Subject Index

Aircraft Technology, Conventional, STOL/VTOL

Particle Radiation Near the Orbit of the Vacuum Wake Shield A90-007

Aerodynamics

Lateral Oscillations of Sting-Mounted Models at High Alpha A90-080

Aerospace Plane

Computational Requirements for Hypersonic Flight Performance Estimates A90-021

Configuration Design

Computational Requirements for Hypersonic Flight Performance Estimates A90-021

Flight Mechanics

Nonplanar Effects on Pitch-Plane Dynamics A90-036

Structural Materials

Crack Growth Behavior in a Composite Propellant with Strain Gradients—Part II A90-103

Testing, Flight and Ground

Lateral Oscillations of Sting-Mounted Models at High Alpha A90-080
Nonplanar Effects on Pitch-Plane Dynamics A90-036

Vibration

Observations on Thermospheric and Mesospheric Density Disturbances Caused by Typhoons and Convective Storms A90-045

Weather Hazards

Observations on Thermospheric and Mesospheric Density Disturbances Caused by Typhoons and Convective Storms A90-045

Energy

Photovoltaic Power

Where Do Negatively Biased Solar Arrays Arc? A90-087
Particle-in-Cell Simulations of Sheath Formation Around Biased Interconnectors in a Low-Earth-Orbit Plasma A90-086
Ground Studies of Ionospheric Plasma Interactions with a High Voltage Solar Array A90-066

Fluid Dynamics

Boundary Layers and Heat Transfer—Laminar

Approximate Viscious Shock-Layer Method for Hypersonic Flow over Blunt-Nosed Bodies A90-095
Hypersonic Vicous Shock-Layer Solutions over Long Slender Bodies—Part II: Low Reynolds Number Flows A90-030
Hypersonic Viscous Shock-Layer Solutions over Long Slender Bodies—Part I: High Reynolds Number Flows A90-029

Boundary Layers and Heat Transfer—Turbulent

Small Submerged Vortex Generators for Turbulent Flow Separation Control A90-079
Hypersonic Viscous Shock-Layer Solutions over Long Slender Bodies—Part I: High Reynolds Number Flows A90-029

Computational Fluid Dynamics

Aeroassisted Flight Experiment Aerodynamic Characteristics at Flight Conditions A90-109
Prediction of Supersonic/Hypersonic Viscous Flows Over Re-entry Vehicles and Decoys A90-078
Induced Roll Computations for Conventional Missiles A90-077
Aerodynamic Characteristics of a Family of Cone-Cylinder-Flare Projectiles A90-057
Nonequilibrium Viscous Hypersonic Flows over Ablating Teflon Surfaces A90-032
Large-Angle-of-Attack Viscous Hypersonic Flows over Complex Lifting Configurations A90-031
Development and Validation of a Navier-Stokes Code for Hypersonic External Flow A90-027
Three-Dimensional Upwind Parabolized Navier-Stokes Code for Real Gas Flows A90-026
Navier-Stokes Simulation of Three-Dimensional Hypersonic Equilibrium Flows with Ablation A90-025
Computational Fluid Dynamics Nose-to-Tail Capability: Hypersonic Unsteady Navier-Stokes Code Validation A90-023
Accurate Navier-Stokes Results for the Hypersonic Flow over a Spherical Nosetip A90-022
Computational Requirements for Hypersonic Flight Performance Estimates A90-021
Need for Control of Numerical Accuracy A90-020

