

PRODUCT
DEVELOPMENT
ASSOCIATES, INC.

*“ Providing excellence in
engineering services
to industry since 1994.”*

PRODUCT **D**EVELOPMENT **A**SSOCIATES, INC.

We are a group of over 20 Engineering Professionals, with extensive experience and capabilities in all phases of product development. From the initial definition of the product through design, prototype, qualification testing to production start-up and manufacturing, we are focused on the principles of engineering excellence and customer satisfaction. Our goal is to provide cost effective and innovative solutions to all of your product development needs.

Product Development Associates, Inc. (PDA) was incorporated in August 1994. It was created to provide design and development engineering expertise. Because of its employee experience base, PDA is focused on mechanical design, system engineering, product development, and project assessment and management.

We Can:

- Take responsibility for an entire project, or assist your engineering staff.
- Participate in or conduct in-depth design reviews and/or product evaluations.
- Take a product through U.S., Canadian, and/or CE approvals.
- Ensure a development plan that will go from concept to production with minimum cost and maximum productivity.

We Are Experienced In All Aspects of Product Development

- Design From concept to detailed implementation
- Analysis Structural, thermal
- Product Definition Develop requirements and design concepts
- Manufacturing Procurement, prototyping, start up, production
- Product Support Continuation engineering, customer support, drawing conversion
- Project Management Planning, schedules, meeting requirements, cost control

Our Engineering Expertise Encompasses:

MECHANICAL DESIGN

- CAD/Tools: ProEngineer, Cadkey, Autocad, NASTRAN, FEMAP
- Electronics Packaging
- Industrial Design
- Mechanisms
- Motion Control Systems
- Finite Element and Thermal Analysis
- Optical Design
- Environmental Testing

ELECTRICAL DESIGN

- Digital/Analog Design
- Microprocessor System Design
- PCB development

MANUFACTURING ENGINEERING

- Production Engineering/Control
- Custom Factory Automation Equipment Design

Customers

PDA has a growing base of customers, most of which have contracted with PDA for more than one task. They are as follows:

- Architecture Technology Corporation
- Ault
- Lockheed Martin Tactical Defense Systems
- Oxboro Technologies Group, Inc.
- Research, Inc.
- Switched Network Technologies
- International Certification Services
- Dan'L Systems Inc.
- Lifetouch National School Systems
- IDE/Plasmon

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Mechanical Design

Our record of successful designs and innovative approach to solving problems has established PDA's reputation and success. Our staff holds about 15 patents in mechanical and electrical design.

PDA's staff consists of approximately 22 engineers, designers and technicians. Our design teams primarily use the following software for their work:

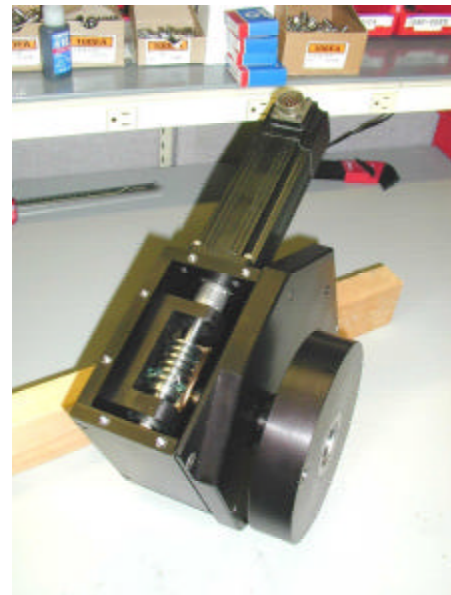
- ProEngineer
- Cadkey
- AutoCAD
- Microsoft Project for scheduling
- Intralink for configuration management

PDA has done work in the following areas:

- Motion control
- Gear boxes
- Optical design
- Digital imaging devices
- Electronic packaging
- Military computers
- Electronic packaging for extreme shock and vibration as well as temperature and humidity environments.

