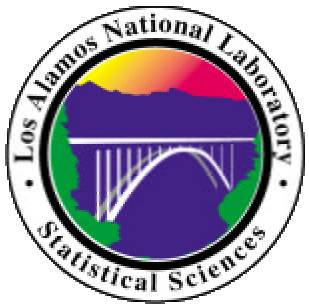


DATA, KNOWLEDGE, AND INFORMATION INTEGRATION TO SUPPORT DECISION MAKING

WHO ARE WE?

We are technical staff from Los Alamos National Laboratory confronted with problems where traditional statistical methods and philosophy simply do not cut it anymore.

Sallie Keller-McNulty
Tom Bement
Mary Meyer
Alyson Wilson
Shane Reese
Jane Booker
Mark McNulty
Jerry Morzinski

LOS ALAMOS 1945

LOS ALAMOS 2000

INFORMATION INTEGRATION TECHNOLOGY (IIT)

IIT is a set of processes, methods, and tools used to solve complex problems in dynamically changing environments.

- IIT brings together the data, information, and knowledge of different scientific disciplines, organizational levels, and geographically separate teams.
- IIT makes advanced problem-solving capability and defensibility available to decision makers.

IIT PROCESSES, METHODOLOGIES, AND TOOLS

Processes

- Defining the decision context
- Problem structuring
- System representation
- Representing the problem-solving process
- Defining information flows

Methodologies

- Information integration
- Analysis strategies
- Estimation and prediction
- Modeling

Tools

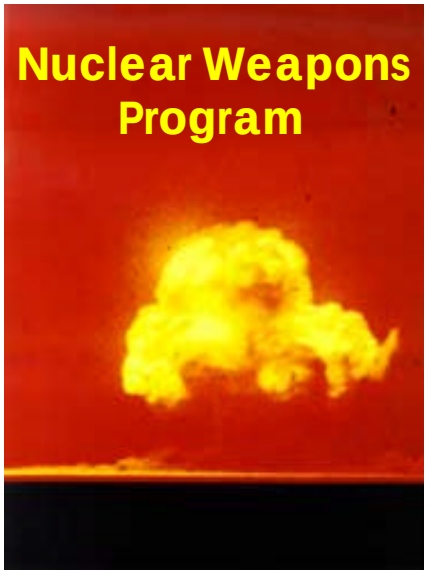
- Knowledge systems
- Knowledge assessment and representation
- Statistical analysis

ISSUES THAT IIT ADDRESS

- Building confidence in product performance and reliability
- Experimental design and analysis for sub- and full system tests
- Data/information requirements for system assessment
- Value of all information sources including
  - Data on similar systems
  - Computer/simulation models
  - Experience/expertise
  - Test data