Hydrodynamics

Response of a Liquid Column to Counter-directional Excitation A90-107

Hypersonic Flow

Aeroassisted Flight Experiment Aerodynamic Characteristics at Flight Conditions A90-109
Explicit Thermochemical Nonequilibrium Algorithm Applied to Compute Three-Dimensional Aeroassist Flight Experiment Flowfields A90-085
Prediction of Supersonic/Hypersonic Viscous Flows Over Re-entry Vehicles and Decoys A90-078
Flowfield and Vehicle Parameters Influence on Hypersonic Heat Transfer and Drag A90-058
Downward-Deployed Tethered Platforms for High-Enthalpy Aerothermodynamic Research A90-033
Nonequilibrium Viscous Hypersonic Flows over Ablating Teflon Surfaces A90-032
Large-Angle-of-Attack Viscous Hypersonic Flows over Complex Lifting Configurations A90-031
Hypersonic Vicous Shock-Layer Solutions over Long Slender Bodies—Part II: Low Reynolds Number Flows A90-030
Hypersonic Viscous Shock-Layer Solutions over Long Slender Bodies—Part I: High Reynolds Number Flows A90-029
Development and Validation of a Navier-Stokes Code for Hypersonic External Flow A90-027
Three-Dimensional Upwind Parabolized Navier-Stokes Code for Real Gas Flows A90-026
Navier-Stokes Simulation of Three-Dimensional Hypersonic Equilibrium Flows with Ablation A90-025
Code Calibration Program in Support of the Aeroassist Flight Experiment A90-024
Computational Fluid Dynamics Nose-to-Tail Capability: Hypersonic Unsteady Navier-Stokes Code Validation A90-023
Accurate Navier-Stokes Results for the Hypersonic Flow over a Spherical Nosetip A90-022

Inlet, Nozzle, Diffusor, and Channel Flows

Generalized One-Dimensional Compressible Flow Matrix Inverse A90-070

Jets, Wakes, and Viscid-Inviscid Flow Interactions

Approximate Viscious Shock-Layer Method for Hypersonic Flow over Blunt-Nosed Bodies A90-095
Effectiveness of Passive Devices for Axisymmetric Base Drag Reduction at Mach 2 A90-037
Prediction of the Visible Signature of Solid Rocket Plumes A90-015

Multiphase Flows

Foam Formation in Low Gravity A90-050
Microgravity Bubble Migration in Rotating Flows A90-008

Plasmadynamics and MHD

Qualitative Experiment with Arc Discharges on Negatively Biased Solar Cells A90-105
Experimental Study of Plasma Contactor Phenomena A90-101

Semiempirical Analytical Model for the Spin Modulation of Retarding Potential Analyzer Fluxes A90-092
Theory of Plasma Contactors in Ground-Based Experiments and Low Earth Orbit A90-063

Rarefied Flows

Hypersonic Vicous Shock-Layer Solutions over Long Slender Bodies—Part II: Low Reynolds Number Flows A90-030

Reacting Flows and Combustion

Nonequilibrium Viscous Hypersonic Flows over Ablating Teflon Surfaces A90-032
Large-Angle-of-Attack Viscous Hypersonic Flows over Complex Lifting Configurations A90-031
Three-Dimensional Upwind Parabolized Navier-Stokes Code for Real Gas Flows A90-026

Separated Flows

Experimental Base Pressure Histories with Nonsteady Discrete Bleed Rates A90-088
Small Submerged Vortex Generators for Turbulent Flow Separation Control A90-079
Effectiveness of Passive Devices for Axisymmetric Base Drag Reduction at Mach 2 A90-037
Measurement of In-Flight Base Pressure on an Artillery-Fired Projectile A90-001

Shock Waves and Detonations

Experimental Base Pressure Histories with Nonsteady Discrete Bleed Rates A90-088

Supersonic Flow

Lift Losses for Fin-Body Gaps in Transonic and Supersonic Speeds A90-093
Modeling Supersonic Missile Fin-Body Interference for Preliminary Design A90-091
Induced Roll Computations for Conventional Missiles A90-077
Effectiveness of Passive Devices for Axisymmetric Base Drag Reduction at Mach 2 A90-037
Analysis of Selected Data from the Triservice Missile Data Base A90-004

Transonic Flow

Lift Losses for Fin-Body Gaps in Transonic and Supersonic Speeds A90-093
Nonplanar Effects on Pitch-Plane Dynamics A90-036

Unsteady Flows

Lateral Oscillations of Sting-Mounted Models at High Alpha A90-080

Viscous Non-boundary-Layer Flows

Accurate Navier-Stokes Results for the Hypersonic Flow over a Spherical Nosetip A90-022

