Technical Staff

CSA Engineering

CONOR D. JOHNSON

President
Principal Engineer

Ph.D., Engineering, Clemson University
M.S., Engineering Mechanics, Clemson University
B.S., Engineering Mechanics, Virginia Polytechnic Institute

Vibration Suppression Technologies and Applications · Contract and Technical Management

Dr. Johnson has overall management responsibility for the operation of CSA Engineering and technical and contract responsibility for specific projects. He is responsible for leading and directing research, development, and applications in the field of vibration suppression. Dr. Johnson has been a leader in the development, design, analysis, and application of passive vibration suppression. He was instrumental in the development of the modal strain energy method for finite element design of damping treatments. He has designed damping and isolation systems for a large number of structures in the aircraft, space, marine, automobile, electronics, and commercial industries. He has been fundamental in the development of whole-spacecraft vibration and shock isolation. Dr. Johnson is an author of over 35 technical papers and numerous technical reports. He holds four patents. He has taught various topics at ten short courses, is a member of three technical societies and a Registered Professional Engineer. He has been Technical Director and Chairman of five major conferences and is a member of the ASME Adaptive Structures and AIAA Structural Dynamics technical committees and the advisory board for the ESM Department at VPI&SU.

DAVID A. KIENHOLZ

Vice President
Principal Engineer

Ph.D., Mechanical Engineering, Stanford University
M.S., Mechanical Engineering Mechanics, Stanford University
B.S., Mechanical Engineering, North Dakota State University

Structural Dynamics · Experimental Methods · Product Development

Dr. Kienholz is in charge of dynamic testing and is responsible for CSA's laboratory facilities. He supports numerous projects in the areas of structural dynamics, vibrations, experimental methods, and motion control. He routinely has responsibility for projects involving product and system development, dynamic testing, troubleshooting, and vibration suppression. He was a co-developer of the Modal Strain Energy method now used throughout aerospace and other industries for analytical design of integrally damped structures. He has taught university and private courses on vibration and dynamic testing. He designed and led the development of a magnetically damped passive isolation system now in use for Space Shuttle science payloads. He invented and led the development of a unique suspension system for simulating zero-gravity conditions in dynamic testing. That work received the 1995 Space Simulation Award from the Institute for Environmental Sciences and was recognized in 1996 as an Air Force SBIR Success Story. Dr. Kienholz was the principal investigator in the development of several advanced vibration isolation systems, both passive and active, including the Airborne Stabilization/Vibration Isolation System (AS/VIS) and the Optical Bench Isolation System (OBIS), both for the Air Force Airborne Laser program. Dr. Kienholz is the author or coauthor of 20 technical papers and holds four patents. He is a member of the ASME and SAE.

ERIC H. ANDERSON

Vice President
Principal Engineer

Ph.D., Aeronautics and Astronautics, MIT
M.S., Aeronautics and Astronautics, MIT
B.S., Aeronautics and Astronautics, MIT

Structural Dynamics · Experimental Methods · Product Development

Dr. Anderson's technical expertise is in active systems, including actuation and control systems for motion control, vibration suppression and vibration isolation. He began working in structural dynamics and active vibration control in 1984. At both MIT and JPL he participated in research that helped initiate work in "smart structures." At CSA he has emphasized the integration of transducers and electronic and software control systems in hexapods and other products. Dr. Anderson led teams that developed the SUITE piezoelectric-based hexapod, systems to cancel cryocooler-induced vibrations, and a vibration-isolated workstation product for the semiconductor industry. He has analyzed fatigue and modeled the effects of damage in helicopters, written embedded code for feedback and feedforward control, fabricated composite structures, developed magnetorheological (MR) devices for automotive applications, performed modal tests, and designed and integrated power amplifiers. He is co-author of over 50 technical papers and inventor on 4 patents. He serves on the Adaptive Structures technical committees of AIA and ASME and is a member of IEEE and SAE.

