1996 Journal of Propulsion and Power Index

How to Use the Index

In the Subject Index, pages 1187–1192, each technical paper is listed under a maximum of three appropriate headings. Note the number in boldface type following each paper title, and use that number to locate the paper in the Chronological Index. The Author Index, pages 1192 and 1193, lists all authors associated with a given technical paper. The locating numbers are identical to those in the Subject Index. The Chronological Index, pages 1194–1199, lists all papers by their unique code 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, as well as the "CP" or conference volume number if the paper was published in a bound collection of meetings papers. 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 1996, that paper also will appear in the Chronological Index. Authors of Comments also are listed in the Author Index.

Subject Index

Aircraft Technology, Conventional, STOL/VTOL

Aerodynamics

Time-Marching Euler Analysis of Ducted-Pro-Numerical Simulations of Unsteady Transonic Flow in Turbomachines B96-064 Identification of Parameter Coupling in Turbine Design Using Neural Networks B96-080 Hot-Streak Clocking Effects in a 1-1/2 Stage Tur-B96-097 Experimental Investigation of a Nonsteady Flow Thrust Augmenter B96-111 Modified Spalart-Allmaras One-Equation Turbulence Model for Rough Wall Boundary Layers B96-123 Three-Dimensional Flowfield in a Turbine Nozzle Passage B96-148 Application of the $k-\omega$ Turbulence Model to Quasi-Three-Dimensional Turbomachinery Flows R96-176

Aeroelasticity and Aeroservoelasticity

Flutter Analysis of Propfans Using a Three-Dimensional Euler Solver B96-040
Stall Flutter Prediction Techniques for Fan and Compressor Blades B96-121

Aerospace Plane

Unsteady Pressure Behavior in a Ramjet/Scramjet Inlet B96-078

Noise

Analysis of Partially Mixed Supersonic Ejector

896-113

Performance

Advanced Propeller Performance Calculation by a Lifting Surface Method B96-077 Identification of Parameter Coupling in Turbine Design Using Neural Networks B96-080 Advanced Seals for Engine Secondary Flowpath B96-120

Powerplant Integration

Advanced Seals for Engine Secondary Flowpath

Propeller and Rotor Systems

Time-Marching Euler Analysis of Ducted-Propellers

Spur, Helical, and Spiral Bevel Transmission
Life Modeling

Advanced Propeller Performance Calculation by
a Lifting Surface Method

B96-077

Rotorcraft

Vibration Signature Analysis of a Faulted Gear Transmission System B96-043

Simulation

Numerical Simulation of Dynamic Wave Rotor Performance B96-145

System Effectiveness

Advanced Seals for Engine Secondary Flowpath B96-120

Vibration

Vibration Signature Analysis of a Faulted Gear Transmission System **B96-043**

Energy

Alternate Fuels

Stochastic-Probabilistic Efficiency Enhanced
Dispersion Modeling of Turbulent Polydispersed Sprays B96-116

Batterie

Nickel-Hydrogen Batteries-An Overview

Current Status of Nickel-Hydrogen Battery
Technology Development B96-135
Space-Station Nickel-Hydrogen Battery Orbital
Replacement Unit Test B96-136

26% Potassium Hydroxide Electrolyte for Long-Term Nickel-Hydrogen Geosynchronous Missions B96-137

Development and Flight of a 250-A-h Lithium Thionyl Chloride Battery B96-138

Conservation

Transient Exergy Analysis and Optimal Removal Time of a Cylindrical Storage System

B96-062

Hydrogen and Unique Fuels

Global Characteristics and Structure of Hydrogen-Air Counterflow Diffusion Flames

B96-084

Current Status of Nickel-Hydrogen Battery Technology Development B96-135
26% Potassium Hydroxide Electrolyte for Long-Term Nickel-Hydrogen Geosynchronous Missions B96-137

Magnetohydrodynamic Power Generation

Wall Surface Leakage Effects on Magnetohydrodynamic Power Generator Performance

R96-009

Magnetohydrodynamic Generator Design for a Combined-Cycle Demonstration Power Plant

B96-058

Laser Cooling of Neutral Argon for Simulating the Storage of Antimatter B96-141

Microwaves

Whistler-Driven, Electron-Cyclotron-Resonance-Heated Thruster: Experimental Status

B96-125

Nuclear Fission

Space Nuclear Power: An Overview B96-139
Laser Cooling of Neutral Argon for Simulating the Storage of Antimatter B96-141

Photovoltaic Power

Concentrating and Splitting of Solar Radiation for Laser Pumping and Photovoltaic Conversion