Vortices

Small Submerged Vortex Generators for Turbulent Flow Separation Control A90-079
Induced Roll Computations for Conventional Missiles A90-077
Analysis of Selected Data from the Triservice Missile Data Base A90-004

Wave Motion and Sloshing

Response of a Liquid Column to Counterdirectional Excitation A90-107

Guidance, Control, and Dynamics Technology

Artificial Intelligence

Orbit/Deorbit Analysis for a Mars Rover and Sample Return Mission A90-067

Astrodynamics

Tumble Orbit Transfer of Spent Satellites A90-054
Velocity Perturbation Distributions in the Breakup of Artificial Satellites A90-046

Flight Mechanics

Aerodynamic Characteristics of a Family of Cone-Cylinder-Flare Projectiles A90-057
Performance Assessment of a Space Station Rescue and Personnel/Logistics Vehicle A90-014

Missile Dynamics

Closed-Form Approach to Rocket-Vehicles Aeroelastic Divergence A89-013

Missile Guidance and Control

Energy Management for Multiple-Pulse Missiles A90-099

Optimization Techniques

Second-Stage Trajectories of Air-Breathing Space Planes A90-098

Remote Control

Opportunities for Space Station Assembly Operations During Crew Absence A90-052
Observations on Thermospheric and Mesospheric Density Disturbances Caused by Typhoons and Convective Storms A90-045
Graphic-Simulator-Augmented Teleoperation System for Space Applications A90-012

Software Technology

EivaN: An Interactive Orbital Trajectory Planning Tool A90-108

Spacecraft Dynamics

Terminal Velocity of a Laser-Driven Light Sail A90-009

System Identification

Prediction of the Visible Signature of Solid Rocket Plumes A90-015

Trajectory Optimization

Energy Management for Multiple-Pulse Missiles A90-099
Velocity Perturbation Distributions in the Breakup of Artificial Satellites A90-046
Performance Assessment of a Space Station Rescue and Personnel/Logistics Vehicle A90-014

Interdisciplinary Topics

Analytical and Numerical Methods

Semiempirical Analytical Model for the Spin Modulation of Retarding Potential Analyzer Fluxes A90-092
Determination of Atmospheric Optical Properties During the First International Satellite Land Surface Climatology Project Field Experiment A90-060
Conversion of Omnidirectional Proton Fluxes into a Pitch Angle Distribution A90-055

Atmospheric and Space Sciences

Semiempirical Analytical Model for the Spin Modulation of Retarding Potential Analyzer Fluxes A90-092
Dispersal of Gases Generated Near a Lunar Outpost A90-083
Determination of Atmospheric Optical Properties During the First International Satellite Land Surface Climatology Project Field Experiment A90-060
Conversion of Omnidirectional Proton Fluxes into a Pitch Angle Distribution A90-055
Vacuum Ultraviolet Radiation/Atomic Oxygen Synergism in Materials Reactivity A90-053
Recent Developments and Near-Term Expectations for the NASA Balloon Program A90-047
Space Shuttle Externally Induced Environment Compared with Skylab's Natural Environment A90-034
Analysis of Extreme Wind Shear A90-005

Human Factors

Effect of an Anomalous Thruster Input During a Simulated Docking Maneuver A90-100
Psychological Health Maintenance on Space Station Freedom A90-076
Human Factors in Spacecraft Design A90-075
Psychosocial Effects of Adjustment in Antarctica: Lessons for Long-Duration Spaceflight A90-074
Problems of Intergroup Behavior in Human Spaceflight Operations A90-073
Psychological, Psychiatric, and Interpersonal Aspects of Long-Duration Space Missions A90-072
Organization, Selection, and Training of Crews for Extended Spaceflight: Findings from Analogs and Implications A90-071
Evaluation of the "0.1% Rule" for Docking Maneuvers A90-002

Lasers and Laser Applications

Terminal Velocity of a Laser-Driven Light Sail A90-009

Research Facilities and Instrumentation

Recent Developments and Near-Term Expectations for the NASA Balloon Program A90-047
Downward-Deployed Tethered Platforms for High-Enthalpy Aerothermodynamic Research A90-033

