

ELIAS Y. AZZI, Ph.D

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TECHNICAL SUMMARY

Environmental/Thermal Systems Lead Engineer with 28 years of experience. Comprehensive knowledge and experience in active and passive thermal analysis, fluid mechanics, systems integration, mathematical modeling, and computational fluid mechanics. Proficient in using thermal analysis software packages namely SINDA, Thermal Desktop, & ICEPAK. Developed acoustic analysis software which was marketed by NASA COSMIC library. Received the silver Snoopy award. Finalist for the Rotary National Award for Space Achievement Foundation's prestigious Stellar Award. Have received outstanding/excellent ratings on personal performance appraisal every year. Dedicated to technical excellence and achievement of organizational goals.

EDUCATION

Doctor of Mechanical Engineering, May 1990

Master of Science Mechanical Engineering, March 1986

Bachelor of Science Mechanical Engineering, March 1985

Louisiana Tech University, Ruston, Louisiana

EXPERIENCE

Lockheed Martin / Lead Engineer, Thermal Systems / August 1990 to Present

Lead Engineer/General Responsibilities:

- Assigned as a lead for the thermal/environment systems and payloads for the components in the forward bay compartment, docking hatches, and CM side hatch of the ORION space Vehicle. Perform/Lead the development of the thermal models for these components for EFT1 and EM1 Missions.
- Assigned as a lead for the thermal/environment systems and payloads for the logistic, propulsion, Habitat, and Air lock modules of the new space station around the moon (Next Step project).
- Assigned as a lead for the thermal/environment systems and payloads for several shuttle/ISS Missions. Perform/Lead the development of the thermal models for these Missions to generate launch-to-activation (LTA)/Stage analyses.
- Evaluated all thermal/environmental systems issues for Spacelab missions and Space Station Racks, participated in decision-making meetings and Critical Design Reviews, and coordinated verifications activities.
- Supervised the thermal design and generated the thermal analysis and acoustic noise control and analysis plans for the Human Research Facility rack currently working in the ISS US laboratory.
- Successfully performed an effective thermal management scenario of space flight hardware to compensate for degraded performance. These real-time findings enabled the preservation of all science requirements.
- Provided technical knowledge to support real time operations in the Payload Operations Control Center during STS-58 and STS-71 Missions.
- Provided effective customer support by solving problem in the middle of the night in high-pressure situation.

Specific Assignments:

- **Spacelab Life Sciences Missions and Human Research Facility (HRF) Thermal/Environmental System:** Supervised and performed the Integrated Thermal/Environmental System analysis for Spacelab Module and HRF Rack. Developed SINDA-based thermal models. This assured astronauts' safety and hardware reliability.
- **Electronics Hardware:** Supervised and performed the thermal and flow analyses of several electronics hardware items to determine the temperature, heat load, flow rate, and pressure drop distribution. SINDA and IcePak software were used. Trade study to optimize the design and fail safe analysis to ensure reliability and safety were also performed.
- **Fluid Loop Piping Design:** Designed and analyzed water and air loops to provide cooling for electronics hardware. The design includes pumps, heat exchangers, fittings, and control valves. Analytical models were developed to determine the fluid flow rates, pressure drops, sizing of pipes and accumulators, leakage assessment, line condensation, and insulation requirements
- **Consumable Analysis:** Supervised and performed the analysis to determine module CO₂ concentration levels and other consumables for Spacelab Life Sciences missions.
- **Potential Flow Analysis of the Spacelab Habitable Cabin:** Studied the interaction of the refrigerator/freezer duct airflow with the Spacelab cabin air flow. A computer program was developed to evaluate the velocities and streamlines profiles.
- **Fluid and Vacuum Analysis:** Analyzed and designed fluid and vacuum systems for aerospace applications.
- **Acoustics Analysis of the Spacelab Habitable Cabin:** Developed a computer program to obtain the composite noise profile using reverberant and direct fields. This program was subsequently used by other companies for their own acoustic analysis, superseding their own previous programs.
- **Software used:** Gaski SINDA, SINDA Fluint, Thermal Synthesizer System (TSS), Thermal Desktop, IcePak, Microsoft Office, and familiar with EASY5.

