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jet plumes



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[Temperature Effects on Acoustic Interactions between Altitude Test Facilities and Jet Engine Plumes](#)

Oct 1994 300 pages

Authors: [K. K. Ahuja](#); [K. C. Massey](#); [C. K. Tan](#); [R. R. Jones](#); [GEORGIA TECH RESEARCH CORP ATLANTA](#)

... specific objective was to determine the effect of heating the **jet** on its coupling with the diffuser used in a typical ... additional objective was to analytically examine the behavior of **jet** instability waves as a function of temperature, and ... any potential of strong coupling between the **jet** instabilities and diffuser duct resonance ... nozzle in a test setup that simulates a supersonic **jet** exhausting into a cylindrical diffuser. The measured ... free and ducted plume for a range of **jet** exit Mach numbers and four ... modes excite the most amplified wave of the **jet**. Screech, Altitude test facilities, Instability ...

Full Text

[Study of Visible Exhaust Smoke from Aircraft Jet Engines](#)

Jun 1971 74 pages

Authors: [John Stockham](#); [Howard Betz](#); [IIT RESEARCH INST CHICAGO IL](#)

The objective of this study was to relate the visibility of inflight **jet** exhaust to the SAE smoke number. A method based on photographic photometry was developed for measuring the optical density of smoke **plumes**. This method was related to visibility and to the smoke number through transmissometer measurements and visibility theory. A portable ... the engines investigated, indicate that SAE smoke numbers below 23 were associated with invisible exhaust **plumes**. Samples of the exhaust smoke showed the particles to be composed of lacy agglomerates. At the ...

Full Text

[Approximate Determination of Jet Contours near the Exit of Axially Symmetrical Nozzles as a Basis for Plume Modeling.](#)

Aug 18, 1972 23 pages

Authors: [H. H. Korst](#); [ARMY MISSILE COMMAND REDSTONE ARSENAL ALA AEROBALLISTICS DIRECTORATE](#)

... , transonic flow, axially symmetric flow, afterbodies, mathematical models computer aided analysis, detection, **plumes**, rocket exhaust A simple, approximate method is presented for rapid determination (utilizing mini-computers) of plume shapes produced by **jet** expansion from axially symmetric nozzles. The analysis is based on concepts developed by Johannesen and ... for plume shape determination can be utilized to model at least the geometric aspects of prototype **plumes** as well as to account for significant inviscid and viscous aspects of the base flow problem. A ...

Full Text

[Measurements of Ions Formed in Jet Engine Exhaust Plumes](#)

Jun 23, 1994 20 pages

Authors: [F. L. Eisele](#); [GEORGIA TECH RESEARCH INST ATLANTA ELECTRO-OPTICS ENVIRONMENT AND MATERIALS LAB](#)

An atmospheric pressure chemical ionization mass spectrometer was modified to measure either ion or neutral effluents from a **jet** engine. The instrument was set up behind an F-15 aircraft at Eglin Air Force Base and measured the ions formed in both the positive and negative spectrum. Since the ion concentrations in the **jet** plume were quite small and measurement times relatively short, most of the measurements ... the exhaust using a corona ion source. The most obvious change in the ion spectrum after the **jet** engines were started was the dramatic increase in what appeared to be sulfuric acid. The ...

Full Text

[Development of Dynamical and Mathematical Models of Exhausted Plasma Plumes and Plasmoids in Space](#)

1995 59 pages

Authors: [Valery I. Garkusha](#); [CENTRAL RESEARCH INST FOR MACHINE BUILDING MOSCOW \(RUSSIA\)](#)

The paper contains the dynamical problem solutions for certain thermal modes of artificial plasma expansion in space, codes to calculate the parameters of freely expanding plasma **jet** and plasmoid, representative samples of calculations, comparison of theoretical results obtained with data of measurements in **plumes** of electric and conventional gas thrusters, comparison of self-similar solutions obtained with published data of analytical and numerical calculation of parameters for plasma and gas jets.

