



# **Professional Analysis and Consulting , Inc.**

**Craig E. Heathco, P.E.**

**Senior Engineer**

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## **Summary**

Over fifty years' experience in gas turbine design and development that encompasses; aviation, industrial, marine and advanced military markets. Successfully taken a broad range of commercial and military programs from initial concept through development and into production. Gas turbine experience extends from 40 horsepower APU's up to 10-megawatt propulsion systems with a diversity of applications from stationary power generation to supersonic flight.

## **2022-Present Professional Analysis and Consulting, Inc.**

Senior Engineer. Experience with system safety, which includes: designing to appropriate airworthiness standards, analysis and development testing to obtain commercial or military certifications, establishing repair/overhaul processes and monitoring fleet safety in the field. Frequently involved in accident investigations, engine teardown inspections, failure analysis and reporting.

## **2014-Present New Centerline Design, LLC**

Principal Engineer. New Centerline Design is actively developing advanced gas turbine technologies and turbine-based hybrid-electric propulsion systems to provide dramatic improvements in fuel efficiency for next generation aerospace and power generation applications.

## **1998 – 2014 Rolls-Royce Corporation / Rolls-Royce North American Technologies**

2012-2014 Senior Staff Engineer, Defense Engineering

Directed technical efforts for 501-MT5S engine for the next generation Navy destroyer gen-sets and the 501-KB8 engine for energy markets. Developed strategies for advanced directed energy systems for land, sea and airborne applications. Led technical and safety audits for development and advanced technology programs.

2008-2012 Senior Staff Engineer, Future Programs

Primary responsibilities involved developing advanced propulsion concepts to address future commercial and military market requirements including the generation of program plans and technical proposals. Also responsible for conducting technical reviews and audits of existing advanced technology programs to ensure product integrity and safety.

2005-2008 Chief Engineer, High Mach Engines

Directed the design and development of a super-sonic turbine engine for the RATTLS missile program. This all new, high technology engine-initiated

development testing in 2008. Managed a diverse engineering team through the design, fabrication, and test phases of the program to deliver a Mach 3+ capable engine.

2003-2005 Senior Staff Engineer, Helicopter & Small Gas Turbines

Reviewed new customer applications and directed proposal activities to provide products and programs which satisfied these initiatives. Supported flight safety activities and served as technical lead for Model 250 engine investigations.

2002-2003 Chief Design Engineer, Helicopter & Small Gas Turbines

Led the small engine design group which developed and certified several T800 and Model 250 turboshaft engine derivatives. Oversaw the technical, in-service support for over 20,000 Model 250 engines, to include product safety initiatives and investigations.

1999- 2002 Director of Engineering, Energy and Marine Operations

Responsible for all engineering related to industrial gas turbine projects for Rolls-Royce Indianapolis Operations. Managed research and development teams, which supported a wide range of gas turbine products for various Energy, Marine and Vehicular applications. Delivered on technical and financial performance for the engineering organization and directed product safety activities for Energy and Marine products.

1998-1999 Chief Engineer, Industrial Engines

Managed design, development, and field improvement programs for several industrial gas turbine products. Led engineering activities for the model 601 program, a world-wide joint venture, and coordinated design and test functions with partners in Asia and Europe. The 601 engine entered service in 1999 with both industrial and marine applications.

**1971-1998 Allison Engine Company / General Motors, Allison Division**

1993-1998 Chief Engineer, Allison Mobile Power Systems (AMPS)

Responsible for organizing a new product group tasked with expanding Allison's gas turbine product line to encompass small, highly efficient auxiliary power units and turbogenerators. AMPS was chartered by the division to select and mature innovative CAD/CAM and rapid prototyping methods to reduce development costs and lead time. The AMPS group successfully qualified a small, under armor APU for General Dynamics' M1 Abrams main battle tank, which went from a clean sheet of paper to running prototype in 14 months.

1986-1993 Design Supervisor, LHTEC Program

Oversaw design activities for the LHTEC T-800 turboshaft engine program, a joint venture between Allison and Honeywell. Directed the Allison design staff and coordinated core and external design elements with our Honeywell partner. LHTEC successfully completed the design, development, and qualification (both FAA certification and Army qualification) of the T-800 in 1992 for the Army's Comanche helicopter program.

- 1981-1986 Supervisor, Small Engine Design  
Managed the design group responsible for Model 250 engine development programs. The small engine design team also supported a variety of in-service and flight safety activity. Personally led design and test activities for the Model 250-C20R turboshaft, which culminated in the successful certification of the 250-C20R engine in 1986.
- 1979-1981 Senior Project Engineer  
Responsible for analysis of Model 250 turboprop and turboshaft field service data and developing technical solutions to improve engine reliability and safety. Managed the change validation process and the release and implementation of these changes into the field.
- 1977-1979 Project Engineer  
Responsible for the mechanical design, analysis and test of the Lamilloy combustor for the TF-41 turbofan engine used in the A-7 Corsair.
- 1976- 1977 Design Engineer  
Provided mechanical design and analytical support for a variety of components during the initial design, development, and flight test of the Model 250-C28 and C30 turboshaft engines.
- 1971- 1975 Co-Op Student  
Various technical and production assignments while attending General Motors Institute.

## **ACADEMIC**

BSME            General Motors Institute - Kettering University  
Flint, Michigan 1976

## **PROFESSIONAL REGISTRATION AND AFFILIATIONS**

- Professional Engineer, State of Indiana (License No.: PE11100313)
- American Helicopter Society
- NASA Transformative Vertical Flight, Working Group Partner

## **PROFESSIONAL SOCIETY REPORTS AND PRESENTATIONS**

- Installation Requirements for Small Gas Turbine Engines  
ASME Beijing Exposition, September 1-10, 1985, Beijing, China
- Tilt Rotor Requirements on Engine Design and Qualification  
AHS Technical Specialists Meeting, September 21, 1989, New Bern, South Carolina
- CR601-K9 Gas Turbine Development  
13<sup>th</sup> Symposium on Industrial Applications of Gas Turbine Engines  
October 13, 1999, Calgary Alberta, Canada

- Advanced Technology for Turboshaft Engines  
AHS Propulsions Specialists Meeting, October 28, 2003, Williamsburg, Virginia
- Rolls-Royce World Engine Program  
AHS International Annual Forum May 10, 2006, Phoenix, Arizona
- Gas Turbine Optimization for UAS using Heat Recovery and Power Transfer  
AHS Propulsion Specialists Meeting, October 30, 2019, Hampton, Virginia
- Recuperator for Model 250 Engine  
AIAA SciTech 2020 Forum, January 10, 2020, Orlando, Florida
- Optimizing Turbogenerators for Hybrid-Electric Applications  
Vertical Flight Society, 77<sup>th</sup> Annual Virtual Forum, May 14, 2021

## **PATENTS**

### Issued

- 4,860,534 Inlet Particle Separator with Anti-Icing Means
- 8,186,168 Thrust Balance of Rotor Using Fuel
- 9,109,539 Turbine Based Combined Cycle Engine
- 9,261,019 Variable Cycle Gas Turbine Engine
- 9,617,868 Gas Turbine Engine Variable Geometry Flow Component
- 9,915,201 Aircraft Power System
- 9,915,202 Gas Turbine Engine Heat Exchanger System
- 9,982,676 Split Axial Centrifugal Compressor, Variable Ratio
- 10,329,943 Split Axial Centrifugal Compressor

### Applications in Process

- 20110154805 Power Augmentation System for an Engine Powered Air Vehicle