PDA has a prototype shop to support the design activities. We have the basic equipment necessary to build and assemble prototypes that require sheet metal and machined parts.

Call or email us and let's talk about how PDA can help you with your mechanical design.



The assembly shown above is a worm gear reduction unit that was designed on ProEngineer, built and assembled by PDA.

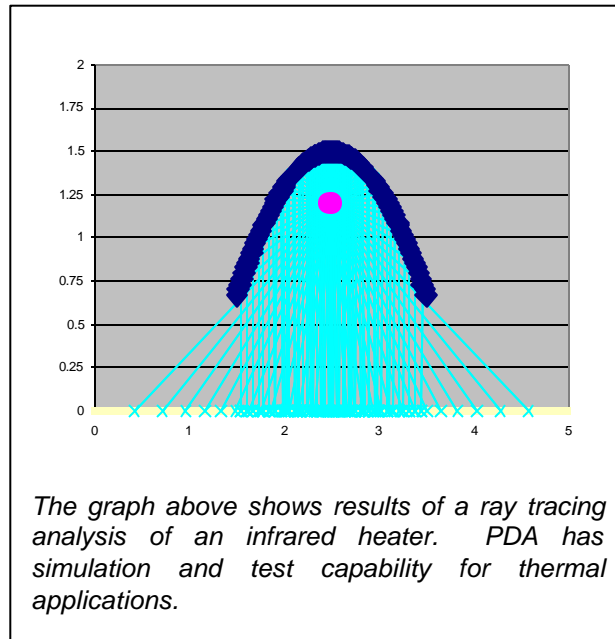
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Thermal Applications Engineering

Understanding process heating can be difficult, as there are many heating technologies from which to choose. Each heating technology has benefits and limitations that are process dependent. The optimum heating solution for one application may be the least desirable in another. Optimizing the heating process has a direct impact on the bottom line with improvements in throughput and quality.

PDA has in-depth experience in analysis, design, and applications of numerous heating technologies, including:

- Infrared - short and medium wavelength (figure on right shows infrared simulation)
- Convection heating
- Resistive heating



Understanding the heating application is also a key ingredient to selecting the proper heating method. Our staff has expertise in a wide variety of heating applications, including:

- Curing and drying of water-based adhesives, coatings, and paints
- Pre-heating, curing and annealing of plastics and rubber materials
- Reflowing solder for Surface Mount Technology assemblies
- Heating of silicone wafers

With expertise in both heating technologies and applications, PDA can solve your thermal process problem. PDA has experienced staff to examine your thermal processes and supply solutions to optimize your heating application. In addition, PDA can provide custom system designs to meet your heating need.

Call or email us and let's talk about how PDA can help improve your bottom line through heat process optimization.

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Analysis

PDA provides analysis services in the areas of:

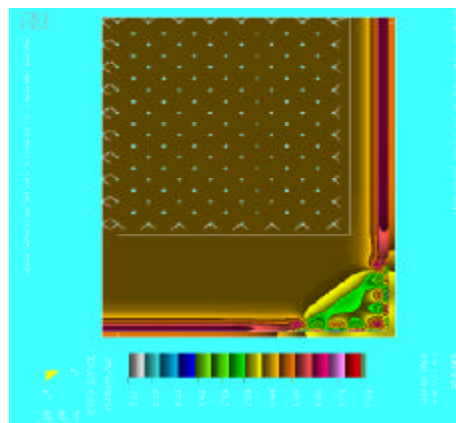
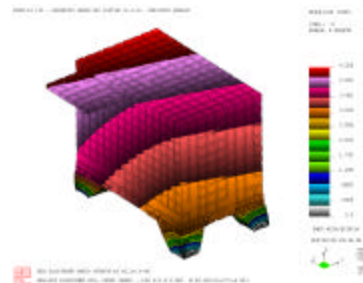
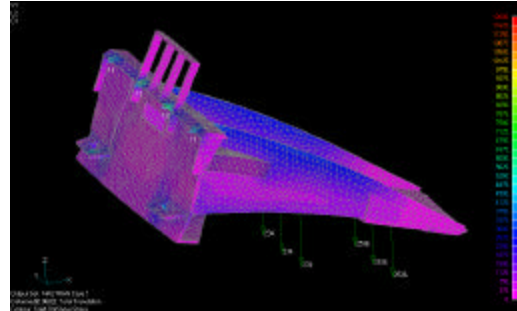
- Static structural analysis
- Dynamic structural analysis for both linear and non-linear materials
- Thermal analysis
- Thermal stress analysis

