Review of Current Status/Action Items

R. Bruce Thompson

Status

- Consortium planning meeting in Austin, TX
  - November 18 & 19, 2003
- First MAPOD WG meeting in Albuquerque, NM
  - September 23 & 24, 2004
- Sub-team meeting in Las Vegas, NV
  - November 17, 2004
- Second MAPOD WG meeting in Palm Springs, CA
  - February 4, 2005
- Third MAPOD WG meeting
  - TBD

Prospectus

- General Objective:
    - To promote the increased understanding, development and implementation of model-assisted POD methodologies.

Approach

The working group will meet periodically and conduct the following activities:

- ☐ Discuss strategies for model-assisted POD determination

- ☐ Discuss requirements for models to be used in POD studies

- ☐ Identify gaps that need to be addressed between state of the art models and real world problems

- ☐ Provide input regarding examples of specific problems that would demonstrate the utility of model-assisted POD activities

- ☐ Communicate the results of model-assisted POD demonstrations

Metric

The Model-Assisted POD Working Group will be considered a success if, during its duration, activities under a variety of programs lead to

- ☐ Draft protocols for model-assisted POD
- ☐ Draft requirements for model qualification for use in POD determination
- ☐ Model-assisted POD demonstrations

Transfer Function Approach (XFM)
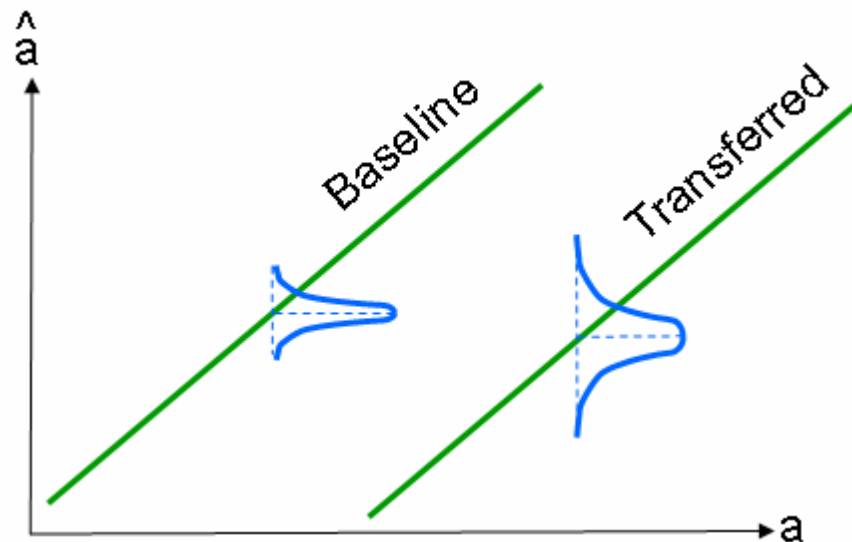
Full Model-Assisted Approach (FMA)
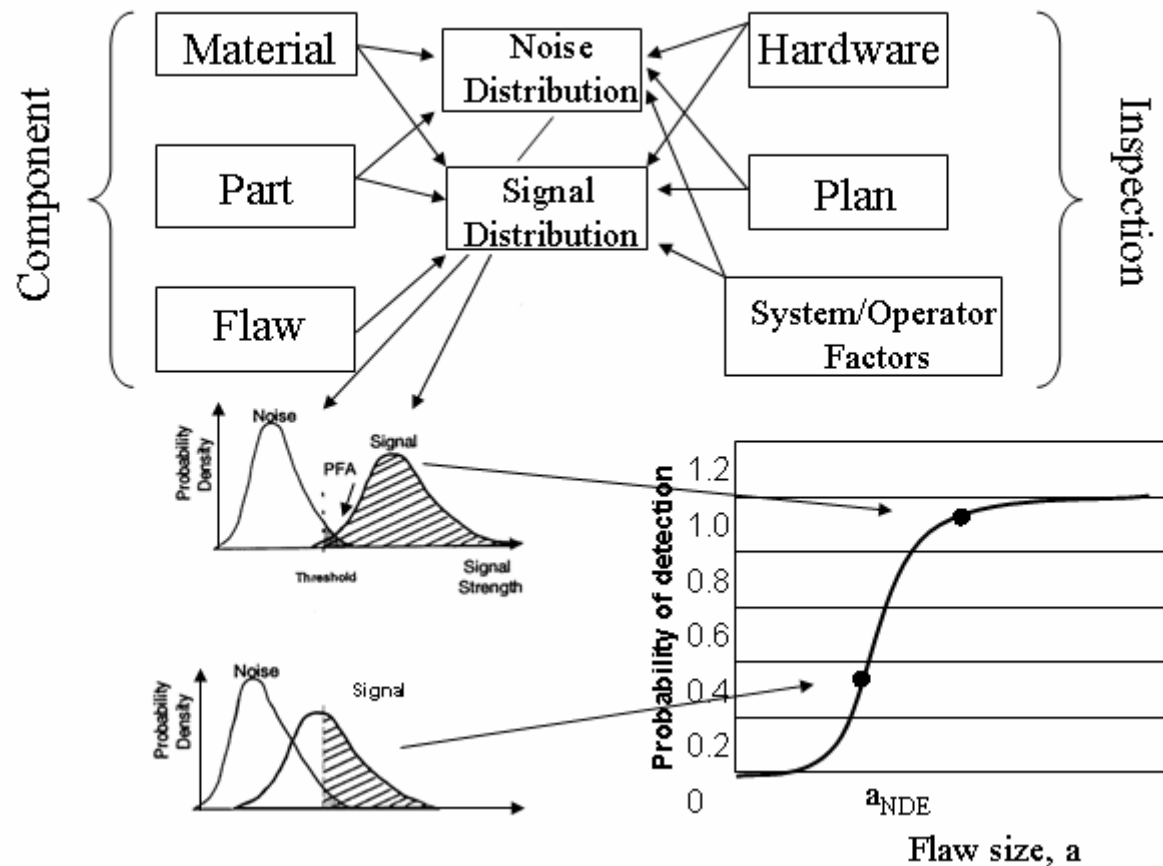
Full Model-Assisted Approach (FMA)

