We work with numerous key industry partners to identify optimal component and system solutions to minimize unit cost and weight while maximizing energy efficiency and performance.

We Optimize Everything We Do to Exceed Customer Expectations.

Our Mission
Our vision is to transform the way thermal systems are designed and developed, freeing engineers to do what they do best — create and innovate. We do this by:

• Developing, verifying and validating highly goal-oriented simulation tools;
• Integrating with multi-objective optimization, analysis and visualization of the entire product design space;
• Providing road-mapping and problem solving seminars; and,
• Providing performance measurement services in a controlled environment to verify analysis and design efforts.

Our People
Our knowledgeable and experienced staff are well equipped to solve unique energy conversion problems using a variety of techniques. OTS was founded and is currently lead by Dr. Reinhard Radermacher, CEO; Dr. Yunho Hwang, Chief Science Officer; and Dr. Vikrant Aute, Chief Simulation Architect. Together, they have more than 60 years of experience in the HVAC&R industry.

Our Products
Our software products help engineers design and optimize their components and systems. Products and capabilities include:

• XProps®
• CoilDesigner®
• VapCyc®
• Thermodynamic Cycle Model (TCM)
• ThermCom Methodology
• Transient Simulation Component Libraries

Our Services
We strive to help your team find the optimal solution for your unique challenge. We do this through:

• Consulting, including component and system analysis, research of new and existing technologies, and data analysis and visualization
• Customized software development
• Energy modeling and auditing
• Research and product development workshops
• Experimental testing and validation
Heat Exchanger Analysis

Consulting Services

Optimized Thermal Systems, Inc. provides design, analysis and optimization services for heat exchangers used in a wide variety of applications. Based on your specific design constraints, we’ll work collaboratively with you to identify cost effective solutions to achieve more or better performance. Analysis is conducted using our proprietary CoilDesigner® software, and takes advantage of integrated program features such as Parametric Analysis and Optimization.

Aluminum HX design study resulting in 14% mass reduction. Heat pump HX optimization effort resulting in 26% evaporator cost reduction and 49% condenser cost reduction.

Testimonial
“The work was very well done and carried out with care . . . . It helped us to make the correct decisions and we were very honored and happy to be able to work with [OTS Staff].”
- Alexandre Restrepo Boland
Consulting Services

Optimized Thermal Systems, Inc. provides design, analysis and optimization services for complete HVAC systems including, but not limited to, commercial air conditioners, transport air conditioners, commercial refrigeration systems, and heat pumps. Analysis is conducted using our proprietary VapCyc® software, or custom code using such programs as MATLAB®, Engineering Equation Solver (EES), Simulink and Modelica.

Testimonials

“Optimized Thermal Systems has been a key element in our simulation-driven design strategy. Its experience and unparalleled commitment in delivering customized simulations models is helping us to take product design to the next level.”
- Anderson Bortoletto, Sr. Systems Engineer

“OTS (formerly TAP) delivered outstanding work on me and within budget.”
- Barbara Minor, Sr. Engineering Associate
Solve and Analyze Problems for Fluid Flow

Optimized Thermal Systems, Inc. has more than 15 years of experience providing comprehensive Computational Fluid Dynamics (CFD) analysis, enabling engineers to solve complex fluid flow and heat transfer problems. Using CFD, we help heat exchanger and system designers understand and evaluate issues such as non-uniform flow distribution, the impact of heat exchanger fin design, and component and system performance. Coupled with our proprietary optimization code, CFD analysis can aid in identifying solutions that maximize performance and minimize cost, helping to develop innovative products and technology that previously seemed impossible. Our expertise and analysis approach enable you to secure fast and cost effective CFD services.

The Power of CFD
- Reduce design time and associated development costs
- Understand the influence of non-uniform flow
- Predict component and/or system level performance
- Optimize designs to improve efficiency, reduce material, minimize pressure drop, etc.