B96-060

Solar Radiation on Mars: Tracking Photovoltaic Array B96-061	Boundary-Layer Stability and Transition	Inlet, Nozzle, Diffuser, and Channel Flows
Array B96-061 Recent Advances in Solar Cell Technology B96-128	Boundary-Layer Tripping by a Roughness Element B96-124	Influence of Rocket Design Parameters on Engine Nozzle Efficiencies B96-005
High-Efficiency GaInP/GaAs Tandem Solar Cells B96-129	Computational Fluid Dynamics	Wall Surface Leakage Effects on Magnetohydro- dynamic Power Generator Performance
Linear Refractive Photovoltaic Concentrator Solar Array Flight Experiment B96-132 Lightweight Inflatable Solar Array B06-133	Reacting Flow Simulation for a Large-Scale Ram Accelerator B96-008	Upwind Relaxation Multigrid Method for Com-
Lightweight Inflatable Solar Array B96-133 Power Conditioning	Computational Analysis of the Unsteady Type IV Shock Interaction of Blunt Body Flows	puting Three-Dimensional, Viscous Internal Flows B96-020
Active Cooling of Metal Oxide Semiconductor	B96-017	Near-Field Study of a Turbulent Freejet and Velocity Bias Effects B96-021
Controlled Thyristor Using Venturi Flow B96-059	Upwind Relaxation Multigrid Method for Computing Three-Dimensional, Viscous Internal Flows B96-020	Internal Flowfield Characteristics of a Scramjet Inlet at Mach 10 B96-022
Fluctuation of Arcjet Plume Properties B96-167	Flow Characteristics in Boundary-Layer Bleed	Dual Stream Axisymmetric Mixing in the Presence of Axial Vorticity B96-025
Rotating Machinery	Slots with Plenum B96-035 Flutter Analysis of Propfans Using a Three-Di-	Optimal Shock Wave Parameters for Supersonic Inlets B96-028
Flow Visualization and the Three-Dimensional Flow in an Axial-Flow Pump B96-038	mensional Euler Solver B96-040 Unsteady Multistage Analysis Using a Loosely	Shock-Wave/Boundary-Layer Interactions with Bleed Through Rows of Holes B96-033
Effect of Target Materials on the Particle Restitu- tion Characteristics for Turbomachinery Ap-	Coupled Blade Row Approach B96-041 Vortex Shedding in Segmented Solid Rocket	Flow Characteristics in Boundary-Layer Bleed Slots with Plenum B96-035
plication B96-039 Identification of Parameter Coupling in Turbine	Motors B96-055 Numerical Simulations of Unsteady Transonic	Performance Characterization of a Highly Offset
Design Using Neural Networks B96-080 Case Wall Pressures in a Multistage Axial Com-	Flow in Turbomachines B96-064	Diffuser with Vortex Generator Jets B96-036
pressor with Tip Clearance Variation B96-147	Simplified Model and Navier–Stokes Calcula- tions for Hypersonic Air Intakes Design B96-076	Active Cooling of Metal Oxide Semiconductor Controlled Thyristor Using Venturi Flow
Three-Dimensional Flowfield in a Turbine Noz- zle Passage B96-148	Upwind Unstructured Scheme for Three-Dimen-	Mixing Pressure-Rise Parameter for Effect of
Solar Power	sional Combusting Flows B96-079 Simulation of Shock-Induced Combustion Past	Nozzle Geometry in Diffuser-Ejectors B96-066
Solar Radiation on Mars: Tracking Photovoltaic	Blunt Projectiles Using Shock-Fitting Technique 896-082	Effects of Initial Boundary Layers to the Lobed Mixer Trailing Streamwise Vorticity
Array B96-061 Transient Exergy Analysis and Optimal Removal	Hot-Streak Clocking Effects in a 1-1/2 Stage Turbine B96-097	B96-070 Unsteady Pressure Behavior in a Ramjet/Scram-
Time of a Cylindrical Storage System B96-062	Evolution of Internal Flow in a Solid Rocket Mo- tor with Radial Slots B96-100	jet Inlet B96-078 Unsteady Vorticity Generation and Evolution in
Recent Advances in Solar Cell Technology B96-128	Modified Spalart-Allmaras One-Equation Tur- bulence Model for Rough Wall Boundary Lay-	a Model of a Solid Rocket Motor B96-102 Numerical Flowfield Analysis of the Next Gen-
Clementine Gallium Arsenide/Germanium Solar Array B96-130	ers B96-123 Guide to Credible Computer Simulations of Flu-	eration Vulcan Nozzle B96-103
Early Results from Solar Dynamic Space Power	id Flows B96-144 Numerical Simulation of Dynamic Wave Rotor	Experimental Investigation of a Nonsteady Flow Thrust Augmenter B96-111
System Testing B96-131 Lightweight Inflatable Solar Array B96-133	Performance B96-145 Application of the k-ω Turbulence Model to Quasi-	Investigation of the Effect of Tabs on Supersonic Jets Using Advanced Diagnostics B96-114
Thermoelectric	Three-Dimensional Turbomachinery Flows	Flow Characteristics of a Rectangular Multielement Supersonic Mixer-Ejector B96-154
Space Nuclear Power: An Overview B96-139	B96-176	Two-Temperature Plasma Modeling of Nitrogen/ Hydrogen Arciets B96-161
SP-100 Thermoelectric Cell Testing B96-140	Hydrodynamics	Impulse Function and Drag in Scramjet Inlet Models B96-178
Fluid Dynamics	Flow Visualization and the Three-Dimensional Flow in an Axial-Flow Pump B96-038	
Aeroacoustics	Hypersonic Flow	Jets, Wakes, and Viscid-Inviscid Flow Interactions
Mixing by Resonant Acoustic Driving in a Closed Chamber B96-054	Reacting Flow Simulation for a Large-Scale Ram Accelerator B96-008	Near-Field Study of a Turbulent Freejet and Velocity Bias Effects B96-021
Vortex Shedding in Segmented Solid Rocket Motors B96-055	Computational Analysis of the Unsteady Type	Crossflow Mixing of Noncircular Jets B96-034
Preliminary Assessment of Wake Management Strategies for Reduction of Turbomachinery	IV Shock Interaction of Blunt Body Flows 896-017	Ram Accelerator Utilizing Active Projectile B96-049
Fan Noise B96-146	Internal Flowfield Characteristics of a Scramjet Inlet at Mach 10 B96-022	Investigation of the Effect of Tabs on Supersonic Jets Using Advanced Diagnostics B96-114
Boundary Layers and Heat Transfer—Laminar	Transverse Jet Mixing and Combustion Experiments in Hypervelocity Flows B96-026	Injection of Supercritical Ethylene in Nitrogen B96-117
Upstream Influence and Peak Heating in Hyper- velocity Shock Wave/Boundary-Layer Inter- action B96-149	Simplified Model and Navier-Stokes Calcula- tions for Hypersonic Air Intakes Design B96-076	Preliminary Assessment of Wake Management Strategies for Reduction of Turbomachinery Fan Noise B96-146
Boundary Layers and Heat Transfer— Turbulent	Simulation of Shock-Induced Combustion Past Blunt Projectiles Using Shock-Fitting Tech- nique B96-082	Case Wall Pressures in a Multistage Axial Compressor with Tip Clearance Variation B96-147
Direct Measurement of Skin Friction in a Tur- bine Cascade B96-037	Upstream Influence and Peak Heating in Hyper- velocity Shock Wave/Boundary-Layer Inter-	Upstream Influence and Peak Heating in Hyper- velocity Shock Wave/Boundary-Layer Inter-
Supersonic Shock/Turbulent Boundary-Layer Interaction on a Roughened Surface	action B96-149 Shock-Tunnel Investigation of Hypervelocity	action B96-149 Shock-Tunnel Investigation of Hypervelocity
B96-075	Free Shear Layers in a Planar Duct B96-152	Free Shear Layers in a Planar Duct B96-152
Numerical Flowfield Analysis of the Next Generation Vulcan Nozzle B96-103	Arcjets and Arc Heaters: An Overview of Research Status and Needs B96-155	Flow Characteristics of a Rectangular Multiele-
Modified Spalart-Allmaras One-Equation Tur- bulence Model for Rough Wall Boundary Lay-	Expansion Corner Effects on Hypersonic Shock Wave/Turbulent Boundary-Layer Interactions	ment Supersonic Mixer–Ejector B96-154 Transverse Gas Jet Injection Behind a Rearward-
ers B96-123	B96-174	Facing Step B96-170