Continuous and Comprehensive Evaluation of the System

MOTIVATION



DELPHI

Automotive Systems

Driving Tomorrow's Technology

P&G

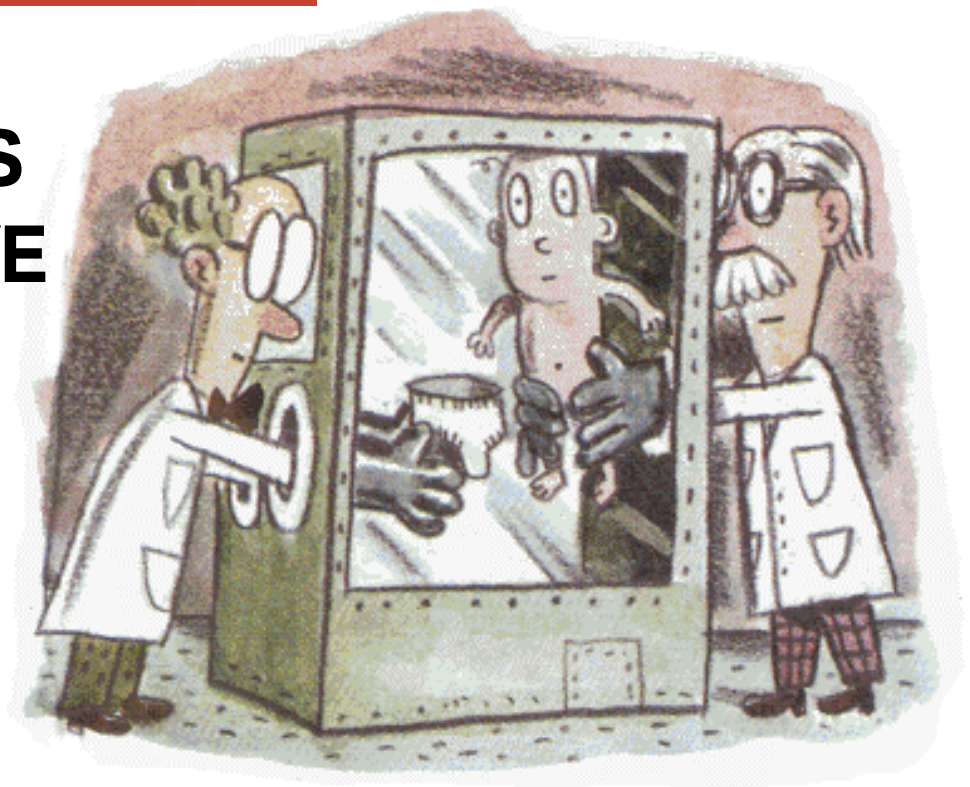
Procter and Gamble

PROCTER & GAMBLE

Up Front

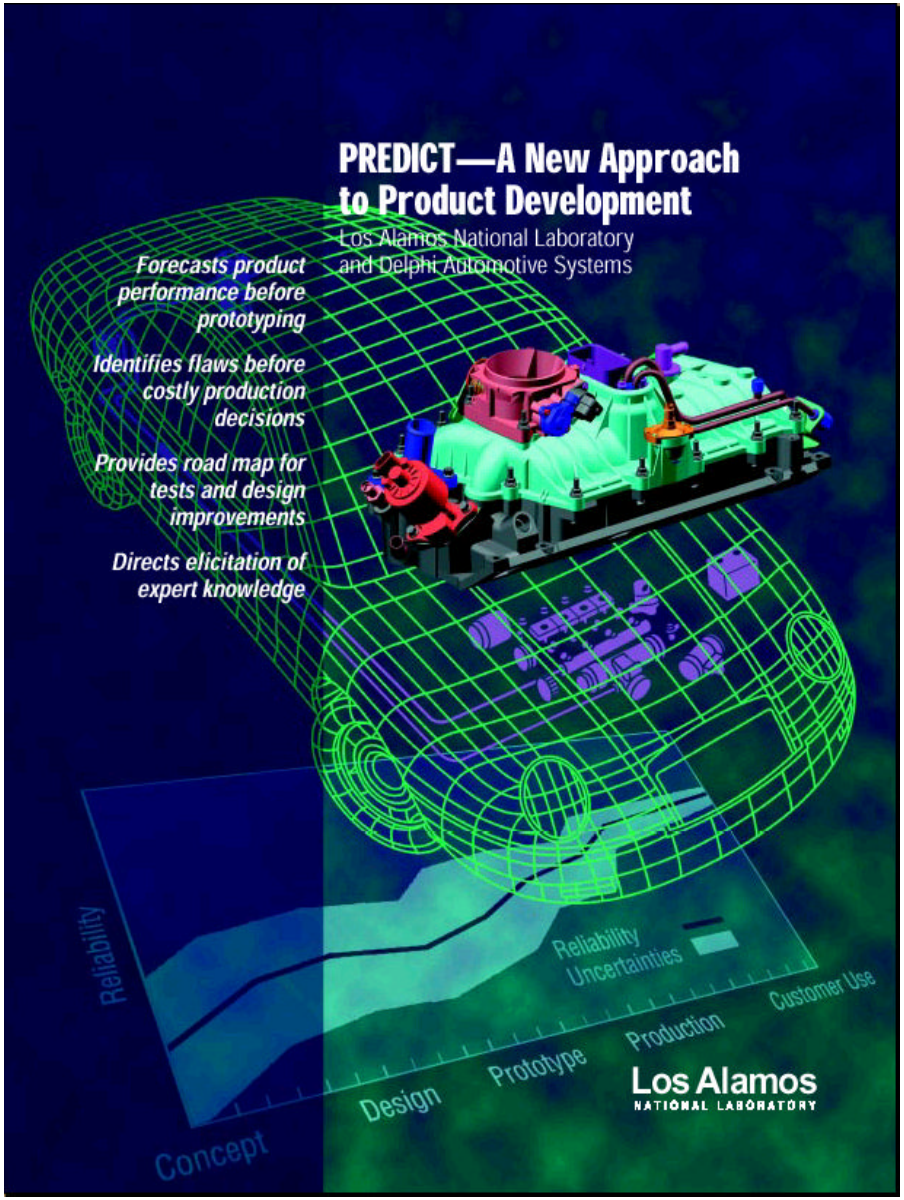
GONE FISSION

DR. SPOCK MEETS DR. STRANGELOVE

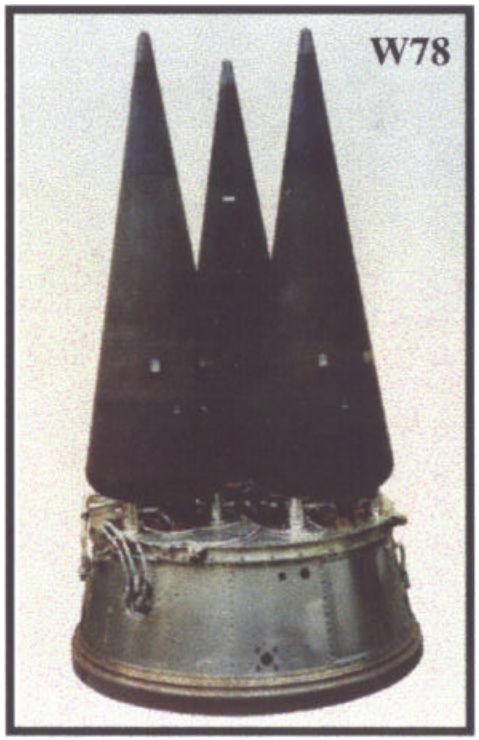


