

# 2009 AIAA Journal Index

## How to Use the Index

In the Subject Index, pages 3047–3056, each technical paper is listed under a maximum of three appropriate headings. Note the locating number in boldface type preceding each paper title, and use that number to find the paper in the Chronological Index. The Author Index, pages 3057–3059, lists all authors associated with a given technical paper. The locating numbers are identical to those in the Subject Index. The Chronological Index, pages 3060–3069, also lists all papers by their locating numbers. This listing contains titles, authors and their affiliations, and volume, issue number, and page where the paper appeared. It also gives the AIAA paper number, if any, on which the article was based. The Book Review Index is listed on page 3069. Comments, Replies, and Errata are listed directly beneath the paper to which they refer. If the paper to which they refer was published prior to 2009, that paper also will appear in both the Subject and Chronological Indexes. Authors of Comments also are listed in the Author Index.

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**J09-216** Axisymmetric Synthetic Jets: An Experimental and Theoretical Examination

### **Hypersonic Flow**

**J09-003** Evaluation of Euler Fluxes for Hypersonic Flow Computations  
**J09-074** Planar Fluorescence Imaging and Three-Dimensional Reconstructions of Capsule Reaction-Control-System Jets  
**J09-143** Extension of a Multiscale Particle Scheme to Near-Equilibrium Viscous Flows  
**J09-210** Numerical Study of Mach 6 Boundary-Layer Stabilization by Means of a Porous Surface  
**J09-128** Three-Dimensional Simulation of the Electric Field and Magnetohydrodynamic Power Generation During Reentry  
**J09-208** Studies on Unsteady Shock Interactions Near a Generic Scramjet Inlet  
**J09-019** Procedure to Validate Direct Numerical Simulations of Wall-Bounded Turbulence Including Finite-Rate Reactions  
**J09-076** Using Pressure- and Temperature-Sensitive Paint on the Aftbody of a Capsule Entry Vehicle

**J09-203** Aero-Optic Distortion in Transonic and Hypersonic Turbulent Boundary Layers  
**J09-226** Shock-Train Structure Resolved with Absorption Spectroscopy Part II: Analysis and CFD Comparison  
**J09-225** Shock-Train Structure Resolved with Absorption Spectroscopy Part I: System Design and Validation

### ***Inlet, Nozzle, Diffuser, and Channel Flows***

**J09-243** Numerical Analysis of Film Cooling in Advanced Rocket Nozzles  
**J09-264** Initial Perturbation Amplitude of Liquid Sheets Produced by Jet-Impingement Nozzles  
**J09-241** Numerical Analysis of Three-Dimensional Flow of Supercritical Fluid in Cooling Channels  
**J09-145** Experimental Investigation of Unstart in an Inlet/Isolator Model in Mach 5 Flow  
**J09-246** Molecular Tagging Using Vibrationally Excited Nitric Oxide in an Underexpanded Jet Flowfield  
**J09-267** Hysteric Phenomenon of Underexpanded Moist Air Jet  
**J09-162** Shock-Wave/Boundary-Layer Interactions in a Model Scramjet Intake

### ***Jets, Wakes, and Viscid-Inviscid Flow Interactions***

**J09-074** Planar Fluorescence Imaging and Three-Dimensional Reconstructions of Capsule Reaction-Control-System Jets  
**J09-195** Mode Conversion in Acoustically Modulated Confined Jets  
**J09-273** Development of a High-Speed Three-Dimensional Flow Visualization Technique  
**J09-111** Large-Eddy Simulation of a Round Jet in Crossflow  
**J09-105** Role of Jet Temperature in Correlating Jet Noise  
**J09-258** Variable-Frequency Fluidic Oscillator Driven by a Piezoelectric Bender  
**J09-235** Experimental Studies on the Limiting Tab  
**J09-177** Large-Eddy Simulations of a Supersonic Jet and Its Near-Field Acoustic Properties  
**J09-104** Experimental Investigation of the Jets in Crossflow: Nonswirling Flow Case  
**J09-216** Axisymmetric Synthetic Jets: An Experimental and Theoretical Examination  
**J09-130** Instantaneous Flame Anchor Measurements Behind a Rearward-Facing Step  
**J09-221** Exploring Mechanisms of Fluidic Thrust Vectoring Using a Transverse Jet and Suction  
**J09-193** Experimental Investigation of Screech-Tone Characteristics of Jet Interaction with a Flat Plate  
**J09-139** Flowfield Downstream of Circular Cylinders Immersed Within Thick Boundary Layers  
**J09-231** Mach Wave Radiation from High-Speed Jets  
**J09-152** Smoke-Wire Flow Visualization in Separated Flows at Relatively High Velocities  
**J09-167** Planar Velocimetry of a Fin Trailing Vortex in Subsonic Compressible Flow  
**J09-141** Acoustic Measurements of High-Speed Jets from Rectangular Nozzle with Thrust Vectoring

**J09-026** Model for Deformation of Drops and Liquid Jets in Gaseous Crossflows  
**J09-042** Flat-Plate Interaction with the Near Wake of a Square Cylinder  
**J09-120** Vortex Roll-Up Criterion for Synthetic Jets  
**J09-009** Active Control of a High Reynolds Number Mach 0.9 Axisymmetric Jet  
**J09-004** Cross-Spectral Analysis of the Pressure in a Mach 0.85 Turbulent Jet  
**J09-012** Direct and Large-Eddy Simulations of Merging in Corotating Vortex System  
**J09-260** Assessment of Computational Fluid Dynamics for Supersonic Shock Containing Jets  
**J09-267** Hysteric Phenomenon of Underexpanded Moist Air Jet  
**J09-173** Simulation of Noise Generation in the Near-Nozzle Region of a Chevron Nozzle Jet