ROSS M. BLANKINSHIP

Principal Engineer

B.S., Astronautical Engineering, USAF Academy

Control Systems · Adaptive Optics - Wavefront and Jitter Control · Active Systems

Mr. Blankinship has 27 years of experience in control system design and analysis. In the Air Force, he analyzed inertial navigation systems at the Central Inertial Guidance Test Facility at Holloman Air Force Base, New Mexico. In 16 years at Lockheed-Martin, he was lead controls engineer for several BMDO and SDIO programs and was responsible for design and analysis of wavefront and jitter control systems. As a member of the team composed of Lockheed, Honeywell, and CSA Engineering he designed the structural control system for the Space Integrated Controls Experiment (SPICE) at the Phillips Laboratory at Kirtland Air Force Base, New Mexico. He designed and analyzed the beam and isolation control systems in the concept development phase of the Airborne Laser program. His effort in the Alpha-Lamp Integration program was key to successful demonstration of closed-loop control of a high-energy laser beam at the TRW Capistrano Test Site, California. He continues to support the Airborne Laser and Space-Based Laser programs, the PowerSail program at AFRL, as well as research into active isolation systems.

Technical Staff

CSA Engineering

BRADLEY R. ALLEN

Associate Principal Engineer

M.S., Mechanical Engineering, Santa Clara University
B.S., Mechanical Engineering, U. of Cincinnati

Experimental Methods · Dynamic Testing · Vibration Suppression Design

Mr. Allen is a lead engineer in the dynamic testing group at CSA Engineering. He regularly manages and performs dynamic testing, experiment design, and diagnostic testing services at CSA Engineering. Mr. Allen is responsible for directing efforts on dynamic tests in the field and at CSA's facilities, on vibration isolation and damping design projects, and on many commercial diagnostic or design efforts. Mr. Allen designed CSA's viscoelastic material test system and is a lead engineer in designs using polymer or specialty materials at CSA. Mr. Allen also specializes in shock testing and design. Analytical codes written by Mr. Allen include simulations of chatter in polishing systems, codes to predict machine positioning error due to floor vibration, and stability and error rejection predictions for single and multivariable control systems. Mr. Allen's graduate work at Santa Clara specialized in dynamics and controls.

JAMES C. GOODDING

Associate Principal Engineer

M.S., Theoretical and Applied Mechanics, University of Illinois
B.S., Mechanical Engineering, Case Western Reserve University

Dynamic Testing · Structural Dynamics & Vibration · Modal Testing · Structural Modeling and Identification

Mr. Goodding leads CSA's test activities in New Mexico and has supported numerous Air Force, BMDO and Sandia National Laboratory structural dynamic testing programs. For Sandia, he has performed work on damage detection, wind turbine fatigue, satellite sensors, flight qualification tests, and general dynamic and modal testing. Mr. Goodding was the test director, and performed two large-scale modal tests in support of the SPICE program at Kirtland AFB, which demonstrated an unprecedented 100-to-1 attenuation in far-field line-of-sight jitter. He has performed structural dynamic tests, in-flight tests, and component modal tests on the Argus KC-135 aircraft photo-documentation system, ABLE ACE, and HABE. He is an experienced user of LMS Cada-X data acquisition and modal parameter estimation software, Matlab and Data Acquisition Toolbox, and I-Deas test analysis software.

JOSEPH R. MALY

Associate Principal Engineer

M.S., Applied Mechanics, Stanford University
B.S., Mechanical Engineering, University of Cincinnati

Vibration Damping / Isolation Design · Structural Dynamics Analysis · Test / Analysis Correlation · Viscoelastic Materials

Mr. Maly leads development of passive damping and isolation systems at CSA, specializing in designs with viscoelastic materials and applications of finite element analysis. Experienced in both analytical and experimental methods of structural dynamics, Mr. Maly has built vibration suppression into space structures, aircraft, medical equipment, and semiconductor manufacturing equipment. He managed development of the solar array dampers for Hubble Space Telescope and the ARGUS airborne optical system. He has designed numerous tuned-mass dampers, including a magnetic damper for the F/A-18 vertical tail and a 350-lb damper for a multi-ton optical system. He has performed complex stiffness tests of isolators and viscoelastic systems for correlation with analytical models. Currently, Mr. Maly is managing the EELV Secondary Payload Adapter - ESPA - program and working with cocured viscoelastic/composites for space structures.

