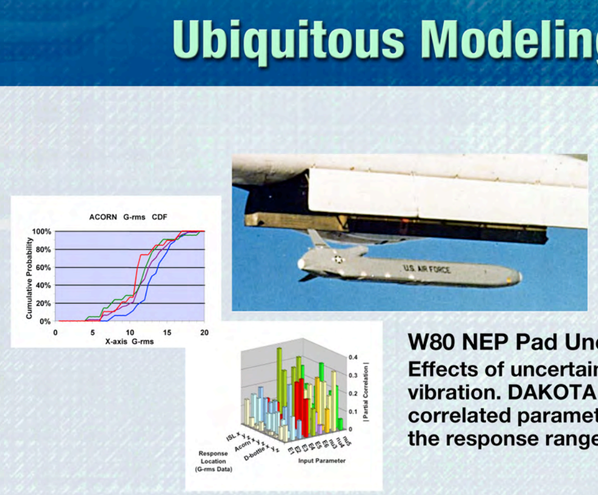
Optimization and Uncertainty Quantification Algorithms for Design and Assessment

Ubiquitous Modeling & Simulation ⟷ **Ubiquitous Optimization**

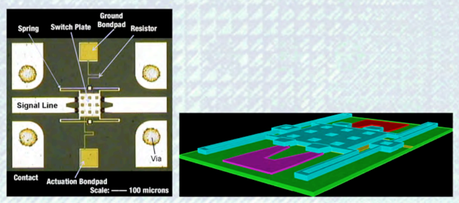


W80 NEP Pad Uncertainty Quantification

Effects of uncertain material properties on vibration. DAKOTA found the most highly correlated parameters, and determined the response range.

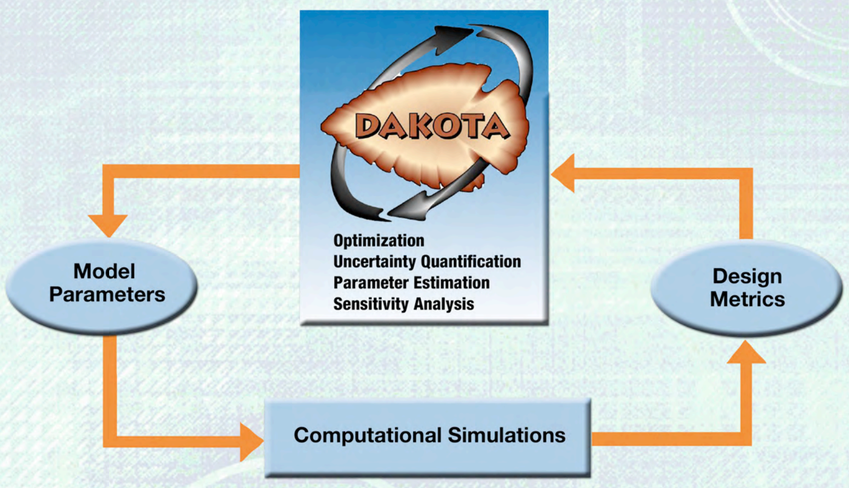
Sandia & Lockheed Martin Partnerships

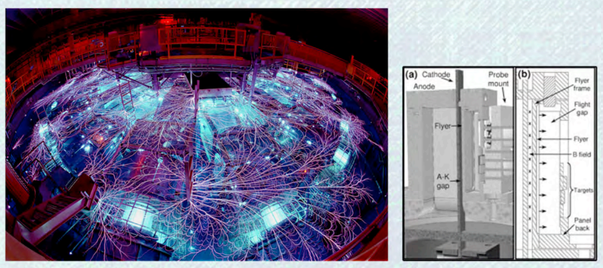
F-35 Joint Strike Fighter external fuel tanks optimized by DAKOTA for drag, flutter and yaw. Verified by wind tunnel tests.



Microsystems and MESA-TOP RF Ohmic Switch redesign

Shape optimization of dimensions and locations for performance, reliability,and lifetime.



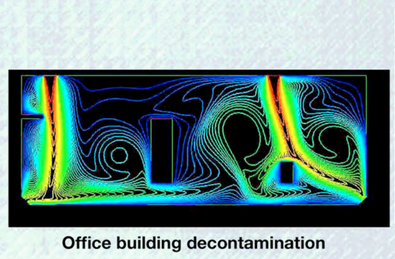


Z-Pinch flyer plate accelerated to record 75,000 m.p.h. DAKOTA optimized the driving current pulse shape

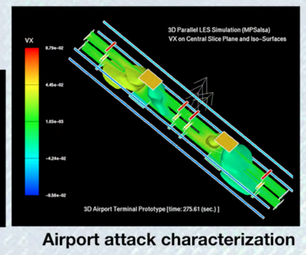
Sandia's Optimization program partners with top faculty and students from across the Nation for leading edge algorithmic research.

DAKOTA software drives multiple parallel simulations to answer fundamental engineering questions, such as:

- **What is the best design?**
- **How safe is it?**
- **How much confidence do I have in my answers?**



Office building decontamination



Airport attack characterization

Homeland Security through Optimization and Inversion

Detect, characterize, mitigate and decontaminate chemical and biological terrorist attacks

- Protecting people, airports, cities and municipal water networks

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http://www.cs.sandia.gov/optimization

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Sandia National Laboratories