Multiphase Flows

Effect of Target Materials on the Particle Restitution Characteristics for Turbomachinery Application

Magnetohydrodynamics of a Particulate Suspension

Numerical Analysis of a Ram Accelerator Employing Two-Phase Combustion

Breakup of Annular Viscous Liquid Jets in Two Gas Streams

By6-115

Stochastic-Probabilistic Efficiency Enhanced Dispersion Modeling of Turbulent Polydispersed Sprays

By6-116

Plasmadynamics and MHD

Wall Surface Leakage Effects on Magnetohydrodynamic Power Generator Performance Electric Probe Measurements in the Plume of an Ion Thruster B96-013 Two-Fluid Nonequilibrium Simulation of Hydrogen Arcjet Thrusters R96-015 Microinstabilities in a 10-Kilowatt Self-Field Magnetoplasmadynamic Thruster B96-057 Magnetohydrodynamic Generator Design for a Combined-Cycle Demonstration Power Plant B96-058 Magnetohydrodynamics of a Particulate Suspension B96-069 Two-Temperature Plasma Modeling of Nitrogen/Hydrogen Arcjets R96-161 Interior Plasma Diagnostics of Arcjet Thrusters

Imacts of External Magnetic Fields Applied to High-Pressure Electric Arc Heaters
Low-Power Ammonia Arcjet: Numerical Simulations and Laser-Induced Flourescence Measurements

B96-169

Hydrodynamic Suppression of Soot Emissions in

Reacting Flows and Combustion

Laminar Diffusion Flames B96-001 Reacting Flow Simulation for a Large-Scale Ram Accelerator B96-008 Dual Stream Axisymmetric Mixing in the Presence of Axial Vorticity B96-025 Transverse Jet Mixing and Combustion Experiments in Hypervelocity Flows B96-026 Experimental Flow Visualization for a Large-Scale Ram Accelerator R96-030 Nitramine Deflagration: Reduced Chemical Mechanism for the Primary Flame Facilitating Simplified Asymptotic Analysis B96-045 Transcritical Liquid Oxygen Droplet Vaporization: Effect on Rocket Combustion Instability R96-052 Upwind Unstructured Scheme for Three-Dimen-

sional Combusting Flows
Simulation of Shock-Induced Combustion Past
Blunt Projectiles Using Shock-Fitting Technique
B96-082
Effect of Heat Release on Streamwise Vorticity

Effect of Heat Release on Streamwise Vorticity
Enhanced Mixing
B96-101

Effects of Hydrodynamics on Soot Formation in Laminar Opposed-Jet Diffusion Flames

Autoignition of Methane Mixtures: The Effect of Hydrogen Peroxide B96-108

Separated Flows

Upwind Relaxation Multigrid Method for Computing Three-Dimensional, Viscous Internal Flows B96-020
Supersonic Shock/Turbulent Boundary-Layer Interaction on a Roughened Surface
B96-075

Boundary-Layer Tripping by a Roughness Element B96-124

Shock Waves and Detonations

Optimal Shock Wave Parameters for Supersonic Inlets

Experimental Flow Visualization for a Large-Scale Ram Accelerator

Shock-Wave/Boundary-Layer Interactions with Bleed Through Rows of Holes

Oblique Detonation Wave Engine Performance Prediction

B96-048

Supersonic Shock/Turbulent Boundary-Layer Interaction on a Roughened Surface

B96-075

Upwind Unstructured Scheme for Three-Dimensional Combusting Flows B96-079
Influence of Formation Processes on Oblique Detonation Wave Stabilization B96-081
Numerical Analysis of a Ram Accelerator Employing Two-Phase Combustion B96-109

Subsonic Flow

Effects of Initial Boundary Layers to the Lobed Mixer Trailing Streamwise Vorticity B96-070 Boundary-Layer Tripping by a Roughness Element B96-124