### ***Multiphase Flows***

**J09-108** Interfacial-Area Transport Equation at Reduced-Gravity Conditions  
**J09-119** Development of Homogeneous Water Condensation Models Using Molecular Dynamics  
**J09-064** Incipient Cavitation Studied Under Strong Thermodynamic Effect  
**J09-236** Analysis of Ultraviolet Radiation Predictions from High Altitude Two-Phase Plumes  
**J09-264** Initial Perturbation Amplitude of Liquid Sheets Produced by Jet-Impingement Nozzles  
**J09-247** Novel Technique for Measurements of Continuous Liquid Jet Core in an Atomizer  
**J09-277** Ghost Fluid Methods for Strong Shock Interactions Part 1: Fluid-Fluid Interfaces  
**J09-278** Ghost Fluid Methods for Strong Shock Interactions Part 2: Immersed Solid Boundaries

### ***Plasmadynamics and MHD***

**J09-154** Phase Synchronization of Vortex Shedding from Two Circular Cylinders Using Plasma Actuators  
**J09-128** Three-Dimensional Simulation of the Electric Field and Magnetohydrodynamic Power Generation During Reentry  
**J09-050** Asymptotic Solutions for Low-Magnetic-Reynolds-Number Gas Flows Inside a Two-Dimensional Channel  
**J09-091** Accurate and Robust Pressure Weight Advection Upstream Splitting Method for Magnetohydrodynamics Equations  
**J09-132** Spatially Distributed Forcing and Jet Vectoring with a Plasma Actuator  
**J09-147** Sensitivity Derivatives for Plasma Discharge Simulations  
**J09-253** Numerical Investigation of Decomposed Magnetofluid Dynamics Equations  
**J09-283** Interaction of a Microwave-Generated Plasma with a Hemisphere Cylinder at Mach 2.1  
**J09-013** Flow Separation Control by Plasma Actuator with Nanosecond Pulsed-Periodic Discharge  
**J09-106** Rotational and Vibrational Temperature Distributions for a Dielectric Barrier Discharge in Air

### ***Rarefied Flows***

**J09-050** Asymptotic Solutions for Low-Magnetic-Reynolds-Number Gas Flows Inside a Two-Dimensional Channel

**J09-119** Development of Homogeneous Water Condensation Models Using Molecular Dynamics  
**J09-023** Stagnation-Point Heat Transfer Near the Continuum Limit  
**J09-143** Extension of a Multiscale Particle Scheme to Near-Equilibrium Viscous Flows  
**J09-168** Hybrid Continuum/Molecular Simulations of Transient Gas Flows with Rarefaction

### ***Reacting Flows and Combustion***

**J09-040** Effects of Scalar Dissipation Rate Fluctuations on Autoignition of Hydrogen/Air Mixture  
**J09-142** Unsteady Flamelet Response in the Near Field of High-Reynolds-Number Jets  
**J09-259** Combustion Analysis Using Roe's Scheme and the Spalart-Allmaras Model  
**J09-263** Fluidic Flame Stabilization in a Planar Combustor Using a Transverse Slot Jet  
**J09-280** Investigation of Dynamics of Lean Turbulent Premixed Flames by Rayleigh Scattering  
**J09-057** Computational-Fluid-Dynamics-Based Kriging Optimization Tool for Aeronautical Combustion Chambers

### ***Separated Flows***

**J09-242** Toward Understanding and Optimizing Separation Control Using Microjets  
**J09-243** Numerical Analysis of Film Cooling in Advanced Rocket Nozzles  
**J09-154** Phase Synchronization of Vortex Shedding from Two Circular Cylinders Using Plasma Actuators  
**J09-100** Boundary-Layer Separation Due to Combustion-Induced Pressure Rise in a Supersonic Flow  
**J09-113** Open-Loop Control of Disk Wakes  
**J09-209** Aerodynamic Stall Suppression on Airfoil Sections Using Passive Air-Jet Vortex Generators  
**J09-110** Simulation and Optimization of Flow Control Strategies for Novel High-Lift Configurations  
**J09-082** Accuracy of Bhatnagar-Gross-Krook Scheme in Solving Laminar Viscous Flow Problems  
**J09-213** Flow Control Predictions Using Unsteady Reynolds-Averaged Navier-Stokes Modeling: A Parametric Study  
**J09-207** Fluidic Control of Separation Over a Hemispherical Turret  
**J09-248** Proper Orthogonal Decomposition Analysis of Separated and Reattached Pressure Gradient Flows  
**J09-152** Smoke-Wire Flow Visualization in Separated Flows at Relatively High Velocities  
**J09-174** Computational and Experimental Investigation of a Nonslender Delta Wing  
**J09-200** Measurements of Fluctuating Pressures on a Circular Cylinder in Subsonic Cross Flow  
**J09-056** Implicit Large-Eddy Simulation of Swept-Wing Flow Using High-Resolution Methods  
**J09-001** High-Resolution Reynolds-Averaged Navier-Stokes Flow Predictions over Axisymmetric Bodies with Tapered Tails  
**J09-107** Accuracy of Local and Nonlocal Linear Stability Theory in Swept Separation Bubbles

- J09-030** Improvement of Delayed-Detached Eddy Simulation Applied to Separated Flow over Missile Fin  
**J09-039** Flow Models for a Vortex Cell  
**J09-071** Active Control of Tip-Flap Loads  
**J09-218** Optical Characterization of a Simulated Weakly Compressible Shear Layer: Unforced and Forced  
**J09-255** High-Fidelity Simulation of Transitional Flows Past a Plunging Airfoil  
**J09-028** Airfoil Stall Suppression by Use of a Bubble Burst Control Plate

### ***Shock Waves and Detonations***

- J09-205** Compressible Boundary-Layer Predictions at High Reynolds Number Using Hybrid LES/RANS Methods  
**J09-032** Experimental Study of a Mach 3 Compression Ramp Interaction at  $Re_{\{\theta\}} = 2400$   
**J09-121** Viscous Effects in Steady Reflection of Strong Shock Waves  
**J09-131** Equation of State for Energetic Structural Materials  
**J09-051** 2-D Euler Shape Design on Nonregular Flows Using Adjoint Rankine-Hugoniot Relations  
**J09-112** Direct Numerical Simulation of a Reflected-Shock-Wave/Turbulent-Boundary-Layer Interaction  
**J09-249** Effects of Meteorological Variability on Sonic Boom Propagation from Hypersonic Aircraft  
**J09-277** Ghost Fluid Methods for Strong Shock Interactions Part 1: Fluid-Fluid Interfaces  
**J09-278** Ghost Fluid Methods for Strong Shock Interactions Part 2: Immersed Solid Boundaries