STEPS TO GENERATE MODEL-ASSISTED POD*

☐ Identify controlling factors whose influence can be simulated using a physics based model

☐ Develop appropriate model

☐ Verify its accuracy in the laboratory through well controlled experiments

☐ Determine values of input parameter (or parameter ranges) appropriate to field application)

☐ Use simulation tool to predict mean response and those components of variability controlled by well understood physical phenomena

☐ Quantify additional sources of variability associated with components of variability not controlled by well understood physical phenomena and with variations of input parameters that cannot be fully controlled in the production environment

☐ Compute POD

*Adapted from R. Bruce Thompson, "Using Physical Models of the Testing Process in the Determination of Probability of Detection," <u>Materials Evaluation</u>, 59, pp. 861-865 (2001).

Scope
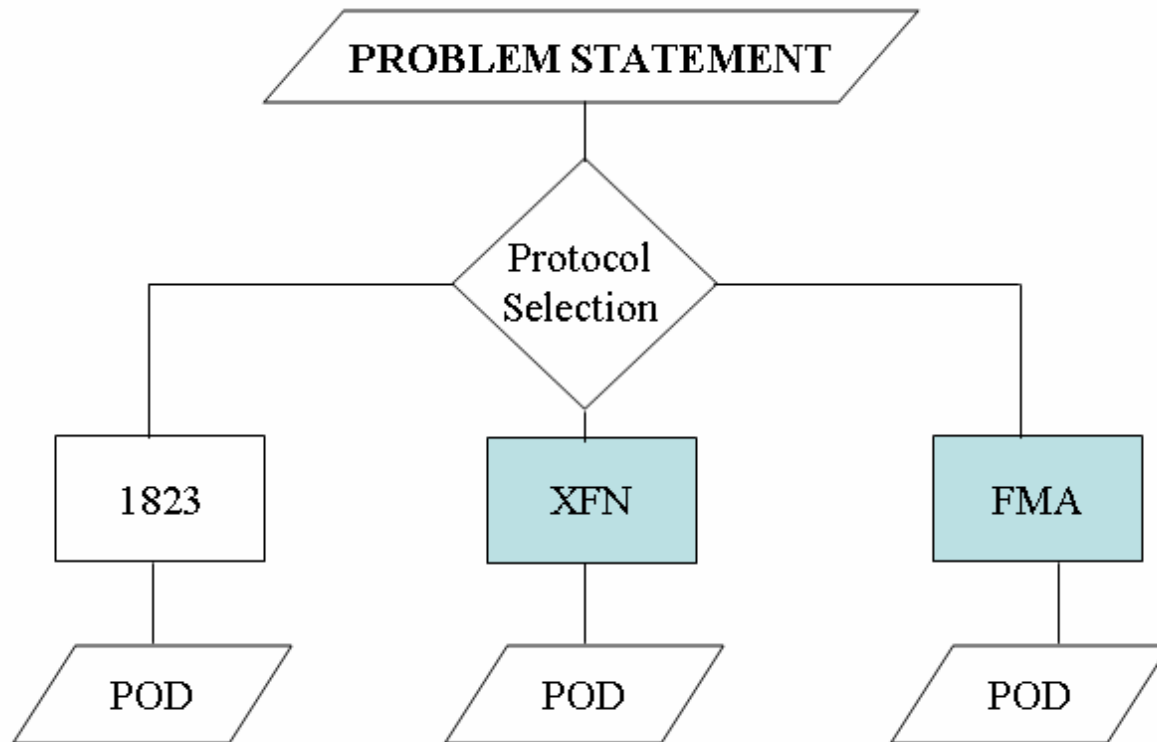
Objective

- To codify methods which are less cost/time intensive than 1823

Action Items - First MAPOD WG Meeting

■ Establish a web site: ISU	Completed
■ Include a reference list and a place where relevant papers could be placed if volunteered: ISU	Place provided
■ Provide an electronic copy of 1823: Spencer → Thompson → WG	Completed
■ Comment on what elements should be included in a MAPOD protocol: Spencer	Discuss this meeting
■ Develop a list of empirical POD studies that have been conducted: I. Gray	Discuss this meeting
■ Develop a list of model-based POD studies that have been conducted (NTIAC report provides a good start): Aldrin	Discuss this meeting
■ Develop a list of items that should be included in the "Toolbox": Rummel	Unable to attend
■ Recommend the ultimate repository for the protocols to be developed: Malas	Discuss this meeting