MARK E. MIMOVICH

Associate Principal Engineer
New Mexico Operations Manager

M.S., Mechanical Engineering, University of New Mexico
B.S., Mechanical Engineering, University of New Mexico

Structural Analysis · Space Systems · Composite Structures · Structures for Optics

Mark has 17 years experience in the fields of analytical structural mechanics and dynamics, dynamic structural testing, and test-analysis correlation. Past experiences include design and analysis of highly stable structures such as telescope metering structures, optical benches, antenna/reflectors, and optics using advanced composite materials, structural dynamic qualification testing of space-based hardware, control-structure interaction for advanced acquisition, tracking, and pointing systems, and programmatic and technical functional management. As Manager of the Engineering Analysis group at Composite Optics, Mark was responsible for a team of 14+ analysts supporting all in-house engineering analysis activities in the Instrument, Antenna, and Spacecraft Structures business areas. Prior to that, Mark worked on-site at AFRL in Albuquerque in support for a variety of programs such as the Advanced Composite Iso-Grid Stiffened Shroud program, the High Altitude Balloon Experiment (HABE), the Space Integrated Control Experiment (SPICE), and ABLE ACE.

PAUL S. WILKE

Associate Principal Engineer

M.S., Engineering Mechanics, Santa Clara University
B.S., Mechanical Engineering, San Jose State University

Vibration Damping / Isolation Design · Structural Dynamics Analysis · Test / Analysis Correlation · Viscoelastic Materials
Vibration Suppression · Finite Element Methods · Modal Testing & Correlation · Structural Dynamics

Mr. Wilke is head of CSA's launch vibration isolation group focusing on whole-spacecraft vibration and shock isolation for several launch vehicles and spacecraft. He has successfully completed six isolation flight-hardware programs and is currently developing vibration and shock isolation system hardware for several launch vehicles. Mr. Wilke has received three United States patents in the area of whole-spacecraft vibration and shock isolation. He has extensive experience in finite element modeling, coupled loads analysis, passive damping and isolation design, and isolation hardware design and testing. Mr. Wilke is the co-author of 22 technical papers on passive damping and isolation and is a member of AIAA and ASME.

Technical Staff

CSA Engineering

MICHAEL E. EVERT

Senior Engineer — **B.S., Mechanical Engineering, University of Colorado**

Active Systems · Electromechanical Devices · Vibration Suppression · Product Development · Mechanical Design

Mr. Evert's primary responsibilities involve development of new concepts for mechanical and electromechanical systems, and translation of those concepts into detailed designs and physical hardware. He has been responsible for design and integration of space flight hardware and systems for ground test of space flight components in addition to several of CSAs hexapod products. He is also product manager and lead engineer for CSAs SA series electromagnetic actuator product line. Mr. Evert designed several compact actuators for vibration cancellation. He designed and qualified a large facility level (200 tons+) optical bench for use in vacuum testing of space flight systems. He performed pneumatic and mechanical integration of a large-scale active-passive isolation/ suspension system for airborne applications. He has experience in mechanical design, finite element modeling, and numerous CAD software packages.

BRYCE L. FOWLER

Senior Engineer — **M.S., Mechanical Engineering, San Jose State University**; **B.S., Mechanical Engineering, U. of California, Santa Barbara**

Engineering Software · Structural Analysis · VEM Characterization · Structural Optimization

Mr. Fowler is trained as a mechanical engineer and has acquired extensive software skills. He has engaged in basic research on characterization of visco-elastic materials and has written software for characterization and database management of these materials. He has performed finite element analysis on diverse problems, from an implantable mechanical medical device to airframe structures. He has written programs on many different platforms, operating systems, and programming languages, including programs for graphic display, data conversion, and numerical analysis. He is experienced in real time control using DSPs and VME processors running VxWorks. He has written and co-authored 10 professional papers on passive damping. Mr. Fowler is a member of ASME.

LESLIE P. FOWLER

Senior Engineer — **M.S., Mechanical Engineering, Virginia Tech**; **B.S., Mechanical Engineering, Virginia Tech**

Active Systems · Control Systems Design · Precision Motion Control · Real-Time Prototyping

Ms. Fowler is responsible for control system design, modeling, and real-time experimental control system prototyping. Most recently she has developed adaptive feedforward control systems for jitter rejection in optical systems including those on the Airborne Laser and Aerospace Relay Mirror System. She has experience with active feedforward vibration control for time-periodic systems, specifically minimization of aeroelastic disturbances on helicopter rotor blades. Recent efforts have also included offline and adaptive real-time system identification techniques for optimal actuator/sensor placement and reference selection. In 7 years at Lord Corporation, Ms. Fowler led the development of active and semi-active control system designs for semiconductor, precision isolation and motion control applications. Her most recent roles at Lord included Program Manager and Chief Engineer for the Lift Fan Shaft Monitoring System on the Joint Strike Fighter. Ms. Fowler is co-author of a dozen papers, inventor on 3 patents, a Licensed Professional Engineer, and an IEEE Senior Member. She has expertise in MATLAB, dSPACE, xPC Target, and ANSYS.