### ***Subsonic Flow***

- J09-165** Acoustically Nonreflecting and Reflecting Boundary Conditions for Vorticity Injection in Compressible Solvers  
**J09-139** Flowfield Downstream of Circular Cylinders Immersed Within Thick Boundary Layers  
**J09-200** Measurements of Fluctuating Pressures on a Circular Cylinder in Subsonic Cross Flow  
**J09-026** Model for Deformation of Drops and Liquid Jets in Gaseous Crossflows  
**J09-010** Laplacian Equivalents to Subsonic Potential Flows  
**J09-137** Implicit Weighted Essentially Non-oscillatory Schemes with Antidiffusive Flux for Compressible Viscous Flows  
**J09-287** Modeled Lattice Boltzmann Equation and the Constant-Density Assumption  
**J09-005** Geometrical Installation and Deformation Effects in High-Lift Flows  
**J09-015** Extremum-Seeking Control of Subsonic Cavity Flow

### ***Supersonic Flow***

- J09-032** Experimental Study of a Mach 3 Compression Ramp Interaction at  $Re_{\{\theta\}} = 2400$   
**J09-078** Pressure, Temperature and Velocity Measurements in Underexpanded Free Jets Using Laser-Induced Fluorescence Imaging  
**J09-220** Supersonic Flutter Analysis Based on a Local Piston Theory  
**J09-281** Pressure Oscillations from Cavities with Ramp

- J09-127** Dynamics of Shock Dispersion and Interactions in Supersonic Freestreams with Counterflowing Jets  
**J09-162** Shock-Wave/Boundary-Layer Interactions in a Model Scramjet Intake  
**J09-235** Experimental Studies on the Limiting Tab  
**J09-003** Evaluation of Euler Fluxes for Hypersonic Flow Computations  
**J09-060** Microramp Control of Supersonic Oblique Shock-Wave/Boundary-Layer Interactions  
**J09-141** Acoustic Measurements of High-Speed Jets from Rectangular Nozzle with Thrust Vectoring  
**J09-112** Direct Numerical Simulation of a Reflected-Shock-Wave/Turbulent-Boundary-Layer Interaction  
**J09-019** Procedure to Validate Direct Numerical Simulations of Wall-Bounded Turbulence Including Finite-Rate Reactions  
**J09-109** Suppression of Cavity Loads Using Leading-Edge Blowing  
**J09-077** Density Measurements in a Supersonic Microjet Using Miniature Rainbow Schlieren Deflectometry  
**J09-203** Aero-Optic Distortion in Transonic and Hypersonic Turbulent Boundary Layers  
**J09-225** Shock-Train Structure Resolved with Absorption Spectroscopy Part I: System Design and Validation  
**J09-267** Hysteric Phenomenon of Underexpanded Moist Air Jet

### ***Transonic Flow***

- J09-151** Oscillatory Behavior of Transonic Aeroelastic Instability Boundaries  
**J09-186** Hermite-Based Mesh Adaptation for Functional Outputs Improvement in Fluid Flow Simulation  
**J09-029** Improvement of Stability and Accuracy for Weighted Essentially Nonoscillatory Scheme  
**J09-051** 2-D Euler Shape Design on Nonregular Flows Using Adjoint Rankine-Hugoniot Relations  
**J09-137** Implicit Weighted Essentially Non-oscillatory Schemes with Antidiffusive Flux for Compressible Viscous Flows

### ***Unsteady Flows***

- J09-065** Large Eddy Simulation of Plasma-Based Control Strategies for Bluff Body Flow  
**J09-195** Mode Conversion in Acoustically Modulated Confined Jets  
**J09-111** Large-Eddy Simulation of a Round Jet in Crossflow  
**J09-258** Variable-Frequency Fluidic Oscillator Driven by a Piezoelectric Bender  
**J09-281** Pressure Oscillations from Cavities with Ramp  
**J09-274** Numerical Prediction of Exhaust Fan-Tone Noise from High-Bypass Aircraft Engines  
**J09-066** Experimental and Numerical Study of Forward Flight Aerodynamics of Insect Flapping Wing  
**J09-201** Alleviation of Pressure Rise from a High-Speed Train Entering a Tunnel  
**J09-230** Helmholtz Resonance of Pitot Pressure Measurements in Impulsive Hypersonic Test Facilities

- J09-245** Bifurcation Behavior of Airfoil Undergoing Stall Flutter Oscillations in Low-Speed Wind Tunnel  
**J09-181** Adjoint-Based Sensitivity Formulation for Fully Coupled Unsteady Aeroelasticity Problems  
**J09-233** Computations of Flow Past a Circular Cylinder Using a Continuous-Turbulence Model  
**J09-165** Acoustically Nonreflecting and Reflecting Boundary Conditions for Vorticity Injection in Compressible Solvers  
**J09-239** Effect of Rotation Kinematics and Angle of Attack on Flapping Flight  
**J09-042** Flat-Plate Interaction with the Near Wake of a Square Cylinder  
**J09-043** Self-Induced Roll Oscillations of Nonslender Wings  
**J09-189** Experimental Study of Shock Oscillation over a Transonic Supercritical Profile  
**J09-018** Large Eddy Simulation of Self-Sustained Flow Instabilities in Cavities Using the Lattice-Boltzmann Method  
**J09-031** Implicit Nonlinear Frequency-Domain Spectral-Difference Scheme for Periodic Euler Flow  
**J09-046** Numerical Study of an Oscillating Airfoil in Transonic Buffeting Flows  
**J09-255** High-Fidelity Simulation of Transitional Flows Past a Plunging Airfoil  
**J09-283** Interaction of a Microwave-Generated Plasma with a Hemisphere Cylinder at Mach 2.1  
**J09-286** Lift Response of a Stalled Wing to Pulsatile Disturbances

