ◆ What would be the effect on
  - Simulation quality?
  - Testing time
  - Overall costs?

# Methodology

- ◆ Literature review
- ◆ Identification of major stakeholders
  - User groups
  - Developers
  - Accreditation bodies
- ◆ Interviews
- ◆ Analysis of the costs, benefits and tradeoffs

# Preliminary results: issues

- ◆ Organizational design issues
  - Source credibility & trust
  - Who accredits? OPTEVFOR or other?
  - Who pays? PM? OPTEVOFR? Other?
- ◆ Organizational change issues
  - How widely implemented since 1995?
  - Scope says "All" but not happening
- ◆ Is COMOPTEVFORINST 5000.1 the best?
  - Legacy models in the "Too Hard Basket"
  - Dahlgren's and other processes

# Next steps

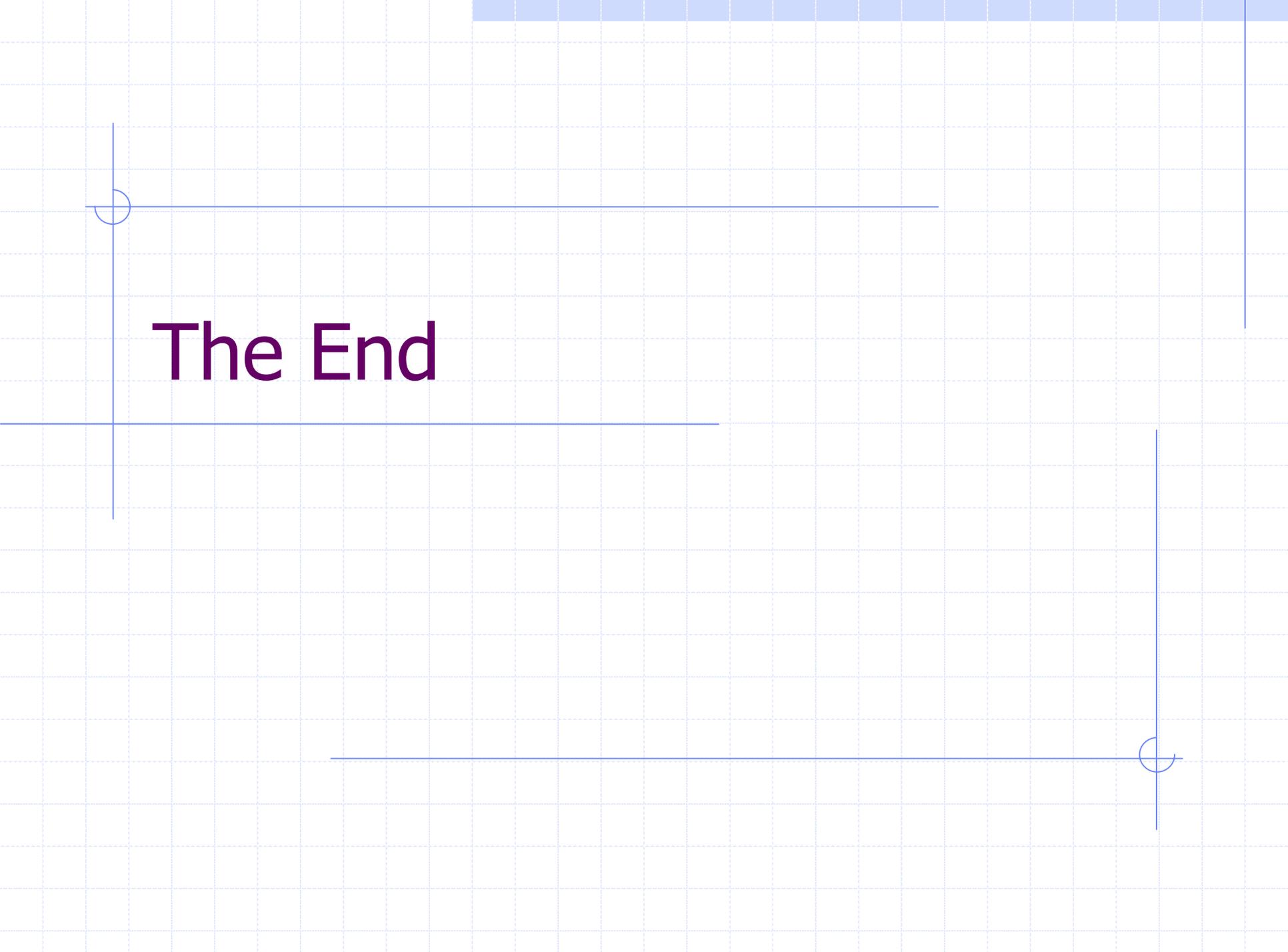
- ◆ Interviews currently being conducted
- ◆ Results in June

# Invitation to participate



\_\_\_\_\_

\_\_\_\_\_



**The End**