

# Helicopter Health Monitoring and Failure Prevention Through Vibration Management Enhancement Program

**Victor Giurgiutiu\***

Department of Mechanical Engineering, University of South Carolina, Columbia,  
SC, 29212, USA  
[victorg@sc.edu](mailto:victorg@sc.edu)

\*Corresponding author:

**Paul Grabill and Dariusz Wroblewski**

Intelligent Automation Corporation, 10299 Scripps Trail, PMB 231, San Diego, CA 92131, USA

**Lem Grant**

South Carolina Army National Guard, Army Aviation Support Facility 1325,  
South Carolina Road, Suite 41, Eastover, SC 29044-5041, USA



Dr. Victor Giurgiutiu graduated from Imperial College of Science, Technology, and Medicine, London University, England, in 1972 with a BSc (Eng.) in Aeronautics. He received a Ph.D. in Aeronautical Structures from the same Imperial College in 1977, with the dissertation titled "Vibrations and Dynamic Stability of Rotor Blades". For the next 15 years, he worked in Romania on aeronautical teaching and research, being connected with the building of several fixed and rotary wing aircraft, under British and French license, as well as of Romanian design. From 1992 till 1996, he worked as Visiting and then Research Professor at Virginia Polytechnic Institute and State University. Presently, he is tenure-track Associate Professor in the Department of Mechanical Engineering at the University of South Carolina. He maintains a broad interest in many areas of applied mechanics with special focus on active materials, smart structures, and structural health monitoring for damage detection, failure prevention, condition base maintenance, life-cycle cost reduction, and life extension.



Paul Grabill is a graduate of the University of Cincinnati receiving his BS (86) and MS (92) from the Department of Mechanical Engineering. While at UC he worked at the Structural Dynamics Research Laboratory where his post-graduate work was sponsored by the NASA Center for Space Systems Health Management. Paul worked for 10 years at GE Aircraft Engines where he performed vibration analysis and field vibration testing of marine, industrial, and aircraft gas turbines. Paul has worked on helicopter vibration diagnostics over the past 8 years while at Scientific Atlanta, Signal Processing Systems, and now Intelligent Automation Corporation. He has developed portable and on-board vibration monitoring equipment currently in use by the US Army, Navy, and commercial airlines.



Dariusz Wroblewski received M.S. degree in Physics from the Warsaw University, Warsaw, Poland, and Ph.D. degree in Electrical Engineering from the University of Wisconsin-Madison, Wisconsin, USA, in 1984. He held research positions at the Johns Hopkins University and the Lawrence Livermore National Laboratory, where he worked on the physics of high-temperature thermonuclear plasma. His contributions to the development of specialized spectroscopic diagnostics for measurement of plasma internal magnetic field resulted in major advances in the understanding of magnetic confinement of plasma. Presently, Dr. Wroblewski is Chief Scientist at Intelligent Automation Corporation in San Diego, California, where he specializes in development of numerical methods for modeling of complex systems. His recent work has dealt with applications of artificial intelligence methods to problems in machine health monitoring, medical diagnostics, bio-informatics, and monitoring of biological systems.



CW5 Lem Grant, commissioned in 1968, is a member of the South Carolina Army National Guard (SCARNG). He has over 34 years of experience with the military, flying and maintaining helicopters, to include a tour in Vietnam, Operation Desert Shield and Operation Joint Endeavor. His awards include the Distinguished Flying Cross with second Oak Leaf Cluster, the Bronze Star, 54 Air Medals, the Army Commendation medal and the Vietnam Presidential Unit Citation. He graduated from Georgia State University with a BS in Criminal Justice. Presently, he is the State Aviation Maintenance Officer for the SCARNG, and a Maintenance Test Flight Examiner/Instructor Pilot at the Army Aviation Support Facility. His diverse background covers vibration analysis, machine prognostication, and vibration diagnostics.