### ***Viscous Non-Boundary-Layer Flows***

- J09-288** Flow Visualization Study of the Aerodynamics of Modeled Dragonfly Wings  
**J09-287** Modeled Lattice Boltzmann Equation and the Constant-Density Assumption  
**J09-121** Viscous Effects in Steady Reflection of Strong Shock Waves

### ***Vortices***

- J09-099** Side Force Suppression by Dimples on Ogive-Cylinder Body  
**J09-195** Mode Conversion in Acoustically Modulated Confined Jets  
**J09-179** Solution Adaptive Mesh Generation Using Feature-Aligned Embedded Surface Meshes  
**J09-104** Experimental Investigation of the Jets in Crossflow: Nonswirling Flow Case  
**J09-065** Large Eddy Simulation of Plasma-Based Control Strategies for Bluff Body Flow  
**J09-216** Axisymmetric Synthetic Jets: An Experimental and Theoretical Examination  
**J09-200** Measurements of Fluctuating Pressures on a Circular Cylinder in Subsonic Cross Flow  
**J09-219** Criteria for Vortex Breakdown Above High-Sweep Delta Wings  
**J09-174** Computational and Experimental Investigation of a Nonslender Delta Wing  
**J09-233** Computations of Flow Past a Circular Cylinder Using a Continuous-Turbulence Model  
**J09-043** Self-Induced Roll Oscillations of Nonslender Wings  
**J09-175** Turbulent Tip Vortex Measurements Using Dual-Plane Stereoscopic Particle Image Velocimetry  
**J09-167** Planar Velocimetry of a Fin Trailing Vortex in Subsonic Compressible Flow



- J09-012** Direct and Large-Eddy Simulations of Merging in Corotating Vortex System  
**J09-041** Compressibility Effect in Vortex Identification  
**J09-038** Manipulating the Flow over Spherical Protuberance in a Turbulent Boundary Layer  
**J09-218** Optical Characterization of a Simulated Weakly Compressible Shear Layer: Unforced and Forced  
**J09-255** High-Fidelity Simulation of Transitional Flows Past a Plunging Airfoil  
**J09-039** Flow Models for a Vortex Cell

### **Wave Motion and Sloshing**

- J09-201** Alleviation of Pressure Rise from a High-Speed Train Entering a Tunnel

## **GUIDANCE, CONTROL, AND DYNAMICS TECHNOLOGY**

### **Control System Design**

- J09-190** Active Aeroelastic Control Over a Multisurface Wing: Modeling and Wind-Tunnel Testing  
**J09-242** Toward Understanding and Optimizing Separation Control Using Microjets

### **Control Theory**

- J09-015** Extremum-Seeking Control of Subsonic Cavity Flow  
**J09-180** QZ-Based Algorithm for System Pole, Transmission Zero, and Residue Derivatives  
**J09-102** Matrix-Free Methods for the Stability and Control of Boundary Layers

### **Dynamics**

- J09-090** Joint Uncertainty Propagation in Linear Structural Dynamics Using Stochastic Reduced Basis Methods  
**J09-020** Efficient Mode Based Computational Approach for Jointed Structures: Joint Interface Modes  
**J09-261** Numerical Investigation of Constrained Direct Solutions Using Hamilton's Law  
**J09-262** Theorem of Expended Power and Finite Element Formulation: Hamiltonian Mechanics Framework  
**J09-053** Eigensensitivity-Based Optimal Damp-er Location in Variable Geometry Trusses

### **Flight Mechanics**

- J09-054** Dynamics Modeling and Simulation of Flexible Airships

### **Intelligent Control**

- J09-025** Control of Beams and Chains Through Distributed Gyroscopes

### **Launch Vehicle Dynamics**

- J09-222** Statistical Combination of Time-Varying Loads

### **Optimization Techniques**

- J09-058** Problem Formulations and Treatment of Uncertainties in Aerodynamic Design  
**J09-053** Eigensensitivity-Based Optimal Damp-er Location in Variable Geometry Trusses  
**J09-116** Concise Airfoil Representation via Case-Based Knowledge Capture

### **Signal Processing**

- J09-279** Physics-Based Foundation for Empirical Mode Decomposition

### **Spacecraft Dynamics**

- J09-172** Blunted-Cone Heat Shields of Atmospheric Entry Vehicles

### **Spacecraft Guidance and Control**

- J09-074** Planar Fluorescence Imaging and Three-Dimensional Reconstructions of Capsule Reaction-Control-System Jets

### **Structural Control**

- J09-158** How Membrane Loads Influence the Modal Damping of Flexural Structures  
**J09-228** Modeling and Analysis of Semi-Active Dampers in Periodic Working Environments  
**J09-270** Analysis and Simulation of Optimal Vibration Attenuation for Underactuated Mechanical Systems  
**J09-044** Nonlinear Control of a Membrane Mirror Strip Actuated Axially and in Bending  
**J09-025** Control of Beams and Chains Through Distributed Gyroscopes

### **System Identification**

- J09-088** Bayesian Wavelet Methodology for Damage Detection of Thermal Protection System Panels  
**J09-279** Physics-Based Foundation for Empirical Mode Decomposition  
**J09-133** Time-Domain In Situ Characterization of Acoustic Liners in a Flow Duct

## **INTERDISCIPLINARY TOPICS**

### **Analytical and Numerical Methods**

- J09-170** Power Balance in Aerodynamic Flows  
**J09-097** Hybrid Representations of Coupled Nonparametric and Parametric Models for Dynamic Systems  
**J09-088** Bayesian Wavelet Methodology for Damage Detection of Thermal Protection System Panels  
**J09-115** Application of p-Multigrid to Discontinuous Galerkin Formulations of the Euler Equations  
**J09-240** Noise Source Localization and Optimization of Phased-Array Results  
**J09-055** Nonlinear Analytical Approach for Preliminary Sizing of Discrete Composite Stringer Terminations  
**J09-186** Hermite-Based Mesh Adaptation for Functional Outputs Improvement in Fluid Flow Simulation  
**J09-180** QZ-Based Algorithm for System Pole, Transmission Zero, and Residue Derivatives  
**J09-223** Continuum Aeroelastic Model for a Folding-Wing Configuration  
**J09-117** Direct Quadrature Method of Moments Solution of Fokker-Planck Equations in Aeroelasticity  
**J09-150** Probability Distributions of Natural Frequencies of Uncertain Dynamic Systems  
**J09-168** Hybrid Continuum/Molecular Simulations of Transient Gas Flows with Rarefaction  
**J09-184** External Mean Flow Influence on Noise Transmission Through Double-Leaf Aeroelastic Plates  
**J09-045** Efficient Methods for Time-Dependent Fatigue Reliability Analysis  
**J09-058** Problem Formulations and Treatment of Uncertainties in Aerodynamic Design  
**J09-007** Uncertainty and Reliability Analysis of Fluid-Structure Stability Boundaries