We Work With
- Ansys Fluent • Ansys Workbench • STAR-CCM+ • Gambit

For Pro-CFD Users
- Our Approximation Assisted Optimization (AAO) methodology goes above and beyond the time consuming approach of Design of Experiments (DOE) to quickly identify the most sensitive parameters in order to significantly improve system performance.
- We offer meshing service for experts who want to save time and stay focused on their innovation.
- We develop custom scripts to automate routine CFD tasks to increase productivity and decrease design time.
- Data analysis-based Proper Orthogonal Decomposition (POD) allows us to reduce computation time.

Sample Projects Include
- HX fin design and optimization • Improving refrigerant circuits • Thermal comfort evaluation • Evaluation of system temperature and pressure profiles • Exhaust thermal analysis • Liquid sloshing impacts • Dust laden airflow • POD Analysis
Integrating Noise Analysis for Optimal Design

Fan noise and performance can have a significant impact on system optimization, as well as user experience and customer satisfaction, but is often over looked when designing an HVAC system or heat exchanger in particular. Optimized Thermal Systems, Inc. has the knowledge and expertise to optimize systems not only for heat transfer performance, material weight, or cost, but also for the best acoustical design and configuration. Using acoustical analysis, CFD analysis and experimental validation, OTS mitigates excessive noise levels while also improving overall system design.

Sample Projects Include

- Fan aero-acoustics: evaluating fan directivity and factors influencing it
- Delivery duct aero-acoustics: evaluating high speed air noise emanating from HVAC supply ducts
- Transmission loss analysis: identifying the transmission loss curve of an exhaust system

Acoustical Analysis Benefits

- Increase operational regime
- Deeper understanding of noise impacts for HX and system design
- Improved understanding of fan and shroud interaction
- Improved product performance and user experience from quieter operation
Consulting Services

Optimized Thermal Systems, Inc. provides comprehensive building energy modeling services:

- For Residential and Commercial Buildings and Applications

- For the Purposes of:
  - Annual Energy Analysis
  - Determining Building Loads and Making Design Decisions
  - Energy Auditing
  - LEED® Certification

- Modeling capabilities include the use of software programs including:
  - TRNSYS
  - EnergyPlus
  - eQUEST
  - Carrier’s HAP
  - Trane Trace

Our staff includes LEED® Accredited Professionals (AP) and ASHRAE Certified Building Energy Modeling Professionals (BEMP)
Consulting Services

Optimized Thermal Systems, Inc. provides comprehensive building energy auditing services:

- For Residential and Commercial Buildings and Applications
- Meeting ASHRAE I, II, and III Level Requirements
- For the Purposes of:
  - Identifying savings opportunities
  - Identifying maintenance deficiencies
  - Meeting requirements for state and federal incentive or rebate programs

Energy Savings Opportunities may include:

- High Efficiency Lighting
- Use of Variable Speed Drives
- HVAC Equipment Upgrades or Replacement
- Building Envelope Improvements
- Properly Utilizing Building Controls and Scheduling Capability

Our staff includes a Certified Energy Manager (CEM)!
Experimental Product Evaluation

Experimental Testing and Validation

Optimized Thermal Systems, Inc. provides experimental product evaluation and performance verification including:

- Prototype development
- Validation and analysis of heat exchanger designs
- Validation and analysis of cycle or total system performance
- Evaluation of new technologies and system modifications
- Comprehensive data acquisition using LabView

Small System Environmental Chamber with the ability to:

- Maintain temperature +/- 1.0 °C (1.8°F) between a range of -7°C (19.4°F) and 43°C (109.4°F)
- Relative Humidity Range: 35% - 100%
- 2-ton maximum capacity
- Custom modified for optimal temperature control

Temperature Controlled Wind Tunnel:

- 5-ton maximum capacity
- Airflow measurements between 260 CFM – 2,000 CFM

Custom experimental set up and complete data acquisition for every project!

Closed loop wind tunnel for testing of small capacity HVAC systems and stand-alone heat exchangers
Data Visualization

Program for Data Visualization and Analysis

Optimized Thermal Systems, Inc. provides programs for data visualization and analysis that are capable of:

• Quickly plotting simulation results based on a variety of parameters
• Changing data point color and size for more extensive data review and comparison
• Visualizing data in multiple dimensions