Supersonic Flow

Petal Nozzle in Supersonic Flow

Mixing of Swirling Jets in a Supersonic Duct
Flow

B96-024

Optimal Shock Wave Parameters for Supersonic
Inlets

B96-028

Flow Characteristics in Boundary-Layer Bleed
Slots with Plenum

B96-035

Mixing Pressure-Rise Parameter for Effect of

Experimental Study on Mixing Enhancement by

Nozzle Geometry in Diffuser-Ejectors **B96-066**

Experimental Investigation of Angled Injection in a Compressible Flow

B96-071

Enhancement of Thermal Mixing in Coaxial Supersonic Jets

Analysis of Partially Mixed Supersonic Ejector

B96-113

Flow Characteristics of a Rectangular Multielement Supersonic Mixer-Ejector

B96-154

Two-Temperature Plasma Modeling of Nitro-

Flow Characteristics of a Rectangular Multielement Supersonic Mixer-Ejector

Two-Temperature Plasma Modeling of Nitrogen/Hydrogen Arcjets

B96-161

Transverse Gas Jet Injection Behind a Rearward-Facing Step

B96-170

Transonic Flow

Shock-Wave/Boundary-Layer Interactions with Bleed Through Rows of Holes B96-033

Unsteady Flows

Computational Analysis of the Unsteady Type IV Shock Interaction of Blunt Body Flows

B96-017
Time-Marching Euler Analysis of Ducted-Propellers
Plutter Analysis of Propfans Using a Three-Dimensional Euler Solver
Unsteady Multistage Analysis Using a Loosely Coupled Blade Row Approach
Mixing by Resonant Acoustic Driving in a Closed Chamber

B96-054

Unsteady Vorticity Generation and Evolution in a Model of a Solid Rocket Motor B96-102 Experimental Investigation of a Nonsteady Flow Thrust Augmenter B96-111

Stall Flutter Prediction Techniques for Fan and Compressor Blades B96-121

Viscous Non-Boundary-Layer Flows

Mixing of Swirling Jets in a Supersonic Duct Flow B96-024 Computational Study of Viscous Effects on Lobed Mixer Flow Features and Performance B96-073

Vortices

Novel Active Ripple Filter for the Solar Array
Shunt Switching Unit

Mixing by Resonant Acoustic Driving in a
Closed Chamber

Experimental Investigation of Angled Injection
in a Compressible Flow

B96-071

Guidance, Control, and Dynamics Technology

Aircraft Dynamics

Vibration Signature Analysis of a Faulted Gear Transmission System B96-043

Interdisciplinary Topics

Analytical and Numerical Methods

Spur, Helical, and Spiral Bevel Transmission
Life Modeling B96-042
Stochastic-Probabilistic Efficiency Enhanced
Dispersion Modeling of Turbulent Polydispersed Sprays B96-116
Guide to Credible Computer Simulations of Fluid Flows B96-144
High-Pressure Arc Heater Development and
Modeling: Status and Requirements B96-159

Reliability, Maintainability, and Logistics Support

Spur, Helical, and Spiral Bevel Transmission Life Modeling B96-042

Research Facilities and Instrumentation

Laboratory-Scale Hybrid Rocket Motor Uncertainty Analysis B96-093
Plasma Generators for Re-Entry Simulation
B96-160

Safety

Impact Characteristics of Hailstones Simulating
Ingestion by Turbofan Aeroengines B96-074

Launch Vehicle and Missile (LV/M) Technology

Configuration Design

Airbreathing Space Boosters Using In-Flight Oxidizer Collection B96-047

Launch Vehicle and Sounding Rocket Systems

Development and Flight of a 250-A-h Lithium Thionyl Chloride Battery B96-138

Propulsion and Propellant Systems

Influence of Rocket Design Parameters on Engine Nozzle Efficiencies

Airbreathing Space Boosters Using In-Flight Oxidizer Collection

Correlation of Slag Expulsion with Ballistic Anomalies in Shuttle Solid Rocket Motors

B96-099

Simulation

Large-Displacement Structural Durability Analyses of Simple Specimens Emulating Rocket Chambers B96-007

Mixing Pressure-Rise Parameter for Effect of Nozzle Geometry in Diffuser-Ejectors

B96-066

B96-165

Testing, Flight and Ground

Laboratory-Scale Hybrid Rocket Motor Uncertainty Analysis

Correlation of Slag Expulsion with Ballistic Anomalies in Shuttle Solid Rocket Motors

B96-099

High-Pressure Arc Heater Development and Modeling: Status and Requirements

Near-Electrode Model for 100-Standard Atmosphere Arc Discharges

B96-164

Imacts of External Magnetic Fields Applied to

Propulsion

High-Pressure Electric Arc Heaters

Airbreathing Propulsion

Hydrodynamic Suppression of Soot Emissions in Laminar Diffusion Flames Effect of Fluorinated Graphite on Combustion of Boron and Boron-Based Fuel-Rich Propellants Role of Slip in the Generation of Acoustic Instabilities in Gas Turbines B96-004 Numerical Analysis of Sweep Effects in Shrouded Propfan Rotors B96-019 Internal Flowfield Characteristics of a Scramjet Inlet at Mach 10 B96-022 Dual Stream Axisymmetric Mixing in the Presence of Axial Vorticity B96-025 Crossflow Mixing of Noncircular Jets R96-034 Direct Measurement of Skin Friction in a Turbine Cascade B96-037 Effect of Target Materials on the Particle Restitution Characteristics for Turbomachinery Application B96-039 Unsteady Multistage Analysis Using a Loosely Coupled Blade Row Approach B96-041 Airbreathing Space Boosters Using In-Flight Oxidizer Collection R96-047 Numerical Simulations of Unsteady Transonic Flow in Turbomachines B96-064 Estimation of Mixing of High-Speed Streams B96-065 Effects of Initial Boundary Layers to the Lobed Mixer Trailing Streamwise Vorticity R96-070

Computational Study of Viscous Effects on Lobed Mixer Flow Features and Performance B96-073

Impact Characteristics of Hailstones Simulating Ingestion by Turbofan Aeroengines