### **Lasers and Laser Applications**

- J09-079** Multi-Property Measurements at High Sampling Rates Using Rayleigh Scattering  
**J09-078** Pressure, Temperature and Velocity Measurements in Underexpanded Free Jets Using Laser-Induced Fluorescence Imaging  
**J09-273** Development of a High-Speed Three-Dimensional Flow Visualization Technique  
**J09-246** Molecular Tagging Using Vibrationally Excited Nitric Oxide in an Underexpanded Jet Flowfield  
**J09-247** Novel Technique for Measurements of Continuous Liquid Jet Core in an Atomizer  
**J09-125** Effect of Laser-Induced Upstream Cylindrical Blast Waves on a High-Velocity Rocket

### **Multidisciplinary Design Optimization**

- J09-016** Multiresponse and Multistage Meta-modeling Approach for Design Optimization  
**J09-116** Concise Airfoil Representation via Case-Based Knowledge Capture  
**J09-164** Dimensionality Reduction Approach for Response Surface Approximations: Application to Thermal Design  
**J09-198** Optimization of a Morphing Wing Based on Coupled Aerodynamic and Structural Constraints  
**J09-251** Globally Convergent Optimization Algorithm Using Conservative Convex Separable Diagonal Quadratic Approximations  
**J09-093** Reduction of Ordering Effect in Reliability-Based Design Optimization Using Dimension Reduction Method  
**J09-147** Sensitivity Derivatives for Plasma Discharge Simulations  
**J09-149** Geometry Parameterization Method for Multidisciplinary Applications  
**J09-022** Multiple-Surrogate Approach to Helicopter Rotor Blade Vibration Reduction  
**J09-057** Computational-Fluid-Dynamics-Based Kriging Optimization Tool for Aeronautical Combustion Chambers  
**J09-096** Consequences of Material Addition for a Beam Strip in a Thermal Environment  
**J09-215** Cross Validation Can Estimate How Well Prediction Variance Correlates with Error  
**J09-052** Interval-Based Multi-Objective Optimization of Aircraft Wings Under Gust Loads

### **Reliability, Maintainability, and Logistics Support**

- J09-088** Bayesian Wavelet Methodology for Damage Detection of Thermal Protection System Panels  
**J09-093** Reduction of Ordering Effect in Reliability-Based Design Optimization Using Dimension Reduction Method  
**J09-150** Probability Distributions of Natural Frequencies of Uncertain Dynamic Systems  
**J09-197** Localization of a Breathing Crack Using Super-Harmonic Signals due to System Non-linearity  
**J09-007** Uncertainty and Reliability Analysis of Fluid-Structure Stability Boundaries  
**J09-045** Efficient Methods for Time-Dependent Fatigue Reliability Analysis  
**J09-067** Nonprobabilistic Interval Reliability Analysis of Wing Flutter

### **Research Facilities and Instrumentation**

- J09-273** Development of a High-Speed Three-Dimensional Flow Visualization Technique  
**J09-079** Multi-Property Measurements at High Sampling Rates Using Rayleigh Scattering  
**J09-076** Using Pressure- and Temperature-Sensitive Paint on the Aftbody of a Capsule Entry Vehicle  
**J09-230** Helmholtz Resonance of Pitot Pressure Measurements in Impulsive Hypersonic Test Facilities

### **Safety**

- J09-045** Efficient Methods for Time-Dependent Fatigue Reliability Analysis

### **Sensor Systems**

- J09-238** Flow-Induced Vibrations of Pressure/Temperature Sensors  
**J09-027** Two-Dimensional Visualization of Turbulent Wall Shear Stress Using Micropillars  
**J09-188** Extension of the Shear-Lag Solution for Structurally Attached Ultrasonic Active Sensors

## **LAUNCH VEHICLE AND MISSILE (LV/M) TECHNOLOGY**

### **Aerodynamics**

- J09-222** Statistical Combination of Time-Varying Loads

### **Launch Vehicle and Sounding Rocket Systems**

- J09-138** Hybrid Empirical/Computational Aeroacoustics Methodology for Rocket Noise Modeling

### **Propulsion and Propellant Systems**

- J09-126** Hydrogen-Helium Leak Detection at Elevated Pressures and Low Temperatures

### **Simulation**

- J09-222** Statistical Combination of Time-Varying Loads

### **Structural Design (Including Loads)**

- J09-238** Flow-Induced Vibrations of Pressure/Temperature Sensors

### **Thermal Protection Systems**

- J09-118** Design-Oriented Thermostructural Analysis with External and Internal Radiation, Part 2: Transient Response

## **PROPULSION**

### **Airbreathing Propulsion**

- J09-130** Instantaneous Flame Anchor Measurements Behind a Rearward-Facing Step  
**J09-226** Shock-Train Structure Resolved with Absorption Spectroscopy Part II: Analysis and CFD Comparison  
**J09-225** Shock-Train Structure Resolved with Absorption Spectroscopy Part I: System Design and Validation  
**J09-280** Investigation of Dynamics of Lean Turbulent Premixed Flames by Rayleigh Scattering

### **Combustion and Combustor Designs**

- J09-130** Instantaneous Flame Anchor Measurements Behind a Rearward-Facing Step

- J09-104** Experimental Investigation of the Jets in Crossflow: Nonswirling Flow Case

- J09-257** Comparison of Direct and Indirect Combustion Noise Mechanisms in a Model Combustor

