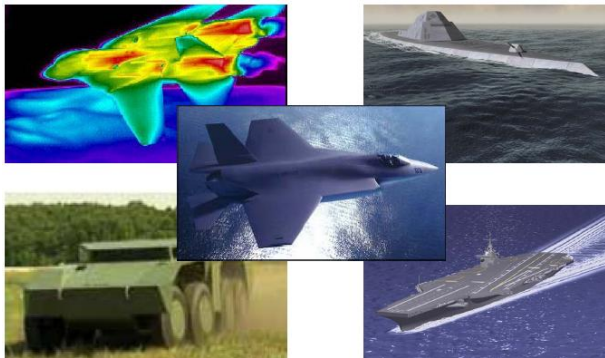




PC Krause and Associates, Inc.

Engineering, Modeling, and Software Solutions for Integrated Power, Thermal, and Propulsion Systems



**Purdue Research Park
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MISSION

To cost-effectively transition new power, thermal, and propulsion technologies and capabilities to our varied customers through the use of advanced modeling, simulation and analysis techniques and collaboration with universities, government laboratories and leading component, system, and platform manufacturers.

APPROACH

Develop solutions comprising new technologies to address existing challenges or growth requirements for integrated systems and transition these solutions to the component, system, or platform manufacturers for production.

VALUES

For successful technology transition involving integrated systems, PCKA must work closely with numerous companies. Therefore, PCKA's paramount objective is to protect the intellectual property of the collaborating organizations while creating an environment that enables system solutions. PCKA has developed technologies and procedures that facilitate such collaborations and enables PCKA to be an "honest broker" in the design, analysis, and engineering of integrated systems.

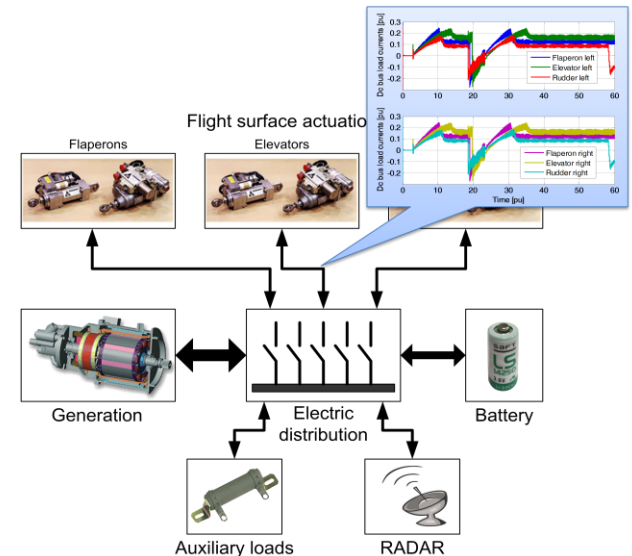
CORE COMPETENCIES

Engineering

PCKA's expertise is in the design, modeling, analysis, and control of dynamic electromechanical, thermal, and propulsion systems with particular emphasis on power-electronic-based systems of the types to be found in advanced aircraft, ships, and ground vehicles.

System Integration / Optimization

PCKA has been actively involved in cutting edge design and optimization of the integrated systems for next-generation military as well as commercial platforms. For example, in one on-going program, PCKA is the lead in the development and implementation of a virtual system integration and optimization facility involving 12 companies and two government organizations.



CUSTOMERS / MARKETS

PCKA supports several programs and research initiatives for various government agencies and numerous industries. The company has a well established reputation for solving engineering challenges through the use of advanced modeling, simulation, analysis, and control techniques.

COMPANY PROFILE

PC Krause and Associates (PCKA) was incorporated in the state of Indiana in 1983 and presently has offices in the Purdue Research Park in West Lafayette, Indiana and in Dayton, Ohio. PCKA has grown to over \$4M in annual business with more than 40 professionals, including 14 full-time PhD's. This forms one of the largest high-tech groups in the US dedicated to the research and development of solutions to dynamic electromechanical, thermal, and propulsion engineered systems.

THE PCKA ADVANTAGE

- On-time, on-budget solutions
- Establishes unique relationships in working with our customers and collaborating organizations
- Works closely with the targeted transition firms
- Integrates both tools and services to target optimal solutions



SERVICES

Engineering Services

PCKA's Engineering Services Division develops and transitions state-of-the-art technologies often found only in academic research environments to meet the needs of government and industry programs. PCKA personnel are currently involved in a wide variety of activities related to system integration and subsystem design activities including the development and demonstration of high-power, high-efficiency power supplies, high-temperature electro-mechanical actuation systems, electric-machine optimization techniques, prognostics and health-management techniques in aircraft generation systems, high-performance heat exchangers, and advanced motor-control techniques.

Computer Services

The Computer Services Division provides research and development of tools and simulation technologies necessary to conveniently analyze and optimize the engineering challenges identified by the Engineering Services Division and supports the commercial deployment of developed software for any products which are deemed to have sufficient market interest. PCKA currently markets two software technologies: Distributed Heterogeneous Simulation (DHS) and the Graphical Automated State Model Generator (ASMG).

PRODUCTS

Distributed Heterogeneous Simulation

DHS is the PCKA patented integration software that enables the interconnection of any number of dynamic subsystem simulations on a single computer, distributed across a local internet, or geographically distributed across the Internet. DHS supports numerous simulation programs/languages and provides a means of simulating the transient and steady-state performance of large-scale systems at a speed and level of detail previously unachievable. In fact, for one system a greater than 1000-fold increase in simulation speed was observed. DHS establishes a collaborative system design and analysis environment wherein intellectual property can readily be protected.

Graphical ASMG

The Graphical ASMG is an electrical and electronic circuits modeling toolbox that automatically establishes the time-varying state-space model based upon a graphical representation of the circuit. This tool enables the rapid development of lumped-parameter circuit / machine models and is compatible with *Simulink*TM to support controls integration. The patented ASMG algorithm establishes a computationally efficient and accurate simulation of switched systems through the use of the minimal state realization approach.