PUBLICATIONS

- Developed an acoustics software package which was marketed by COSMIC. This was submitted to NASA as a new technology report.
- "Heat Transfer in a Cryosurgery Probe Tip," American Society of Mechanical Engineers Annual Meeting, Dallas, November 1990.
- "Heat Transfer in a Cryosurgery Probe Tip Cavity," Doctoral Dissertation, Louisiana Tech University, May 1990.
- "Potential Flow Analysis in the Spacelab Habitable Cabin," NASA Technical Briefs. Submitted as a new technology report.
- Paper Presentation: "Potential Flow Analysis in the Spacelab Habitable Cabin," 16th Annual Technical Symposium of the American Institute of Aeronautics and Astronautics (AIAA), University of Houston, Clear Lake, May 1991.

HONORS

- Received the "Silver Snoopy" award from NASA in special ceremony headed by a NASA Astronaut. This award is given to less than 1% of top engineers for making significant contributions to the space program.
- Finalist for the Rotary National Award for Space Achievement Foundation's prestigious Stellar Award.
- Space Act Award, certificate of recognition from NASA for the creative development of a technical innovative paper entitled "Potential Flow Analysis in the Spacelab Habitable Cabin."
- Space Act Award, certificate of recognition from NASA for the creative development of a technical innovative program to determine the composite noise profile in three dimensions. This program is entitled "General Electric Acoustics Analysis Program (GAAP)."
- Four "Certificate of Achievement" awards from GE Government Services for outstanding performance in support of Systems Engineering group.
- Member, Pi Tau Sigma Mechanical Engineering Honor Society, and Pi Tau Epsilon Mathematical Honor Society.
- "Who's Who in American Colleges and Universities" for excellent academic achievements.

ACADEMIC EXPERIENCE

- **College of the Mainland, Texas City, Texas / Fall 2005 to Fall 2009**
- Adjunct Professor, Mathematics
- **Texas Southern University, Houston, Texas / Fall 2002 to Fall 2014**
- Adjunct Professor, Mathematics
- **San Jacinto College, Pasadena, Texas / Fall 2001 to Spring 2001**
- Adjunct Professor, Mathematics
- **Grambling State University, Grambling, Louisiana / January 1989 to June 1990**
- Adjunct Professor, Mathematics
- **Louisiana Tech University, Ruston, Louisiana / June 1985 to June 1990**
- Teaching Assistant, Department of Mechanical Engineering
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- **Major Subjects Studied:** Advanced Heat Transfer, Heat Exchanger Design, Fluid Mechanics, Advanced Engineering Dynamics, Advanced Mathematical Modeling & Computational Techniques, Viscous Flow, Engineering Acoustics, Cryogenic Systems, Solar Energy Design, Design Optimization, Manufacturing Processes, Materials of Engineering, Analysis of Structure (Frames, Plates & Shells), Instrumentation & Automatic Process Control.
- **Minor Subjects:** Mathematics (4.0/4.0 in math courses, an equivalent to a Master's Degree in Mathematics, 42 credits). Programming courses in STRUDL, ALGOR, SINDA, IcePak, TRASYS, IDEAS, AND NASTRAN.
- **Thesis Topic:** Design Review of Vuilleumier Refrigeration System (Cryocooler Refrigeration) Including the Thermodynamics Analysis of The Ideal and Real Cycles.
- **Dissertation Topic:** Heat transfer in a Cryosurgery probe tip which includes hydraulic and thermal analysis in inner tube, outer tube, and a cavity.
- **Training Received:** SINDA and IcePak courses, Total Quality Management, Team Building, Spacelab Systems, Payload Operations Flight Controller, and Introduction to C Programming.

LANGUAGES

Fluent in English, Arabic, and familiar with French

U.S. security clearance has been obtained

REFERENCES

Furnished upon request