ROGER M. GLAESE

Senior Engineer — **Ph.D., Aerospace and Astronautics, MIT**; **M.S., Aeronautics and Astronautics, MIT**; **B.S., Aerospace Engineering, VPI&SU**

Structural Analysis · Control System Design · Vibroacoustics · Active Systems

Dr. Glaese is responsible for modeling, analysis and design of structures, control systems, and their interaction. He is experienced in advanced finite element techniques for structural modeling and in modern control system synthesis. He has developed models and techniques for vibroacoustic control and has demonstrated these methods on several sets of hardware. He has created control design models for a space flight experiment and implemented various optimal control algorithms on terrestrial systems using DSP's. Dr. Glaese has analyzed gossamer and membrane structures and the effects of gravity on the response of highly flexible structures. He has co-authored more than 20 papers in the fields of structural analysis, structural control, and active structural acoustics. He is a Senior Member of AIAA and member of the ASME and the Acoustical Society of America.

PAUL C. JANZEN

Senior Engineer — **M.S., Acoustics, Pennsylvania State University**; **B.S., Mechanical Engineering, The University of Texas**

Acoustics · DSP and Embedded Control · Active Systems · Finite Element Methods

Mr. Janzen is responsible for structural and acoustic analysis and active noise control at CSA. He has performed structural and acoustic analysis for active and passive noise control for launch vehicle fairings, vacuum-loaded panels, optical systems, and manufacturing equipment. Mr. Janzen's responsibilities at CSA also include the development and testing of software for embedded systems. He has developed software for embedded control of systems ranging from miniature optical devices to hydraulic-powered flight motion simulators. He also has experience in designing and implementing feedforward and feedback controllers for a variety of systems. Mr. Janzen is experienced in a number of engineering analysis packages, including I-DEAS, Patran, Nastran, Matlab, Autocad, Comet/Acoustics, and Sysnoise, and is experienced in several computer languages and operating systems.

RAMAN S. JOHAL

Senior Engineer — **M.S., Mechanical Engineering, University of California at Los Angeles**; **B.S., Mechanical Engineering, San Jose State University**

Coupled Loads Analysis · Active Vibration Suppression Systems · Vibration Isolation

The analysis, design, and optimization of spacecraft isolation systems are Mr. Johal's main responsibilities at CSA Engineering. He is currently involved in the development of whole-spacecraft isolation systems for single and multiple spacecraft on the EELV family of vehicles. His experience also includes the finite element modeling and analysis of space structures, including a Russian module for the International Space Station and several payloads launched on the

Space Shuttle. Mr. Johal was the lead dynamicist for a team that designed and built a satellite bus simulator. He also has performed trade studies for several theoretical damping formulations for Space Shuttle components. Mr. Johal is proficient in NASTRAN and DMAP and he has used this to create Craig-Bampton reduced math models and data recovery matrices. He is proficient in the use of I-DEAS FEM and Test packages and he is also knowledgeable in the use of MATLAB. Mr. Johal is a member of AIAA.

PAUL J. KEAS
Senior Engineer

Postgraduate Engineering Curriculum, Stanford and Santa Clara Universities
B.S., Electrical Engineering, Cal Poly, San Luis Obispo

Control Systems · Software Development · Flight Test Systems

Mr. Keas recently joined CSA after working for Orbital Sciences for several years. He supports the integration and test of control systems for aircraft instrumentation and flight experiments for Airborne Laser, Stratospheric Observatory for Infrared Astronomy (SOFIA), and morphing wing concept testing on the B-52. His focus at Orbital was work on the NASA/DLR SOFIA, where he had responsibility for control system, dynamic testing and damping evaluation and participated in wind tunnel testing. He developed models for the NASA Vertical Motion Simulator (VMS), a facility used for pilot training on vehicles ranging from helicopters to the Space Shuttle. At Rockwell Collins Flight Dynamics, he developed a simulator for rapid prototyping of heads-up display guidance control laws and symbology. He developed and flight tested optical sensor control systems for a NASA DC8 atmospheric research aircraft.