Safety

Psychosocial Effects of Adjustment in Antarctica: Lessons for Long-Duration Spaceflight A90-074

Sensor Systems

Determination of Atmospheric Optical Properties During the First International Satellite Land Surface Climatology Project Field Experiment A90-060

Launch Vehicle and Missile (LV/M) Technology

Aerodynamics

Lift Losses for Fin-Body Gaps in Transonic and Supersonic Speeds A90-093
Modeling Supersonic Missile Fin-Body Interference for Preliminary Design A90-091

Aerodynamic Characteristics of a Family of Cone-Cylinder-Flare Projectiles A90-057
Analysis of Selected Data from the Triservice Missile Data Base A90-004
Measurement of In-Flight Base Pressure on an Artillery-Fired Projectile A90-001

Configurational Design

Modeling Supersonic Missile Fin-Body Interference for Preliminary Design A90-091
Flowfield and Vehicle Parameters Influence on Hypersonic Heat Transfer and Drag A90-058
Propulsion System Optimization for Advanced Manned Launch System Vehicles A90-039

Missile System

Design Model of High-Performance Ramjet or Scramjet-Powered Vehicles A90-097

Propulsion and Propellant Systems

Design Model of High-Performance Ramjet or Scramjet-Powered Vehicles A90-097
Propulsion System Optimization for Advanced Manned Launch System Vehicles A90-039

Structural Design (Including Loads)

Analysis of Extreme Wind Shear A90-005

Testing, Flight and Ground

Measurement of In-Flight Base Pressure on an Artillery-Fired Projectile A90-001

Trajectories and Tracking Systems

Propulsion System Optimization for Advanced Manned Launch System Vehicles A90-039

Propulsion

Airbreathing Propulsion

Flux-Vector Splitting Calculation of Nonequilibrium Hydrogen-Air Reactions A90-028

Electric and Advanced Space Propulsion

Solar Photon Thrustor A90-065
Theory of Plasma Contactors in Ground-Based Experiments and Low Earth Orbit A90-063
Performance Verification of the Eurostar Propulsion Subsystem A90-038
Terminal Velocity of a Laser-Driven Light Sail A90-009

Environmental Effects

Ground Studies of Ionospheric Plasma Interactions with a High Voltage Solar Array A90-066
Space Shuttle Externally Induced Environment Compared with Skylab's Natural Environment A90-034
Method for Estimating Atomic Oxygen Surface Erosion in Space Environments A90-017

Solid Rocket Motors and Missile Systems

Energy Management for Multiple-Pulse Missiles A90-099
Prediction of the Visible Signature of Solid Rocket Plumes A90-015

Supersonic Combustion

Flux-Vector Splitting Calculation of Nonequilibrium Hydrogen-Air Reactions A90-028

Space Technology

Aerobraking Configurations/ Aerodynamics

Aerothermodynamics of Sprint-Type Manned Mars Missions A90-094
Explicit Thermochemical Nonequilibrium Algorithm Applied to Compute Three-Dimensional Aeroassist Flight Experiment Flowfields A90-085
Use of Atmospheric Braking During Mars Missions A90-081
Downward-Deployed Tethered Platforms for High-Enthalpy Aerothermodynamic Research A90-033
Code Calibration Program in Support of the Aeroassist Flight Experiment A90-024
Surface Pressure and Streamline Effects on Laminar Heating Calculations A90-003

Aerobraking Flight Mechanics

Lifting Entry Rescue Vehicle Configuration A90-096
Use of Atmospheric Braking During Mars Missions A90-081

Humans in Space/ Life Support Systems, EVA

Problems of Intergroup Behavior in Human Spaceflight Operations A90-073
Psychological, Psychiatric, and Interpersonal Aspects of Long-Duration Space Missions A90-072
Organization, Selection, and Training of Crews for Extended Spaceflight: Findings from Analogs and Implications A90-071
Space Radiation Dose Estimates on the Surface of Mars A90-056
Evaluation of the "0.1% Rule" for Docking Maneuvers A90-002

