

ANDREW J. HAMER, P.E. M.S.

EDUCATION

B.S., Mechanical Engineering, Virginia Polytechnic Institute, Blacksburg, VA, 1988

M.S., Mechanical Engineering, Virginia Polytechnic Institute, Blacksburg, VA, 1989

THESIS

Hamer, A. J., *The Use of Chemiluminescence for Light-off Detection of Flames*
Virginia Polytechnic Institute & State University, September 1989

PROFESSIONAL EXPERIENCE

Vice President and Principal Engineer, Combustion Science & Engineering
Columbia, MD 1998 to present

- Responsible, along with my partner, for developing and directing CSE's engineering services business (ESB). ESB is responsible for the application of commercial computational fluid dynamic codes (CFD) to engineering analyses and component design. Power generation devices investigated include gas turbine combustion systems, rotating components and exhaust systems. These include: predicting emissions by incorporating reduced chemical kinetic mechanisms into liner reacting models, transition piece cooling schemes, transition piece exit profile predictions, developing gaseous radiation methodologies, low btu syngas liner redesign, fuel injector analysis and design, swirler analysis and design, pre-mixer development, flow sleeve redesign for flow control, catalytic combustion system pre-burner redesign. Rotating component analyses include nozzles, buckets, investigation of cavity flows, anti-swirl devices, and moving mesh transient blade/nozzle interactions. Exhaust system analyses identify component losses and loss mechanisms and then reduce losses through component redesign.

Senior Engineer, Hughes Associates, Inc. 1994 - 1997
Baltimore, MD

- Responsible for the application of commercial computational fluid dynamic codes (CFD) to fire and combustion engineering problems. Combustion applications include designing a gas turbine combustion premixer for the Department of Energy's Advanced Turbine System, analysis of an oxidizing chamber for a fire gas analysis instrument, and determining thermal response of various insulation materials to thermal loadings. Fire related applications include modeling pool fire in warehouse to determine sprinkler response, modeling atrium smoke control system, modeling the effect of hull shape on smoke movement aboard a submarine mock-up, investigation of turbulence constants effect on thermal plume temperature and velocity profiles.
- Responsible for test program to acquire Underwrites Laboratory Listing for client's halon alternative agent and hardware. Responsible for Naval Research Laboratory experimental test program to reduce fire-fighter trainer emissions by premixing air with fuel system. Performed fire hazard analyses for the Department of Energy.

Combustion Engineer, GE Power Generation 1989 to 1994
Schenectady, NY

- Responsible for analysis and design of gas turbine combustion components. Supported aerothermal needs of combustion engineering. Developed a data reduction/visualization system for combustor exit temperature profiles. Lead Combustion Engineer for implementation of computational fluid dynamic (CFD) codes into Combustion Engineering Group. Trained six combustion engineers in use and application of a commercial CFD code. Used CFD codes to analyze transition pieces, flow sleeves, venturi's, fuel nozzles, and air swirlers.
- Responsible for improving combustion design and analysis methods. Ported VAX FORTRAN to Hewlett Packard UNIX workstation. Modified existing FORTRAN code to improve the design link between the aerothermal/heat transfer and mechanical design groups.
- Developed FORTRAN code to ease the creation of finite element and CFD meshes for gas turbine combustion components. Performed finite element thermal and stress analysis on transition pieces, venturi's, and nozzle bars. Analyzed failure modes, material changes and effects of manufacturing tolerances on part's lives.
- Developed a chemiluminescence based fiberoptic probe to examine flame spectral for determining flame ignition, machine transfer, and flame equivalence ratio (temperature). Supported five field tests by monitoring dynamic pressures, emissions, metal temperatures, ignitions, and transfers. Headed task force to determine water injection tolerances for NOx abatement and power augmentation.

PROFESSIONAL REGISTRATIONS

- **Registered Professional Engineer**, Mechanical Engineering, License Number 23202 (Maryland 1998).