GREG V. MEHLE
Senior Engineer

Postgraduate Engineering Curriculum, University of Wyoming, Utah and UCSD
B.S., Mechanical Engineering, University of Wyoming

Advanced Composite Material Structures · Stable Platforms · Spacecraft, Launch Vehicle and Missile Systems

Mr. Mehle has 20 years experience in the fields of design, analytical structural mechanics, manufacturing, and testing of advanced composite structural systems. In his vast career, Mr. Mehle has specialized in the application of composite and metal structures for extreme environments (cryogenic and elevated temperatures). In addition, Mr. Mehle has extensive experience in technical management / direction for leading-edge technology development programs and has a demonstrated track record for developing and qualifying structural flight hardware as well as functioning as the Principal Investigator on SBIR and IRAD efforts. Mr. Mehle has had direct involvement and demonstrated success in new business development from customer marketing; cost/technical proposal preparation; and development of program statements of work, technical specification, and interface control definition.

SCOTT C. PENDLETON
Senior Engineer

M.S., Mechanical Engineering, San Jose State University
B.S., Aerospace Engineering, San Jose State University

Space Flight Hardware · Magnetic Circuit Design · Vibration Suppression Design / Testing · Product Development

Mr. Pendleton is experienced in the design, analysis, and testing of vibration suppression technologies for structures relating to aircraft, spacecraft, and semiconductor manufacturing equipment. Mr. Pendleton's expertise is in mechanical design, which includes viscous and magnetic eddy current tuned-mass dampers, piezoelectric actuators for active vibration isolation, and viscoelastic shear damping technologies. He has extensive experience with several CAD software packages and is well versed in using two- and three-dimensional magnetic boundary element modelers. Mr. Pendleton has been with CSA Engineering, Inc. for 10 years and has become a primary contributor to space flight hardware programs. Mr. Pendleton is currently managing several programs including the development of flight hardware launch isolation systems for attenuating high frequency shock loads to small and medium size payloads. Most notably, he was the lead designer for a solar array damper installed into the Hubble Space Telescope in March 2002 on Servicing Mission 3B. Mr. Pendleton has coauthored 6 technical papers and is a member of AIAA and SEM.

GREGORY E. SANFORD
Senior Engineer

M.S., Structural Mechanics, University of New Mexico
B.S., Mechanical Engineering, University of Wyoming

Structural Test Design · Component Design · Test Conduct

Mr. Sanford is part of CSA's New Mexico office and is based at Kirtland Air Force Base in Albuquerque, NM. He is responsible for the development and operation of a large structural test facility, including a multi-channel load controller and data acquisition system. This system is used to test a variety of launch vehicle structures. Previous experience includes the design, conduct, and supervision of all aspects of static and dynamic structural tests on space launch vehicles, ground support, and launch vehicle payloads. Additional responsibilities include mechanical design for a variety of aerospace applications including payload accommodation and ground test structures. Mr. Sanford also has extensive experience with materials characterization testing primarily in the field of composites. He is a member of SEM and AIAA.

CHRISTIAN "SMITTY" SMITH
Senior Engineer

Ph.D., Applied Mathematics, University of Southern California
Sc.B., Applied Mathematics, Brown University

Engineering Software · Structural Analysis · Electro-Optics · Structural Optimization

Dr. Smith's primary responsibilities at CSA include systems engineering, vibration isolation, magnetics design, and vibroacoustic noise suppression for optical systems. He has designed eddy current dampers for a variety of space and terrestrial based applications. These dampers have been integrated into vibration isolation systems for sensitive Space Shuttle payloads, tuned mass dampers for large solar arrays, as well as in a prototype MRI machine suffering from vibration-induced image degradation. He has designed various electromagnetic devices for active induced image degradation. He has designed various electromagnetic devices for active structural control including voice coil actuators, proof mass actuators, and stepper motors. Dr. Smith has also worked in image stabilization for airborne cameras. In addition to his core CSA responsibilities, Dr. Smith directs CSA's Airborne Laser related jitter suppression efforts and is CSA's quality assurance manager.