Advanced Propeller Performance Calculation by a Lifting Surface Method

B96-077

Hot-Streak Clocking Effects in a 1-1/2 Stage

Turbine B96-097
Effect of Heat Release on Streamwise Vorticity

Enhanced Mixing

Measured Supersonic Flame Properties: HeatRelease Patterns, Pressure Losses, Thermal
Choking Limits

B96-110

B96-110

Choking Limits B96-110
Enhancement of Thermal Mixing in Coaxial Supersonic Jets B96-112

Analysis of Partially Mixed Supersonic Ejector

896-113

Investigation of the Effect of Tabs on Supersonic
Jets Using Advanced Diagnostics
Wave Rotor Optimization for Gas Turbine Engine Topping Cycles

B96-118

Semiempirical Predictions and Correlations of CO Emissions from Utility Combustion Turbines B96-142

Numerical Simulation of Dynamic Wave Rotor Performance B96-145

Preliminary Assessment of Wake Management Strategies for Reduction of Turbomachinery Fan Noise

B96-146

Case Wall Pressures in a Multistage Axial Compressor with Tip Clearance Variation

Three-Dimensional Flowfield in a Turbine Nozzle Passage B96-148 Transverse Gas Jet Injection Behind a Rearward-Facing Step B96-170

Effects of Nozzle Geometry on Parallel Injection into a Supersonic Flow B96-173

Expansion Corner Effects on Hypersonic Shock Wave/Turbulent Boundary-Layer Interactions 896-174

Application of the k-ω Turbulence Model to Quasi-Three-Dimensional Turbomachinery Flows

B96-176
Impulse Function and Drag in Scramjet Inlet
Models
B96-178

Combustion and Combustor Designs

Hydrodynamic Suppression of Soot Emissions in Laminar Diffusion Flames

B96-001

Validity of Droplet Ignition Criteria Derived Assuming Gas-Phase Quasisteadiness

B96-002

Crossflow Mixing of Noncircular Jets

Nitramine Deflagration: Reduced Chemical Mechanism for the Primary Flame Facilitating Simplified Asymptotic Analysis

B96-045

Transcritical Liquid Oxygen Droplet Vaporization: Effect on Rocket Combustion Instability

B96-052

Oscillatory Fuel Droplet Vaporization: Driving Mechanism for Combustion Instability

B96-053

Semiempirical Correlations of NO_X Emissions from Utility Combustion Turbines with Inert Injection 896-083

Global Characteristics and Structure of Hydrogen-Air Counterflow Diffusion Flames

Theoretical Effects of Aluminum Gel Propellant Secondary Atomization on Rocket Engine Performance B96-091

Internal Ballistic Model for Spinning Star-Grain
Motors B96-094

Effect of Heat Release on Streamwise Vorticity
Enhanced Mixing B96-101

Burn Time Measurements of Single Aluminum Particles in Steam and CO₂ Mixtures **B96-104** Effects of Hydrodynamics on Soot Formation in Laminar Opposed-Jet Diffusion Flames

Autoignition of Methane Mixtures: The Effect of
Hydrogen Peroxide

Measured Supersonic Flame Properties: Heat-

Measured Supersonic Flame Properties: Heat-Release Patterns, Pressure Losses, Thermal Choking Limits B96-110

Semiempirical Predictions and Correlations of CO Emissions from Utility Combustion Turbines

B96-142

Propellant Injection in a Liquid Oxygen/Gaseous
Hydrogen Rocket Engine
B96-171

Triggering of Longitudinal Combustion Instabilities in Rocket Motors: Nonlinear Combustion Response B96-172

Combustion Instability

Role of Slip in the Generation of Acoustic Instabilities in Gas Turbines B96-004 Holography Experiments in a Dense High-Speed Impinging Jet Spray B96-051 Transcritical Liquid Oxygen Droplet Vaporization: Effect on Rocket Combustion Instability 896-052

Oscillatory Fuel Droplet Vaporization: Driving Mechanism for Combustion Instability

Plateau Region of Composite Propellants

B96-053 its **B96-067**

Magnetic Flow Meter Measurement of Solid Propellant Pressure-Coupled Responses Using an Acoustic Analysis B96-068

Global Characteristics and Structure of Hydrogen-Air Counterflow Diffusion Flames

B96-084

Examination of Chemical Approaches to Stabilizing Composite-Propellant Combustion B96-086

Theory of Unsteady Combustion of Solids: Investigation of Quasisteady Assumption

B96-087

Acoustic-Instability Boundaries in Liquid-Propellant Rockets: Theoretical Explanation of Empirical Correlation B96-098

Unsteady Vorticity Generation and Evolution in a Model of a Solid Rocket Motor B96-102
Triggering of Longitudinal Combustion Instabil-

ities in Rocket Motors: Nonlinear Combustion Response B96-172

Linear Acoustic Analysis of Solid Propellant Pressure-Coupled Distributed Combustion

B96-177

Droplet Characterization

Holography Experiments in a Dense High-Speed Impinging Jet Spray B96-051
Oscillatory Fuel Droplet Vaporization: Driving

Mechanism for Combustion Instability
B96-053

Role of Combustion on Droplet Transport in Pressure-Atomized Spray Flames B96-085 Burn Time Measurements of Single Aluminum Particles in Steam and CO₂ Mixtures B96-104

Electric and Advanced Space Propulsion

Electric Probe Measurements in the Plume of an lon Thruster B96-013

Near- and Far-Field Plume Studies of a One-Kilowatt Arcjet B96-014

Two-Fluid Nonequilibrium Simulation of Hydrogen Arcjet Thrusters B96-015

Anode Heat Loss and Current Distributions in a DC Arcjet B96-016

Simple Geometric Model for Estimating the Impingement Current on Ion Thruster Grids