Mission Design and Analysis

Effect of an Anomalous Thruster Input During a Simulated Docking Maneuver A90-100
Second-Stage Trajectories of Air-Breathing Space Planes A90-098
Lifting Entry Rescue Vehicle Configuration A90-096
Aerothermodynamics of Sprint-Type Manned Mars Missions A90-094
OPSMODEL, An On-Orbit Operations Simulation Modeling Tool for Space Station A90-090
Disposal of Spacecraft at End of Life in Geosynchronous Orbit A90-068
Tumble Orbit Transfer of Spent Satellites A90-054

Mission Trajectories (Earth and Interplanetary)

EivaN: An Interactive Orbital Trajectory Planning Tool A90-108
Effect of an Anomalous Thruster Input During a Simulated Docking Maneuver A90-100
Second-Stage Trajectories of Air-Breathing Space Planes A90-098
Lifting Entry Rescue Vehicle Configuration A90-096
Disposal of Spacecraft at End of Life in Geosynchronous Orbit A90-068
Solar Photon Thrustor A90-065
Evaluation of the "0.1% Rule" for Docking Maneuvers A90-002

Space Experiments

Response of a Liquid Column to Counter-directional Excitation A90-107
CIRRIS-1A Space Shuttle Experiment A90-106
Limitations on Vibration Isolation for Microgravity Space Experiments A90-102
Threshold Voltage for Arcing on Negatively Biased Solar Arrays A90-084
New Interplanetary Proton Fluence Model A90-064
Low-Gravity Electrodeposition of Metals and Metal/Cermet Composites A90-062
Hardware Development for the Surface Tension Driven Convection Experiment A90-048
Velocity Perturbation Distributions in the Breakup of Artificial Satellites A90-046
Spacelab 2 Plasma Diagnostics Package A90-013
Microgravity Bubble Migration in Rotating Flows A90-008
Vehicle Charging Effects During Electron Beam Emission from the CHARGE-2 Experiment A90-006

Space Processing

Limitations on Vibration Isolation for Microgravity Space Experiments A90-102
Low-Gravity Electrodeposition of Metals and Metal/Cermet Composites A90-062
Foam Formation in Low Gravity A90-050

Space Systems

OPSMODEL, An On-Orbit Operations Simulation Modeling Tool for Space Station A90-090
Disposal of Spacecraft at End of Life in Geosynchronous Orbit A90-068
Vacuum Ultraviolet Radiation/Atomic Oxygen Synergism in Materials Reactivity A90-053
Opportunities for Space Station Assembly Operations During Crew Absence A90-052
GSTAR Satellite Disturbance from Plume Impingement A90-043
Systems Analysis of a Low-Acceleration Research Facility A90-010

Spacecraft Attitude Determination

Ion Drag for a Negatively Biased Solar Array in Low Earth Orbit A90-044

Spacecraft Communication

Encoding *Y,I,Q* Component Estimates of an NTSC Composite Signal A90-011

Spacecraft Contamination/ Sterilization

Qualitative Experiment with Arc Discharges on Negatively Biased Solar Cells A90-105
Effect of Eleven Years in Earth Orbit on a Mirror Surface A90-041
Ion Beam Removal of Water and Dioctyl Phthalate from Cryogenic Mirrors A90-040
Space Shuttle Externally Induced Environment Compared with Skylab's Natural Environment A90-034

Spacecraft Power

Where Do Negatively Biased Solar Arrays Arc? A90-087

Particle-in-Cell Simulations of Sheath Formation Around Biased Interconnectors in a Low-Earth-Orbit Plasma A90-086
Threshold Voltage for Arcing on Negatively Biased Solar Arrays A90-084
Theory of Plasma Contactors in Ground-Based Experiments and Low Earth Orbit A90-063
Ion Drag for a Negatively Biased Solar Array in Low Earth Orbit A90-044
Optimum Heat Rejection Temperatures for Spacecraft Heat Pumps A89-046

Spacecraft Propulsion System Integration

Solar Photon Thrustor A90-065
Performance Verification of the Eurostar Propulsion Subsystem A90-038