- J09-263** Fluidic Flame Stabilization in a Planar Combustor Using a Transverse Slot Jet

- J09-280** Investigation of Dynamics of Lean Turbulent Premixed Flames by Rayleigh Scattering

- J09-142** Unsteady Flamelet Response in the Near Field of High-Reynolds-Number Jets

### **Combustion Instability**

- J09-161** Acoustic Damping of a Helmholtz Resonator with an Oscillating Volume

### **Droplet and Spray Characterization**

- J09-224** Comparison of Hot-Fire and Cold-Flow Observations of Nitrogen Tetroxide/Monomethylhydrazine Impinging Combustion  
**J09-247** Novel Technique for Measurements of Continuous Liquid Jet Core in an Atomizer  
**J09-026** Model for Deformation of Drops and Liquid Jets in Gaseous Crossflows  
**J09-047** Influence of Breakup Regimes on the Droplet Size Produced by Splash-Plate Nozzles

### **Emissions and Noises**

- J09-194** Acoustic Scattering by a Localized Thermal Disturbance  
**J09-257** Comparison of Direct and Indirect Combustion Noise Mechanisms in a Model Combustor  
**J09-014** Algorithm for the Nonlinear Propagation of Broadband Jet Noise  
**J09-135** Pylon-Based Jet Noise Suppressors  
**J09-037** Sound Radiation from a Bypass Duct with Bifurcations

### **Engine Cooling and Heat Transfer**

- J09-241** Numerical Analysis of Three-Dimensional Flow of Supercritical Fluid in Cooling Channels

### **Fuels and Propellants, Properties of**

- J09-126** Hydrogen-Helium Leak Detection at Elevated Pressures and Low Temperatures

### **Gas Turbine Engines**

- J09-057** Computational-Fluid-Dynamics-Based Kriging Optimization Tool for Aeronautical Combustion Chambers  
**J09-161** Acoustic Damping of a Helmholtz Resonator with an Oscillating Volume

### **Hypersonic Propulsion**

- J09-145** Experimental Investigation of Unstart in an Inlet/Isolator Model in Mach 5 Flow

### **Ignition**

- J09-040** Effects of Scalar Dissipation Rate Fluctuations on Autoignition of Hydrogen/Air Mixture  
**J09-224** Comparison of Hot-Fire and Cold-Flow Observations of Nitrogen Tetroxide/Monomethylhydrazine Impinging Combustion

### **Liquid Rocket Engines**

- J09-224** Comparison of Hot-Fire and Cold-Flow Observations of Nitrogen Tetroxide/Monomethylhydrazine Impinging Combustion

- J09-243** Numerical Analysis of Film Cooling in Advanced Rocket Nozzles

### **Micro Propulsion and Power**

- J09-050** Asymptotic Solutions for Low-Magnetic-Reynolds-Number Gas Flows Inside a Two-Dimensional Channel

### **Ramjets and Scramjets**

- J09-145** Experimental Investigation of Unstart in an Inlet/Isolator Model in Mach 5 Flow  
**J09-100** Boundary-Layer Separation Due to Combustion-Induced Pressure Rise in a Supersonic Flow

### **Solid Rocket Motors**

- J09-138** Hybrid Empirical/Computational Aeroacoustics Methodology for Rocket Noise Modeling

### **Supersonic Combustion**

- J09-100** Boundary-Layer Separation Due to Combustion-Induced Pressure Rise in a Supersonic Flow

### **Transient Combustion**

- J09-040** Effects of Scalar Dissipation Rate Fluctuations on Autoignition of Hydrogen/Air Mixture  
**J09-142** Unsteady Flamelet Response in the Near Field of High-Reynolds-Number Jets

### **Turbomachinery**

- J09-063** Inverse Approach to Turbomachinery Blade Design  
**J09-192** Investigation of Rotor Wake Turbulence Through Cyclostationary Spectral Analysis  
**J09-124** Turbulent Flow over Low-Order Models of Highly Irregular Surface Roughness

## **REAL-TIME SYSTEMS**

### **Sensor Systems**

- J09-080** Aero-Micro-Electromechanical System Sensor Arrays for Time Resolved Wall Pressure Measurements  
**J09-185** Reference-Free Damage Detection Using Instantaneous Baseline Measurements  
**J09-191** Monitoring Impact Events Using a System-Identification Method

### **Signal Processing**

- J09-185** Reference-Free Damage Detection Using Instantaneous Baseline Measurements  
**J09-191** Monitoring Impact Events Using a System-Identification Method

## **SPACE TECHNOLOGY**

### **Aerobraking Configurations/ Aerothermodynamics**

- J09-076** Using Pressure- and Temperature-Sensitive Paint on the Aftbody of a Capsule Entry Vehicle  
**J09-172** Blunted-Cone Heat Shields of Atmospheric Entry Vehicles

### **Aerobraking Flight Mechanics**

- J09-172** Blunted-Cone Heat Shields of Atmospheric Entry Vehicles

### **Spacecraft Sensor Systems**

- J09-191** Monitoring Impact Events Using a System-Identification Method



### ***Spacecraft Test and Evaluation***

**J09-017** Dimensional Stability Testing on a Space Optical Bench Structure

## **STRUCTURAL MECHANICS AND MATERIALS**

### ***Aeroelasticity and Control***

**J09-117** Direct Quadrature Method of Moments Solution of Fokker-Planck Equations in Aeroelasticity

**J09-006** Dynamic Aeroelasticity of Structurally Nonlinear Configurations Using Linear Modally Reduced Aerodynamic Generalized Forces

