



Phoenix Analysis & Design Technologies

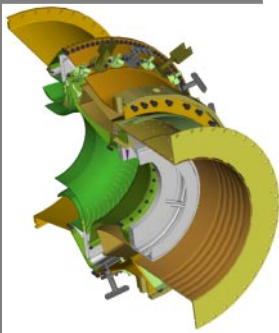
# Outline of Capabilities Turbo-Machinery

Phoenix Analysis & Design Technologies (PADT) is a growing and diverse mechanical engineering services provider that delivers world class solutions to a variety of industries. However, the company has also established itself as a leading deliverer of Turbo-Machinery related services. The majority of PADT's experienced staff members came to the company from the turbo-machinery industry and they continue to develop their skill by providing design, simulation, prototyping, and productivity enhancement solutions to several leading companies in the industry. The purpose of this document is to provide a high-level overview of the company's capabilities in this critical area and to serve as a starting point for further discussions on how we can help you:

## Design

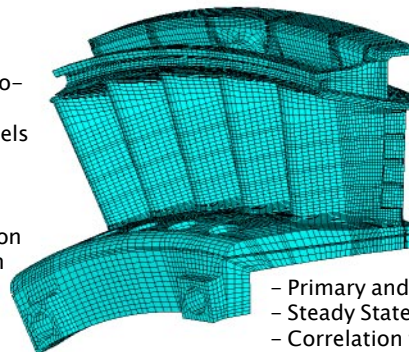
- **3D Solid Modeling**
  - Blades, Disks & Shafts
  - Static Components
  - Parametric and Associative Models
  - Complex Surfaces
- **Component Design**
  - Cooled Turbine Blades
  - Fan & Compressor Blades
  - Impellers & Radial Turbines
  - Combustors
  - Frames
  - Mounts
  - Shafting
  - Radial, Face, Knife Edge & Other Seals
  - Cases

- Gear Boxes
- Ceramic Components
- **System & Assembly Design**
  - Externals Packaging
  - Rotating Group Couplings
  - Fan, Compressor, Turbine and Combustor Rigs
  - Ceramic Component Attachment Schemes
- **Drawings & Documentation**
  - Detail Drawings to Aerospace Specification
  - Assembly Drawings to Aerospace Specification
  - BOM's
  - Assembly Process Plans



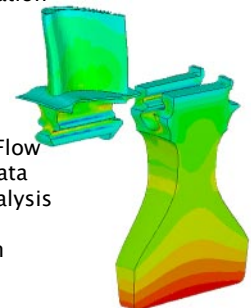
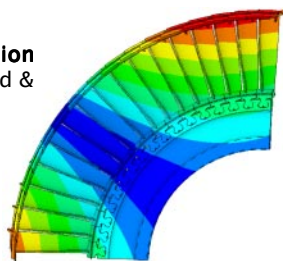
## Analysis & Simulation

- **Structural Analysis**
  - Stress on Rotating Components
  - Stress on Static Components
  - Cyclo-Symmetric Models with Non-Symmetric Loading
  - Deflection Analysis
  - Hot-to-Cold Conversion
  - 2D System Simulation
  - 3D Rotating Group Assemblies
  - Ceramic Components
  - Composite Components
- **Non-Linear Structural Analysis**
  - Plasticity
  - Creep
  - Single Crystal & DS Materials
  - Large Deflection
  - Contact
  - Bird and Ice Strike
  - FOD Damage
  - Containment
- **Vibration Simulation**
  - Blade Modes, Cold & Hot
  - Cyclo-Symmetric Modal Analysis
  - Strain Gage Locating
  - Correlation to Strain Gage Data



- Forced Vibration
- Random Vibration
- Pre-Stress Effects
- **Heat Transfer Analysis**
  - 2D Assemblies
  - 3D Components and Assemblies
  - 3D Internally Cooled Components
  - Heat Transfer Coefficients
  - Heat Generation
- Primary and Secondary Flow
- Steady State or Transient
- Correlation to Test Data

- **Other**
  - Ceramic Component Reliability
  - HCF and LCF Assessment
  - Model Building and Meshing
  - Hex Meshing
  - Shape Optimization of Most Components
  - Lean & Tilt Optimization
  - Rotor Dynamics
  - Cycle Counting
  - Burst Calculations
  - Overspeed Studies
  - CFD for Cooling
  - CFD for Secondary Flow
  - Post-Process CFD Data
  - Curvic Coupling Analysis
  - Testing Support
  - Test Data Reduction



*"We Bring  
Dimension to  
Your Ideas"*

Phoenix Analysis & Design Technologies

7755 S Research Dr.

Suite 110

Tempe, AZ 85284

Tel: 480 813-4884

Fax: 480 813-4807

www.padtinc.com