■ Scope out how the XFN and FMA approaches could be applied to generic problems of high current interest (cracks under fasteners, cracks in engines, volumetric defects in engines): Malas, Smith, Brasche, Aldrin, Knopp, Thompson	Initiated at ASNT Discuss this meeting

Web Site Established

- Model-Assisted POD Working Group
  - Web site is linked from the Center for Nondestructive Evaluation web site at:
  - http://www.cnde.iastate.edu/ under Research

Documents Currently on Web Site

- **Home**
  - ☐ Details of next meeting
  - ☐ Agenda
- **About Us**
  - ☐ Prospectus
- **Contact us**
  - ☐ Members List

- **Document List**
  - ☐ Prospectus
  - ☐ Important Historical Documents
    - ▪ 1823
  - ☐ Empirical POD Studies
  - ☐ Model-Based POD Studies
  - ☐ Meeting Minutes
    - ▪ Albuquerque
  - ☐ Reference List
  - ☐ Current Working Documents

Agenda

Review of current status/action items-Thompson	8:00-8:30 a.m.
Elements to be included in MAPOD protocol-Spencer	8:30-9:00
Status of list of empirical POD studies-I. Gray	8:30-8:50
Status of list of model-based POD studies-Aldrin	8:50-9:10
Update on the repository of protocols and review of	
ASNT subgroup meeting-Knopp	9:10-9:30
BREAK	9:30-9:45
Outline of general steps for XFN approach	
and example of application to engines-Smith	9:45-10:30
Updated statement of steps for FMA approach-Thompson	10:30-11:30
Discussion of lap splice data available at AANC-Swindell	11:30-12:00
LUNCH	12:00-1:00 p.m.
TESI POD Approach-Annis	1:00-1:30
Comparison of crack/EDM notch POD results	
for B-1B and preliminary results/plans for the C-141	
splice joint-Lindgren	1:30-2:00
Discussion of cracks versus notches-Group	2:00-3:00
BREAK	3:00-3:15
Future directions-Group	3:15-5:00
ADJOURN	5:00