**J09-190** Active Aeroelastic Control Over a Multisurface Wing: Modeling and Wind-Tunnel Testing

**J09-266** Effects of Turbulent Boundary Layer on Panel Flutter

**J09-007** Uncertainty and Reliability Analysis of Fluid-Structure Stability Boundaries

**J09-067** Nonprobabilistic Interval Reliability Analysis of Wing Flutter

### ***Dynamic Model Analysis***

**J09-261** Numerical Investigation of Constrained Direct Solutions Using Hamilton's Law

**J09-097** Hybrid Representations of Coupled Nonparametric and Parametric Models for Dynamic Systems

**J09-117** Direct Quadrature Method of Moments Solution of Fokker-Planck Equations in Aeroelasticity

**J09-020** Efficient Mode Based Computational Approach for Jointed Structures: Joint Interface Modes

**J09-228** Modeling and Analysis of Semi-Active Dampers in Periodic Working Environments

**J09-180** QZ-Based Algorithm for System Pole, Transmission Zero, and Residue Derivatives

**J09-206** Modeling and Dynamics of Sandwich Beams with a Viscoelastic Soft Core

**J09-153** Wrinkling Analysis Using Improved Dynamic Relaxation Method

**J09-008** Detection of the Crack in Cantilever Structures Using Fuzzy Gaussian Inference Technique

**J09-095** Modal Analysis of a Nonlinear Periodic Structure with Cyclic Symmetry

**J09-212** Identification of Structural Systems Using an Iterative, Improved Method for System Reduction

### ***Flexible and Active Structures***

**J09-285** Efficient Laminate Theory for Predicting Transverse Shear Stresses in Piezoelectric Composite Plates

**J09-153** Wrinkling Analysis Using Improved Dynamic Relaxation Method

**J09-136** Control of Nonlinear Vibrations of Functionally Graded Plates Using 1-3 Piezoelectric Composite

**J09-134** Exploitation of Higher-Order Membrane Modes for Improved Synthetic Jet Performance

**J09-198** Optimization of a Morphing Wing Based on Coupled Aerodynamic and Structural Constraints

**J09-098** New Look at Kirchhoff's Theory of Plates

**J09-036** Buckling of Sandwich Plates with Random Material Properties Using Improved Plate Model

**J09-069** Flexural Stiffness Control of Multilayered Beams

**J09-270** Analysis and Simulation of Optimal Vibration Attenuation for Underactuated Mechanical Systems

**J09-025** Control of Beams and Chains Through Distributed Gyroscopes

**J09-048** Topological Optimization of Compliant Adaptive Wing Structure

### ***Materials Structural Properties***

**J09-155** Code Verification for Energetic Structural Material Simulations

**J09-163** Effect of Stacking Sequence on Open-Hole Tensile Strength of Composite Laminates

**J09-265** Graphite Nanoplatelets Interlayered Carbon/Epoxy Composites

**J09-086** Hilbert Transform and Its Engineering Applications

**J09-021** Nonlinear Constitutive Relations of Cellular Materials

**J09-061** Impact Response of Titanium and Titanium Boride Monolithic and Functionally Graded Composite Plates

**J09-214** Pressurized Hollow Spherical Vessels with Arbitrary Radial Nonhomogeneity

### ***Structural Composite Materials***

**J09-171** Asymptotic Solution for Nonlinear Buckling of Orthotropic Shells on Elastic Foundation

**J09-275** Cyclic Buckling Tests Under Combined Compression and Shear on Composite Stiffened Panels

**J09-183** Fracture Mechanics Analysis of Composite Structures Using the Boundary Element Shape Sensitivities

**J09-265** Graphite Nanoplatelets Interlayered Carbon/Epoxy Composites

**J09-166** Polymer Nanofabric Interleaved Composite Laminates

**J09-214** Pressurized Hollow Spherical Vessels with Arbitrary Radial Nonhomogeneity

**J09-163** Effect of Stacking Sequence on Open-Hole Tensile Strength of Composite Laminates

**J09-070** Geometrically Nonlinear First-Order Shear Deformation Theory for General Anisotropic Shells

**J09-085** Maximization of Fundamental Frequencies of Axially Compressed Laminated Plates Against Fiber Orientation

**J09-136** Control of Nonlinear Vibrations of Functionally Graded Plates Using 1-3 Piezoelectric Composite

**J09-285** Efficient Laminate Theory for Predicting Transverse Shear Stresses in Piezoelectric Composite Plates

**J09-062** Hierarchical Evaluation of Failure Parameters in Composite Plates

**J09-073** Energy Absorption and Deformation in Textile Composite Cellular Structures

### ***Structural Design***

**J09-187** Heuristic Thermal Postbuckling and Large-Amplitude Vibration Formulations of Beams

**J09-011** Improvement of Axial Load Capacity of Elliptical Cylindrical Shells

**J09-094** Approach for Increasing the Static Dimensional Stability of Composite Space Structures

**J09-156** Optimal Morphing-Wing Design Using Parallel Nondominated Sorting Genetic Algorithm II

**J09-237** Reinvestigation of Intuitive Approach for Thermal Postbuckling of Circular Plates

**J09-282** Optimal Design of Constrained-Layer Damping Structures Considering Material and Operational Condition Variability

