Thrust Reverser

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The NASA Langley Configuration Aerodynamics Branch has conducted an experimental investigation to study the static performance of innovative thrust reverser concepts applicable to high-bypass-ratio turbofan engines. Testing was conducted on a conventional separate-flow exhaust system configuration, a conventional cascade thrust reverser configuration, and six innovative thrust reverser configurations. The innovative thrust reverser configurations consisted of a cascade thrust reverser with porous fan-duct blocker, a blockerless thrust reverser, two core-mounted target thrust reversers, a multi-door crocodile thrust reverser, and a wing-mounted thrust reverser. Each of the innovative thrust reverser concepts offer potential weight savings and/or design simplifications over a conventional cascade thrust reverser design. Testing was conducted in the Jet-Exit Test facility at NASA Langley Research Center using a 7.9% scale exhaust system model with a fan-to-core bypass ratio of approximately 9.0. All tests were conducted with no external flow and cold, high-pressure air was used to simulate core and fan exhaust flows. Results show that the innovative thrust reverser concepts achieved thrust reverser performance levels which, when taking into account the potential for system simplification and reduced weight, may make them competitive with, or potentially more cost effective than current state-of-the-art thrust reverser systems.

NACA Research Memorandum Createspace Independent Publishing Platform

The changes in thrust minus drag performance as well as longitudinal and directional stability and control characteristics of a single-engine jet aircraft attributable to an in-flight thrust reverser of the blocker-deflector door type were investigated in a 16-foot transonic wind tunnel. The longitudinal and directional stability data are presented. Test conditions simulated landing approach conditions as well as high speed maneuvering such as may be required for combat or steep descent from high altitude.

Summary of Scale-model Thrust-reverser

Investigation Springer Science & Business Media
"This book disseminates knowledge on modern information technology applications in air transportation useful to professionals, researchers, and academicians"--Provided by publisher.
Patents IGI Global
This program was to model test, analyze, and design a thrust reverser for use on tactical aircraft. The reverser is intended to replace speed brakes and drag chutes currently in use as decelerating devices. The program was divided into twelve areas of investigation. These areas of investigation encompassed design, performance analysis of both the reverser and the reverser aircraft combination, loads analysis and both cold flow and hot gas model testing. A target type reverser was selected in the design study, and all the testing proved that reversal efficiencies of from 50 to 60 percent could be obtained through pressure ratios of 1.3:1.0 and 4.0:1.0. A method of eliminating reverse ejector flow was determined. Performance loss caused by the reverser installation was found to be negligible. It can be concluded that a thrust reverser is feasible for use on supersonic aircraft for inflight decelerations over and above those normally provided by speed brakes or drag chutes. The reverser installation will not cause adverse effects on the performance of the aircraft. It is recommended that a flight test program be initiated utilizing the concept derived in this study. This flight test program would substantiate the use and need for a thrust reverser on tactical aircraft as well as prove the structural concept chosen in this study. (Author).
Static Performance of Six Innovative Thrust Reverser Concepts for Subsonic Transport Applications DIANE Publishing
The NASA Langley Configuration Aerodynamics Branch has conducted an experimental investigation to study the static performance of innovative thrust reverser concepts applicable to high-bypass-ratio turbofan engines. Testing was conducted on a conventional separate-flow exhaust system configuration, a conventional cascade thrust reverser configuration, and six innovative thrust reverser configurations. The innovative thrust reverser configurations consisted of a cascade thrust reverser with porous fan-duct blocker, a blockerless thrust reverser, two core-mounted target thrust reversers, a multi-door crocodile thrust reverser, and a wing-mounted thrust reverser. Each of the innovative thrust reverser concepts offer potential weight savings and/or design simplifications over a conventional cascade thrust reverser design. Testing was conducted in the Jet-Exit Test facility at NASA Langley Research Center using a 7.9% scale exhaust system model with a fan-to-core bypass ratio of approximately 9.0. All tests were conducted with no external flow and cold, high-pressure air was used to simulate core and fan exhaust flows. Results show that the innovative thrust reverser concepts achieved thrust reverser performance levels which, when taking into account the potential for system simplification and reduced weight, may make them competitive with, or potentially more cost effective than current state-of-the-art thrust reverser systems.
Effects of an In-flight Thrust Reverser on the Stability and Control Characteristics of a Single-engine Fighter Airplane Model
Static Performance of Six Innovative Thrust Reverser Concepts for Subsonic Transport ApplicationsSummary of the NASA Langley Innovative Thrust Reverser Test Program
An investigation was undertaken to determine the characteristics of several basic types of thrust-reverser. Models of three types, target, tailpipe cascade, and ring cascade, were unheated air. The effects of design variables on reverse-thrust performance, reversed-flow boundaries, and thrust modulation characteristics were determined.
Organized Crime and Illicit Traffic in Narcotics
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Patents
Static Performance of Six Innovative Thrust Reverser Concepts for Subsonic Transport ApplicationsSummary of the NASA Langley Innovative Thrust Reverser Test ProgramDIANE Publishing
Aeronautical Engineering Review
The changes in thrust minus drag performance as well as longitudinal and directional stability and control characteristics of a single-engine jet aircraft attributable to an in-flight thrust reverser of the blocker-deflector door type were investigated in a 16-foot transonic wind tunnel. The longitudinal and directional stability data are presented. Test conditions simulated landing approach conditions as well as high speed maneuvering such as may be required for combat or steep descent from high altitude.
Full-scale Wind-tunnel Investigation of a Target-type Thrust Reverser on the A-37B Airplane
Investigates DOD contract policies for F-111 tactical fighter experimental (TFX) program. Classified material has been deleted.
Technical Note - National Advisory Committee for Aeronautics
This book constitutes the refereed post-proceedings of the Second International Conference on Theoretical and Mathematical Foundations of Computer Science, ICTMF 2011, held in Singapore in May 2011. The conference was held together with the Second International Conference on High Performance Networking, Computing, and Communication systems, ICHCC 2011, which proceedings are published in CCIS 163. The 84 revised selected papers presented were carefully reviewed and selected for inclusion in the book. The topics covered range from computational science, engineering and technology to digital signal processing, and computational biology to game theory, and other related topices.
Thrust-Reverser Flow Investigation on a Twin-Engine Transport
A double set of turning vanes was carried inside the jet tailpipe. To produce reverse thrust, the tailpipe opens into two side sections and the turning vanes move