Microinstabilities in a 10-Kilowatt Self-Field Magnetoplasmadynamic Thruster B96-057
Theoretical Upper Limits on Enthalpy Rocket Performance B96-072
Whistler-Driven, Electron-Cyclotron-Resonance-

Heated Thruster: Experimental Status

B96-125

Laser Cooling of Neutral Argon for Simulating the Storage of Antimatter B96-141
Arcjets and Arc Heaters: An Overview of Research Status and Needs B96-155
Directions for Arcjet Technology Development B96-157

Arcjet Modeling: Status and Prospects B96-158
Interior Plasma Diagnostics of Arcjet Thrusters

Arcjet Thruster Development

Near-Electrode Model for 100-Standard Atmosphere Arc Discharges

B96-164

Exit-Plane Electrostatic Probe Measurements of a Low-Power Arciet

B96-166

a Low-Power Arcjet Fluctuation of Arcjet Plume Properties

roperties **B96-167**

B96-055

B96-067

R96-068

B96-086

Low-Power Ammonia Arcjet: Numerical Simu lations and Laser-Induced Flourescence Mea surements B96-16 Arcjet Anode Sheath Voltage Measurement by Langmuir Probe B96-17
Engine Performance
Theoretical Upper Limits on Enthalpy Rocke Performance B96-07. Impact Characteristics of Hailstones Simulating Ingestion by Turbofan Aeroengines B96-07. Semiempirical Correlations of NO _X Emission from Utility Combustion Turbines with Iner Injection B96-08. Theoretical Effects of Aluminum Gel Propellan Secondary Atomization on Rocket Engine Performance B96-09. Numerical Flowfield Analysis of the Next Generation Vulcan Nozzle B96-10. Wave Rotor Optimization for Gas Turbine Engine Topping Cycles B96-11.
Environmental Effects
Semiempirical Correlations of NO _X Emission from Utility Combustion Turbines with Iner Injection B96-08 Role of Combustion on Droplet Transport in Pres sure-Atomized Spray Flames B96-08 Semiempirical Predictions and Correlations of CO Emissions from Utility Combustion Turbines B96-14
Fuels and Propellants, Properties of
Effect of Fluorinated Graphite on Combustion of Boron and Boron-Based Fuel-Rich Propel lants B96-00 Corrosion of Ti-6Al-4V Alloy and 304L Stain less Steel in Liquid Nitrogen Oxides B96-00
Nitramine Deflagration: Reduced Chemical Mechanism for the Primary Flame Facilitating Simplified Asymptotic Analysis Magnetic Flow Meter Measurement of Solid Propellant Pressure-Coupled Responses Using a Acoustic Analysis B96-06 Examination of Chemical Approaches to Stabilizing Composite-Propellant Combustion
Laboratory Methodologies for Propellant Corro sion Research B96-08 Aluminum Alloy Compatibility with Gelled In hibited Red Fuming Nitric Acid B96-09 Theoretical Effects of Aluminum Gel Propellan Secondary Atomization on Rocket Engin

Performance

Gas Streams

Bomb

Hybrid Rocket Engines

tainty Analysis

chlorate Propellant Combustion

Laminar Opposed-Jet Diffusion Flam

and Fluorine Compounds

red Spectroscopy Experiment

Laboratory-Scale Hybrid Rocket Motor Uncer-

Transverse Jet Mixing and Combustion Experiments in Hypervelocity Flows Oblique Detonation Wave Engine Performance Prediction Ram Accelerator Utilizing Active Projectile Finite Element Analysis of the Scramaccelerator with Hydrogen-Oxygen Combustion Simplified Model and Navier-Stokes Calculations for Hypersonic Air Intakes Design Unsteady Pressure Behavior in a Ramjet/Scram-B96-091 iet Inlet Effects of Kevlar® Fibers on Ammonium Per-Influence of Formation Processes on B96-096 **Detonation Wave Stabilization** Shock Initiation of Crystalline Boron in Oxygen Autoignition of Methane Mixtures: The Effect of B96-105 Hydrogen Peroxide Effects of Hydrodynamics on Soot Formation in Injection of Supercritical Ethylene in Nitrogen B96-107 Shock-Tunnel Investigation of Hypervelocity Breakup of Annular Viscous Liquid Jets in Two Free Shear Layers in a Planar Duct B96-115 Effects of Nozzle Geometry on Parallel Injection Injection of Supercritical Ethylene in Nitrogen into a Supersonic Flow B96-117 Expansion Corner Effects on Hypersonic Shock Condensed-Phase Kinetics of Cyclotrimethylen-Wave/Turbulent Boundary-Layer Interactions etrinitramine by Modeling the T-Jump/Infra-B96-143 Impulse Function and Drag in Scramjet Inlet Analysis of Agglomerate Size from Burning Alu-Models minized AP/RDX/HTPB Propellants in Quench Hollow Projectile Operation in the Ram Acceler-

B96-093

J. PROPULSION, VOL. 12, NO. 6: 1996 INDEX Ignition and Ignitor Design Predicting and Analyzing X-Rays to Measure Propellant Crack Propagation Speed B96-046 Validity of Droplet Ignition Criteria Derived As-Vortex Shedding in Segmented Solid Rocket suming Gas-Phase Quasisteadiness **B96-002** Motors Hot-Spot Ignition of Condensed Phase Energetic Plateau Region of Composite Propellants Magnetic Flow Meter Measurement of Solid Pro-Injector Design and Characterization pellant Pressure-Coupled Responses Using an Acoustic Analysis Novel Active Ripple Filter for the Solar Array Examination of Chemical Approaches to Stabi-Shunt Switching Unit B96-010 lizing Composite-Propellant Combustion Role of Combustion on Droplet Transport in Pressure-Atomized Spray Flames B96-085 Theory of Unsteady Combustion of Solids: In-