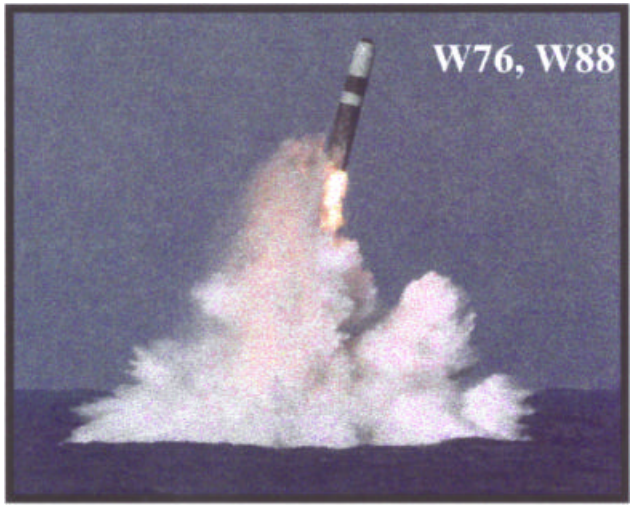
BUSINESS WEEK / July 10, 2000

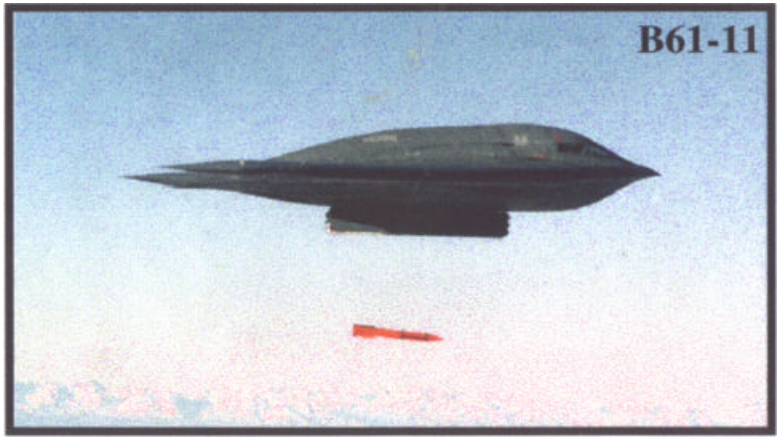
DELPHI AUTOMOTIVE



LOS ALAMOS NUCLEAR WEAPONS

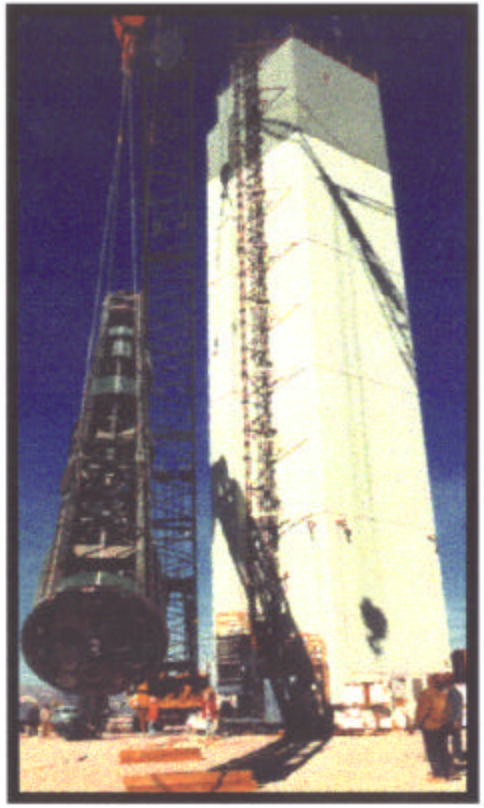




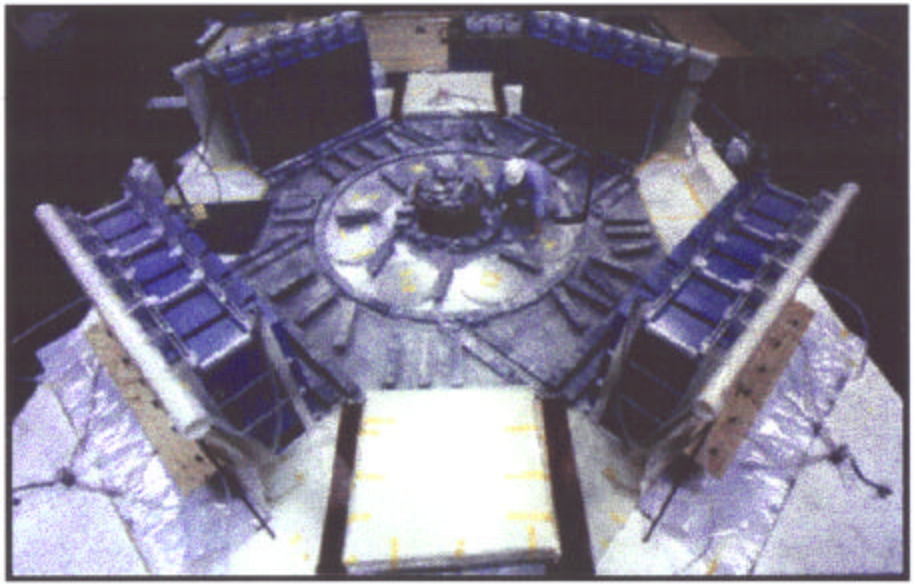


HOW WE CARRY OUT OUR MISSION

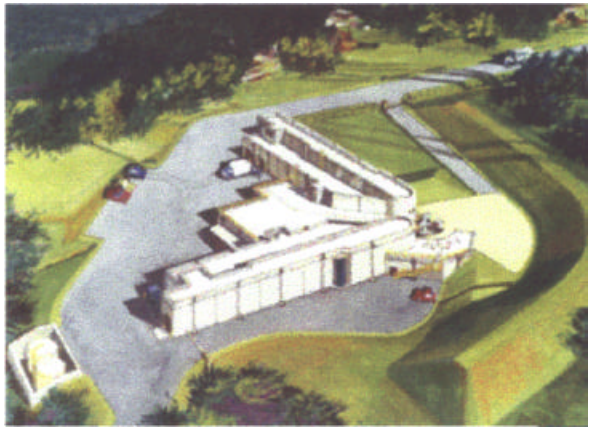
Before: Design-Test-Produce