Spacecraft Radiation Protection

Space Radiation Dose Estimates on the Surface of Mars A90-056

Spacecraft Structural Configuration, Design, and Analysis

Thermal Distortion Behavior of Graphite Reinforced Aluminum Space Structures A90-061
Vacuum Ultraviolet Radiation/Atomic Oxygen Synergism in Materials Reactivity A90-053
Exterior Spacecraft Subsystem Protective Shielding Analysis and Design A90-042
Lunar Habitat Concept Employing the Space Shuttle External Tank A90-035
Axisymmetric Shell Analysis of the Space Shuttle Solid Rocket Booster Field Joint A90-016

Spacecraft Test and Evaluation

Orbit/Deorbit Analysis for a Mars Rover and Sample Return Mission A90-067

Spacecraft Thermal Management

Automation Techniques for Thermal Analysis of Spacecraft Systems A90-104
Optimum Heat Rejection Temperatures for Spacecraft Heat Pumps A89-046

Structural Mechanics and Materials

Aeroelasticity and Control

Closed-Form Approach to Rocket-Vehicles Aeroelastic Divergence A89-013

Flexible and Active Structures

Effects of the Earth Orbit Environment on Thin-Wall Bubbles A90-069
Adaptive Structures: An Overview A90-051

Materials Structural Properties

Strength Design Criteria for Carbon/Epoxy Pressure Vessels A90-082
Physical Properties of Manganese-Bismuth Specimens Produced in Microgravity A90-059

Structural Composite Materials

Strength Design Criteria for Carbon/Epoxy Pressure Vessels A90-082
Thermal Distortion Behavior of Graphite Reinforced Aluminum Space Structures A90-061

Structural Design

Exterior Spacecraft Subsystem Protective Shielding Analysis and Design A90-042

Structural Dynamics and Characterization

Exterior Spacecraft Subsystem Protective Shielding Analysis and Design A90-042

Structural Modeling

Axisymmetric Shell Analysis of the Space Shuttle Solid Rocket Booster Field Joint A90-016

Structural Stability

Effects of the Earth Orbit Environment on Thin-Wall Bubbles A90-069

Thermal Effects

Effects of the Earth Orbit Environment on Thin-Wall Bubbles A90-069

Thermophysics and Heat Transfer

Ablation, Pyrolysis, Thermal Decomposition and Degradation

Method for Estimating Atomic Oxygen Surface Erosion in Space Environments A90-017

Aerothermodynamics/Thermal Protection

Approximate Viscious Shock-Layer Method for Hypersonic Flow over Blunt-Nosed Bodies A90-095
Aerothermodynamics of Sprint-Type Manned Mars Missions A90-094
Use of Atmospheric Braking During Mars Missions A90-081
Prediction of Supersonic/Hypersonic Viscous Flows Over Re-entry Vehicles and Decoys A90-078
Flowfield and Vehicle Parameters Influence on Hypersonic Heat Transfer and Drag A90-058
Navier-Stokes Simulation of Three-Dimensional Hypersonic Equilibrium Flows with Ablation A90-025
Surface Pressure and Streamline Effects on Laminar Heating Calculations A90-003

Computational Heat Transfer

Development and Validation of a Navier-Stokes Code for Hypersonic External Flow A90-027
Code Calibration Program in Support of the Aeroassist Flight Experiment A90-024

Electronics Cooling

Heat-Pump-Augmented Spacecraft Heat-Rejection Systems A90-049

Thermal Control

Heat-Pump-Augmented Spacecraft Heat-Rejection Systems A90-049
Optimum Heat Rejection Temperatures for Spacecraft Heat Pumps A89-046

Thermal Modeling and Analysis

Automation Techniques for Thermal Analysis of Spacecraft Systems A90-104
Heat-Pump-Augmented Spacecraft Heat-Rejection Systems A90-049

Thermochemistry and Chemical Kinetics

Explicit Thermochemical Nonequilibrium Algorithm Applied to Compute Three-Dimensional Aeroassist Flight Experiment Flowfields A90-085
Foam Formation in Low Gravity A90-050
Flux-Vector Splitting Calculation of Nonequilibrium Hydrogen-Air Reactions A90-028