Propellant Injection in a Liquid Oxygen/Gaseous vestigation of Quasisteady Assumption Hydrogen Rocket Engine Al2O3 Collection and Sizing from Solid Rocket Liquid Rocket Motors and Missile Systems Motor Plumes R96-092 Effects of Kevlar® Fibers on Ammonium Per-Influence of Rocket Design Parameters on Enchlorate Propellant Combustion B96-096 gine Nozzle Efficiencies B96-005 Correlation of Slag Expulsion with Ballistic Development of Equations of State for Com-Anomalies in Shuttle Solid Rocket Motors pressible Liquids B96-032 R96-099 Holography Experiments in a Dense High-Speed Evolution of Internal Flow in a Solid Rocket Mo-Impinging Jet Spray B96-051 tor with Radial Slots B96-100 Laboratory Methodologies for Propellant Corro-Burn Time Measurements of Single Aluminum sion Research B96-089 Particles in Steam and CO₂ Mixtures B96-104 Aluminum Alloy Compatibility with Gelled Inhibited Red Fuming Nitric Acid B96-090 Supersonic Combustion

Propellant Injection in a Liquid Oxygen/Gaseous Hydrogen Rocket Engine B96-171

B96-098

B96-106

B96-010

B96-024

B96-026

B96-048

B96-050

B96-076

B96-078

Oblique

B96-081

B96-108

B96-117

B96-152

R96-173

B96-174

B96-178

B96-179

B96-044

Acoustic-Instability Boundaries in Liquid-Pro-

Hot-Spot Ignition of Condensed Phase Energetic

Novel Active Ripple Filter for the Solar Array

Mixing of Swirling Jets in a Supersonic Duct

Empirical Correlation

Propulsion Hazards

Ramjets and Scramjets

Shunt Switching Unit

Materials

pellant Rockets: Theoretical Explanation of

Petal Nozzle in Supersonic Flow B96-023 Experimental Flow Visualization for a Large-Scale Ram Accelerator B96-030 Oblique Detonation Wave Engine Performance Prediction B96-048

Ram Accelerator Utilizing Active Projectile B96-049 Preliminary Studies on Dual-Mode Combustion

Experimental Study on Mixing Enhancement by

Ramiet Using Petal Nozzle B96-063

Estimation of Mixing of High-Speed Streams B96-065 Influence of Formation Processes on Oblique **Detonation Wave Stabilization** B96-081 Measured Supersonic Flame Properties: Heat-Release Patterns, Pressure Losses, Thermal **Choking Limits** B96-110 Effects of Nozzle Geometry on Parallel Injection into a Supersonic Flow B96-173 Hollow Projectile Operation in the Ram Acceler-B96-179

Transient Combustion and Detonation

Theory of Unsteady Combustion of Solids: Investigation of Quasisteady Assumption

B96-087 Shock Initiation of Crystalline Boron in Oxygen and Fluorine Compounds B96-105 Hollow Projectile Operation in the Ram Acceler-B96-179 ator

Space Technology

Space Experiments

Linear Refractive Photovoltaic Concentrator Solar Array Flight Experiment B96-132

Spacecraft Power

Chemical Double-Layer Capacitor Power Source for Electromechanical Thrust Vector Control R96-012 Actuator Concentrating and Splitting of Solar Radiation for Lasér Pumping and Photovoltaic Conver-B96-060 Technologies for Spacecraft Electric Power Sys-B96-126 tems Designs and Technologies for Future Planetary Power Systems B96-127

Recent Advances in Solar Cell Technology B96-128

Laser Pyrolysis of Hydroxyl-Terminated Polyb-

Solid Rocket Motors and Missile Systems

utadiene

	High-Efficiency GaInP/GaAs Tandem Sol	lar Cells
		B96-129
	Early Results from Solar Dynamic Space	e Power
	System Testing	B96-131
Linear Refractive Photovoltaic Concentrator		
	lar Array Flight Experiment	B96-132
	Lightweight Inflatable Solar Array	B96-133
	Nickel-Hydrogen Batteries-An Overvi	ew
	, ,	B96-134
	Space-Station Nickel-Hydrogen Battery	Orbital
	Replacement Unit Test	B96-136
	Space Nuclear Power: An Overview	B96-139
	SP-100 Thermoelectric Cell Testing	B96-140

Spacecraft Sensor Systems

Early Results from Solar Dynamic Space Power System Testing B96-131

Structural Mechanics and Materials

Aeroelasticity and Control

Stall Flutter Prediction Techniques for Fan and Compressor Blades B96-121

Materials Structural Properties

Study on Thermal Strain Using Subscale Specimens B96-031

Structural Composite Materials

Micromechanics of Nonlinear Behavior in Solid-Filled Mooney-Rivlin Rubber Specimen

B96-150

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

Large-Displacement Structural Durability Analyses of Simple Specimens Emulating Rocket Chambers B96-007

Micromechanics of Nonlinear Behavior in Solid-Filled Mooney-Rivlin Rubber Specimen

B96-150

Structural Dynamics and Characterization

Predicting and Analyzing X-Rays to Measure Propellant Crack Propagation Speed **B96-046**

Structural Finite Elements

Large-Displacement Structural Durability Analyses of Simple Specimens Emulating Rocket Chambers B96-007
Study on Thermal Strain Using Subscale Specimens B96-018

Thermal Effects

Study on Thermal Strain Using Subscale Specimens B96-031

Thermophysics and Heat Transfer

Ablation, Pyrolysis, Thermal Decomposition, and Degradation

Laser Pyrolysis of Hydroxyl-Terminated Polybutadiene B96-044

Aerothermodynamics/Thermal Protection

High-Pressure Arc Heater Development and Modeling: Status and Requirements B96-159
Plasma Generators for Re-Entry Simulation
B96-160

Near-Electrode Model for 100-Standard Atmosphere Arc Discharges B96-164

Computational Heat Transfer

Guide to Credible Computer Simulations of Fluid Flows B96-144

Electronics Cooling

Active Cooling of Metal Oxide Semiconductor Controlled Thyristor Using Venturi Flow

D)0-0.