outward to form a V-shaped cascade, which deflects the exhaust-gas flow. Forward and reverse net thrust were measured over a range of engine speeds with the airplane stationary. Taxi tests were made to determine the comparative stopping distances using wheel braking and reverse thrust separately, and a combination of both. The effect of turning-vane spacing on thrust-reverser performance was determined by scale-model tests using unheated air.

In-flight Thrust Reversers for Tactical Fighter Applications

An investigation was conducted in the NASA Langley 14 x 22 foot Subsonic Tunnel to study the effects of engine thrust reversing on an aft-mounted twin-engine transport and to develop effective testing techniques. Testing was done over a fixed and a moving-belt ground plane and over a pressure instrumented ground board. Free-stream dynamic pressure was set at values up to 12.2 psf, which corresponded to a maximum Reynolds number based on the mean aerodynamic chord of 765,000. The thrust reversers examined included cascade, target and four-door configurations. The investigation focused on the range of free-stream velocities and engine thrust-reverser flow rates that would be typical for landing ground-roll conditions. Flow visualization techniques were investigated, and the use of water or smoke injected into the reverser flow proved effective to determine the forward progression of the reversed flow and reingestion limits. When testing over a moving-belt ground plane, as opposed to a fixed ground plane, forward penetration of the reversed flow was reduced. The use of a pressure-instrumented ground board enabled reversed flow ground velocities to be obtained, and it provided a means by which to identify the reversed flow impingement point on the ground. Gatlin, Gregory M. and Quinto, P. Frank Langley Research Center ENGINE TESTS; FREE FLOW; GROUND EFFECT (AERODYNAMICS); REVERSED FLOW; THRUST REVERSAL; TRANSPORT AIRCRAFT; DYNAMIC PRESSURE; FLOW VELOCITY; FLOW VISUALIZATION; WIND TUNNEL TESTS...

Hearings Before the United States Senate Committee on Government Operations, Permanent Subcommittee on Investigations, Eighty-Eighth Congress, First Session

Static Internal Performance of a Nonaxisymmetric Vaned Thrust Reverser with Flow Splay Capability

Static Internal Performance Characteristics of Two Thrust Reverser Concepts for Axisymmetric Nozzles

Thrust-reverser Flow Investigation on a Twin-engine Transport

Second International Conference, ICTMF 2011, Singapore, May 5-6, 2011, Revised Selected Papers

Technical Note

Effect of Thrust Reverser Operation on the Lateral-directional Characteristics of a Three-surface F-15 Model at Transonic Speeds