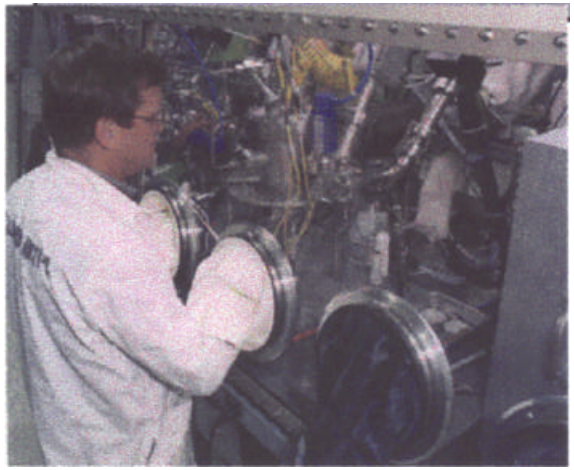


Now: Surveil-Assess-Respond

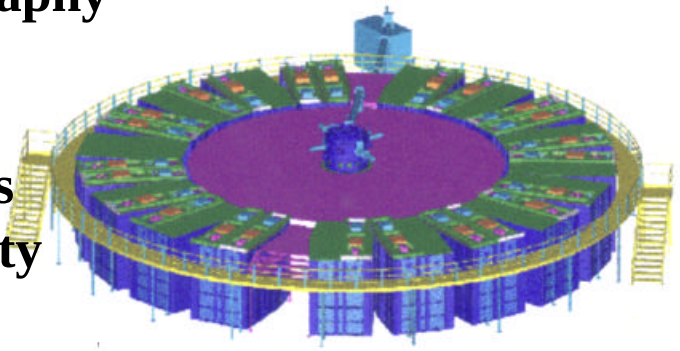


SCIENCE BASED STOCKPILE STEWARSHIP (SBSS)





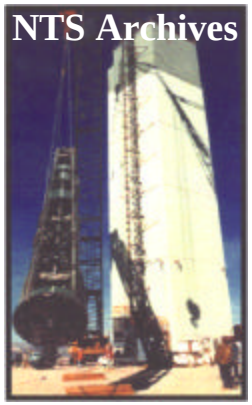
- **Large Scale Computing**
- **Advanced Radiography**
- **Material Science**
  - **–Pu**
  - **–high explosives**
- **High-energy density experiments**
- **Advanced manufacturing**
- **Information integration**



SBSS IN ACTION

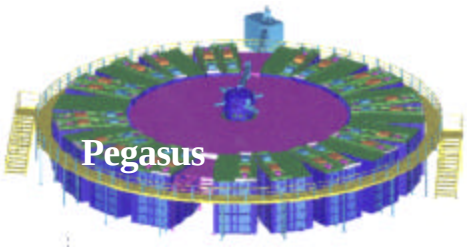
Production Processes

Weapons Performance



Materials Properties

Implosion Conditions



COURSE MANTRA

Gather all we know,
determine how well we know it,
combine all that information
use statistical methods
and philosophy to
guide decision making