Heat Conduction

Anode Heat Loss and Current Distributions in a DC Arcjet B96-016

Melting/Solidification

Hot-Spot Ignition of Condensed Phase Energetic
Materials B96-106

Nonintrusive Diagnostics

Predicting and Analyzing X-Rays to Measure Propellant Crack Propagation Speed B96-046 Interior Plasma Diagnostics of Arcjet Thrusters B96-162

Low-Power Ammonia Arcjet: Numerical Simulations and Laser-Induced Flourescence Measurements

B96-169

Thermal Modeling and Analysis

Condensed-Phase Kinetics of Cyclotrimethylenetrinitramine by Modeling the T-Jump/Infrared Spectroscopy Experiment B96-143

Thermochemistry and Chemical Kinetics

Shock Initiation of Crystalline Boron in Oxygen and Fluorine Compounds

B96-105

Condensed-Phase Kinetics of Cyclotrimethylenetrinitramine by Modeling the T-Jump/Infrared Spectroscopy Experiment

B96-143

Thermophysical Properties

Development of Equations of State for Compressible Liquids B96-032

Author Index

Adair, P., B96-011 Ahmed, S. A., B96-021 Ahuja, J. K., **B96-082** Aithal, S. M., B96-168 Al-Garni, A. Z., B96-021 Allan, Barry D., B96-089, B96-090 Alvarado, Alexis, B96-099 Amin, Sameh M., B96-111 Appelbaum, J., B96-060, B96-061 Arakawa, Yoshihiro, B96-016 Arndt, Ramona E., B96-089, B96-090 Arva, Vinod K., B96-007 Ashford, S. A., B96-048 Ault, D. A., B96-022, B96-174 Auweter-Kurtz, M., B96-160, B96-163 Avedisian, C. T., B96-085 Babu, V., B96-168 Bailey, Sheila G., B96-128 Bankston, P., B96-127 Barkhoudarian, S., B96-029 Barnes, J. C., B96-142 Bayley, Douglas J., B96-071 Beam, J. E., B96-059 Beckstead, M. W., B96-104 Bélanger, Jacques, B96-026 Belovich, V. M., B96-025 Bennett, Gary L., B96-126, B96-139

Bertness, K. A., B96-129 Birkan, Mitat A., B96-155 Bittner, H. F., B96-138 Bonnett, David L., B96-106 Bowersox, R. D. W., B96-036 Brandeis, Julius, B96-049 Brandhorst, Henry W., B96-126 Braun, M. J., B96-027 Brewster, M. Q., B96-044, B96-087, B96-096 Brill, Thomas B., B96-143 Brookfield, J. M., B96-146 Bruce, W. E., III, B96-159 Bruckner, A. P., B96-179 Bruno, C., B96-108 Buckmaster, J., B96-004 Bufton, Scott A., B96-166 Burtner, David, B96-169 Burton, R. L., B96-105, B96-161, B96-166, B96-175 Buter, T. A., B96-036 Butler, G. W., B96-157 Butler, P. Barry, B96-106 Buttsworth, D. R., **B96-152** Capece, V. R., B96-121 Cappelli, Mark A., B96-162 Carreiro, Louis R., B96-047 Carter, Campbell D., B96-117 Cassady, R. J., **B96-157** Cauty, F., B96-068

Chamkha, Ali J., B96-069 Chang, Jyh-Cheng, B96-002 Chang, W. S., B96-059 Chapman, R., B96-159 Chen, Chao-Hsun, B96-150 Chen, Tzong H., B96-117, B96-173 Chen, Xi-Qing, **B96-116** Cheng, Chiang-Ho, B96-150 Chetty, P. R. K., B96-126 Chiang, C. H., B96-053 Chima, Rodrick V., B96-176 Chinzei, Nobuo, B96-178 Cho, B. H., B96-010 Choueiri, Edgar Y., B96-057 Choy, F. K., B96-043 Chyu, W. J., B96-033 Clark, K., B96-127 Coates, D. K., B96-135 Coe, H. H., B96-042 Cohen, Fred, **B96-136** Comas, P., B96-068 Connors, C. S., B96-142 Coy, J. J., B96-042 Cross, G. S., B96-029 Crutchik, M., B96-061 Cutler, A. D., B96-024 Dalton, Penni J., B96-136 Darracq, D., B96-076 Dash, Sanford M., B96-079 Davis, Roger L., B96-041, B96-064

Dawes, W. N., B96-073 de Boer, P. C. T., B96-013 Delplanque, J.-P., **B96-052** Detwiler, R., B96-127 DiCicco, M., B96-004 Doherty, M. J., B96-126 Donbar, Jeffrey M., B96-110 Dorney, Daniel J., B96-041, B96-064, B96-097 Dove, Michael F. A., B96-006, B96-089, B96-090 Driscoll, James F., B96-110 Duvvur, A., B96-053 Dyne, Barry R., **B96-050** Eagar, Mark A., B96-100 Edwards, Jack R., B96-020 EL-Aini, Y. M., B96-121 Elliott, G. S., B96-114 Emami, Saied, B96-078 Emanuel, G., **B96-048** Erwin, Daniel A., B96-167 Esker, D. R., **B96-044** Ewell, Richard, B96-140 Faeth, G. M., B96-001, B96-107 Farmer, S. B., B96-046 Felderman, E. J., B96-159, B96-164, B96-165 Fisher, C. J., B96-164 Flood, D. J., **B96-061** Foster, John E., B96-014