**J09-096** Consequences of Material Addition for a Beam Strip in a Thermal Environment

**J09-073** Energy Absorption and Deformation in Textile Composite Cellular Structures

### ***Structural Durability (Including Fatigue, Fracture, and Environmental Degradation)***

**J09-244** Fatigue Damage Prediction in Metallic Materials Based on Multiscale Modeling

**J09-166** Polymer Nanofabric Interleaved Composite Laminates

**J09-148** Enhanced 2-D Modeling Technique for Single-Side Patch Repairs

### ***Structural Dynamics and Characterization***

**J09-097** Hybrid Representations of Coupled Nonparametric and Parametric Models for Dynamic Systems

**J09-123** Experimental Mistuning Identification in Bladed Disks Using a Component-Mode-Based Reduced-Order Model

**J09-279** Physics-Based Foundation for Empirical Mode Decomposition

**J09-054** Dynamics Modeling and Simulation of Flexible Airships

**J09-086** Hilbert Transform and Its Engineering Applications

**J09-197** Localization of a Breathing Crack Using Super-Harmonic Signals due to System Nonlinearity

**J09-212** Identification of Structural Systems Using an Iterative, Improved Method for System Reduction

**J09-158** How Membrane Loads Influence the Modal Damping of Flexural Structures

**J09-136** Control of Nonlinear Vibrations of Functionally Graded Plates Using 1-3 Piezoelectric Composite

**J09-150** Probability Distributions of Natural Frequencies of Uncertain Dynamic Systems

**J09-134** Exploitation of Higher-Order Membrane Modes for Improved Synthetic Jet Performance

**J09-044** Nonlinear Control of a Membrane Mirror Strip Actuated Axially and in Bending

**J09-095** Modal Analysis of a Nonlinear Periodic Structure with Cyclic Symmetry

**J09-085** Maximization of Fundamental Frequencies of Axially Compressed Laminated Plates Against Fiber Orientation

### ***Structural Finite Elements***

**J09-148** Enhanced 2-D Modeling Technique for Single-Side Patch Repairs

**J09-163** Effect of Stacking Sequence on Open-Hole Tensile Strength of Composite Laminates

**J09-153** Wrinkling Analysis Using Improved Dynamic Relaxation Method

**J09-073** Energy Absorption and Deformation in Textile Composite Cellular Structures

**J09-156** Optimal Morphing-Wing Design Using Parallel Nondominated Sorting Genetic Algorithm II

**J09-196** Accurate Stick Model Development for Static Analysis of Complex Aircraft Wing-Box Structures

**J09-061** Impact Response of Titanium and Titanium Boride Monolithic and Functionally Graded Composite Plates

**J09-036** Buckling of Sandwich Plates with Random Material Properties Using Improved Plate Model

### **Structural Modeling**

**J09-061** Impact Response of Titanium and Titanium Boride Monolithic and Functionally Graded Composite Plates

**J09-086** Hilbert Transform and Its Engineering Applications

**J09-011** Improvement of Axial Load Capacity of Elliptical Cylindrical Shells

**J09-055** Nonlinear Analytical Approach for Preliminary Sizing of Discrete Composite Stringer Terminations

**J09-098** New Look at Kirchhoff's Theory of Plates

**J09-158** How Membrane Loads Influence the Modal Damping of Flexural Structures

**J09-206** Modeling and Dynamics of Sandwich Beams with a Viscoelastic Soft Core

**J09-183** Fracture Mechanics Analysis of Composite Structures Using the Boundary Element Shape Sensitivities

**J09-070** Geometrically Nonlinear First-Order Shear Deformation Theory for General Anisotropic Shells

**J09-217** Prebuckling and Buckling of Unsymmetrically Laminated Composite Panels with Stringer Run-Outs

**J09-285** Efficient Laminate Theory for Predicting Transverse Shear Stresses in Piezoelectric Composite Plates

### **Structural Optimization**

**J09-016** Multiresponse and Multistage Meta-modeling Approach for Design Optimization

**J09-156** Optimal Morphing-Wing Design Using Parallel Nondominated Sorting Genetic Algorithm II

**J09-212** Identification of Structural Systems Using an Iterative, Improved Method for System Reduction

**J09-251** Globally Convergent Optimization Algorithm Using Conservative Convex Separable Diagonal Quadratic Approximations

**J09-093** Reduction of Ordering Effect in Reliability-Based Design Optimization Using Dimension Reduction Method

**J09-085** Maximization of Fundamental Frequencies of Axially Compressed Laminated Plates Against Fiber Orientation

**J09-094** Approach for Increasing the Static Dimensional Stability of Composite Space Structures

**J09-282** Optimal Design of Constrained-Layer Damping Structures Considering Material and Operational Condition Variability

**J09-052** Interval-Based Multi-Objective Optimization of Aircraft Wings Under Gust Loads

**J09-048** Topological Optimization of Compliant Adaptive Wing Structure

### **Structural Stability**

**J09-275** Cyclic Buckling Tests Under Combined Compression and Shear on Composite Stiffened Panels

**J09-090** Joint Uncertainty Propagation in Linear Structural Dynamics Using Stochastic Reduced Basis Methods

**J09-011** Improvement of Axial Load Capacity of Elliptical Cylindrical Shells

**J09-036** Buckling of Sandwich Plates with Random Material Properties Using Improved Plate Model

**J09-017** Dimensional Stability Testing on a Space Optical Bench Structure

**J09-211** Buckling Mosaic of Concentrically Hinged or Cracked Circular Plates on Elastic Foundation

### **Thermal Effects**

**J09-118** Design-Oriented Thermostructural Analysis with External and Internal Radiation, Part 2: Transient Response

**J09-064** Incipient Cavitation Studied Under Strong Thermodynamic Effect

**J09-096** Consequences of Material Addition for a Beam Strip in a Thermal Environment

## **THERMOPHYSICS AND HEAT TRANSFER**

### **Ablation, Pyrolysis, Thermal Decomposition and Degradation**

**J09-059** Dynamics of Plumes Generated by Local Injection of Ablated Material

### **Aerothermodynamics/Thermal Protection**

**J09-023** Stagnation-Point Heat Transfer Near the Continuum Limit

**J09-127** Dynamics of Shock Dispersion and Interactions in Supersonic Freestreams with Counterflowing Jets

### **Forced Convection**

**J09-023** Stagnation-Point Heat Transfer Near the Continuum Limit

### **Mixed Convection**

**J09-075** Simultaneous Measurements of Droplet Size and Transient Temperature Within Surface Water Droplets

### **Nonintrusive Diagnostics**

**J09-114** Arc Wind-Tunnel Flow Diagnostics by Cavity-Enhanced Absorption Spectroscopy

**J09-078** Pressure, Temperature and Velocity Measurements in Underexpanded Free Jets Using Laser-Induced Fluorescence Imaging

**J09-075** Simultaneous Measurements of Droplet Size and Transient Temperature Within Surface Water Droplets

**J09-077** Density Measurements in a Supersonic Microjet Using Miniature Rainbow Schlieren Deflectometry

**J09-079** Multi-Property Measurements at High Sampling Rates Using Rayleigh Scattering

### **Thermal Modeling and Analysis**

**J09-164** Dimensionality Reduction Approach for Response Surface Approximations: Application to Thermal Design

### **Thermochemistry and Chemical Kinetics**

**J09-246** Molecular Tagging Using Vibrationally Excited Nitric Oxide in an Underexpanded Jet Flowfield