Full Text

[Effect of Mixture Ratio on UV, Visible and Infrared Radiation from Exhaust Plumes](#)

May 1975 66 pages

Authors: [D. B. Ebeoglu](#); [C. W. Martin](#); [AIR FORCE ARMAMENT LAB EGLIN AFB FL](#)

... with the design goals of approximating threat aircraft/missile signatures required the identification of major physical and chemical parameters which affect the radiation characteristics (spectral and spatial intensity) of **jet** aircraft and missile exhaust **plumes**. Investigations have been carried out to determine the spectral distributions of general hydrocarbon exhaust and combustion between 0.3 and 14 microns. Gaseous, liquid and solid ...

Full Text

[An Investigation for Modeling Jet Plume Effects on Missile Aerodynamics](#)

Jul 1982 152 pages

Authors: [James H. Henderson](#); [NEW TECHNOLOGY INC HUNTSVILLE AL](#)**Full Text**

Results of an investigation of concepts for modeling **jet** plume effects on missile aerodynamics tend to confirm the concepts proposed by Korst. Comparisons were made of afterbody pressure distributions influenced by **plumes** of the same shape but with different plume Mach numbers and with a solid plume. These comparisons indicate that increasing effect becoming more pronounced with increasing freestream Mach number. The solid plume has the greatest effect on afterbody pressures with the effect increasing considerably at Mach numbers of 1.25 and higher. (Author)

[An Approach to Experimental Investigation of Jet Plume Effects on Missile Aerodynamics](#)

Jul 1982 94 pages

Authors: [George M. Landingham](#); [ARMY MISSILE COMMAND REDSTONE ARSENAL AL SYSTEMS SIMULATION AND DEVELOPMENTDIRECTORATE](#)**Full Text**

An approach to modeling a rocket's plume effects based on the theory of Korst is presented. To implement the modeling scheme an interactive Fortran program was developed which designs model nozzles that produce geometrically similar **plumes** with similar base flow characteristics as prototype nozzles but use air or some other medium instead of a propellant. Included are the modeling theory, experimental results and the Fortran program with a sample case. (Author)

[ARO and AFOSR Contractors Meeting in Chemical Propulsion, Held in Virginia Beach, Virginia on 3-6 June 1996](#)

Jun 20, 1996 299 pages

Authors: [David M. Mann](#); [Mitat A. Birkan](#); [Julian M. Tishkoff](#); [AIR FORCE OFFICE OF SCIENTIFIC RESEARCH BOLLING AFB DC](#)**Full Text**

... : Supercritical droplet behavior; Fundamentals of acoustic instabilities in liquid-propellant rockets; Modeling liquid **jet** atomization processes; Liquid-propellant droplets dynamics and combustions in supercritical forced convective ... flow conditions; Droplet collision on liquid propellant combustion; Combustion and **plumes**; Development of a collisional radiative emission model for strongly nonequilibrium flows; Energy ... states in reacting rocket flows; modeling nonequilibrium radiation in high altitude **plumes**; kinetics of plume radiation, and of HEDMs and metallic fuels combustion; Nonsteady ...

[DSMC Calculation of Supersonic Free Jets from an Orifice with Convex and Concave Corners](#)

Jul 9, 2000 9 pages

Authors: [Masaru Usami](#); [Koji Teshima](#); [MIE UNIV TSU \(JAPAN\) DEPT OF MECHANICAL ENGINEERING](#)**Full Text**

... jets from an orifice with convex and concave corners are investigated in three-dimensional field by the DSMC method. The **plumes** develop faster from the concave corners of a hexagram orifice with symmetric cross section than those from the ... right behind the orifice. The directions of flow are also investigated in various cross sections of a **jet**. There is a complicated flow-field and several circulations of flow are observed. The variation of cross section of a star shaped **jet** along the **jet** axis changes with the ratio of a stagnation pressure to a background pressure. In an asymmetric orifice, ...

[Source Characterization of Heavy Gas Dispersion Models for Reactive Chemicals. Volume 1](#)

Dec 21, 1987 127 pages

Authors: [Phani K. Raj](#); [John A. Morris](#); [TECHNOLOGY AND MANAGEMENT SYSTEMS INC BURLINGTON MA](#)**Full Text**

... vapors generated by accidental spills. This report describes the mathematical models developed to describe a variety of source types and the dispersion of vapor clouds/**plumes** in the atmosphere. Sixteen different source types are modeled including pressurized liquid releases, flashing and aerosol formation, two phase **jet** releases, explosive releases and releases of high vapor pressure liquids, cryogenic liquids and gases. Dispersion model takes into account the differences in source ...

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