We use 2 different software packages for our analysis work. Nastran is typically used for our linear static and dynamic problems where EMRC is used for thermal and non-linear structural cases.

The illustration in the middle at the right is an example of a dynamic response for a computer cabinet mounted on polymeric isolators.

Our analysis capability can save you time and money by giving you quick answers to complex structural and thermal problems.

Contact Paul Erickson at the phone number listed below and let's talk about how PDA can help your company.



The illustration shows the stresses that result when an assembly is heated and the various components have different cooling rates and coefficients of thermal expansion.

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Production and Continuation Support

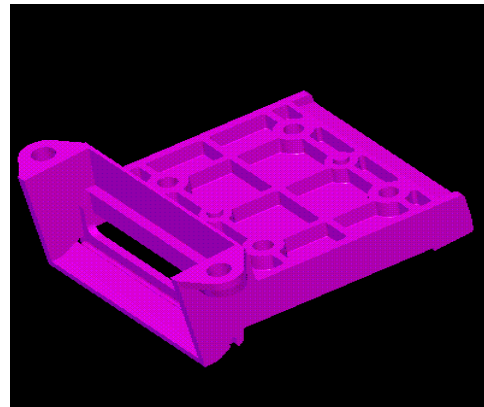
PDA has been responsible for cost reduction projects that have resulted in millions of dollars of savings for our customers. Whether it is injection molding, pressure or vacuum forming, die-casting or other types of tooled parts we have the experience to bring you big savings to your recurring costs.



Do you find your design engineers spending time on the production floor trouble-shooting problems when you would like to have them working on new projects? PDA can supply the expertise to trouble-shoot design and manufacturing problems. We have engineers and technicians that have decades of experience with production support issues.

Many mechanical assemblies require some type of fixturing or alignment jigs. PDA has years of experience designing and building production support tooling.

Give PDA a call and let's discuss how we can help you maximize your company's potential.



The part shown above was designed by PDA to replace the 8 milled aluminum parts used in the original design. The calculated savings for this project were \$250 per unit. It was designed on Cadkey

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Examples of PDA's Work

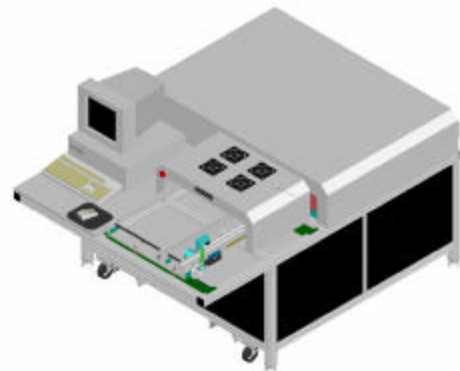
PDA has designed a wide variety of products for the military and commercial marketplaces. Some examples are listed below:

Military:

- Computer packaging
- Surface and subsurface enclosures for electronic equipment:
 - AN/UYK 43, 44, 7, 20
 - Trident
- Avionics equipment
 - Wild Weasel
 - ABCCC
 - Optical Disk Drive
- Various power supplies for both avionics and shipboard equipment

Commercial:

- Graphics market
 - Laser printers
 - Ink jet printers
 - Drying equipment
- Electronics market
 - Reflow oven design (shown)
- Material handling
- Factory automation
- Gear reducers
- Cameras



Example shown is a reflow soldering profile station. PDA designed and delivered the prototype and initial production.

Industrial Design:

- Network Switch box
- Test equipment for testing telecommunications equipment