A Flight Test Evaluation Of The 16 6 Meter Ventus By

The results of an exploratory full-scale ground and flight test evaluation of the stability, control, performance, handling, and maintenance characteristics of the Robertson Ultra-Low-Speed Control System (ULS) are presented. The (ULS) consists of a small set of aerodynamic control surfaces placed immediately behind the propeller disk and permanently connected to the airplane's conventional flight control system. The results of this program showed that, at 40 mph., the ULS

increased pitch, yaw, and roll control powers to 256, 280, and 250%, respectively, of basic airplane values. This increase also reduced the airplane's minimum speed from a control-limited 40 to a power-limited 20 mph with an attendant 50% reduction in landing and take-off distance. Glide angle was increased from 10 to 20 degrees through installation of the new system. The ULS installation did not appreciably affect stability or handling qualities, and caused no 'oversensitivity' at maximum speed (168 mph). Test results indicate that the rudimentary ULS system tested is a light, simple, and inexpensive way of generating the powerful low-spped control moments required for V/STOL operation.

(Author).

To date there is no agreed upon definition of mental workload and therefore there is no agreement on how it should be measured. Current workload researchers do seem to agree on at least three aspects of mental workload: it is multidimensional construct, a clear distinction must be maintained between imposed mental load (task load) and the mental load as experienced (subjective load), and the use of subjective ratings should be central to any investigation of workload. On this last point, The President's Task Force on Aircraft Crew Complement made the following recommendations: This technique (task/timeline analysis

based on comparison with previous aircraft designs), supplemented by improved subjective evaluation methods applied by qualified pilots, will offer the best means for demonstrating compliance with faa crew complement criteria. We recommend that FAA incorporate such methods in the tests to be employed for the certification of the B-757 and B-767 aircraft. The paper outlines the Pilot Subjective Evaluation (PSE) process developed by Boeing, in conjunction with the FAA, to supplement the analytical, simulator, and flight test crew workload evaluation techniques used to demonstrate compliance with the minimum crew size requirements of FAR 25.1523 and Appendix D(4).

The Airborne Information for Lateral Spacing (AILS) concept is designed to support independent parallel approach operations to runways spaced as close as 2,500 feet. This report briefly describes the AILS operational concept and the results of a flight test of one implementation of this concept. The focus of this flight test experiment was to validate a prior simulator study, evaluating pilot performance, pilot acceptability, and minimum miss-distances for the rare situation in which an aircraft on one approach intrudes into the path of an aircraft on the other approach. Although the flight data set was not meant to be a statistically valid sample, the trends acquired in flight followed those of the simulator

and therefore met the intent of validating the findings from the simulator. Results from this study showed that the design-goal mean miss-distance of 1,200 feet to potential collision situations was surpassed with an actual mean miss-distance of 1,859 feet. Pilot reaction times to the alerting system, which was an operational concern, averaged 0.65 seconds, were well below the design goal reaction time of 2.0 seconds. From the results of both of these tests, it can be concluded that this operational concept, with supporting technology and procedures, may provide an operationally viable means for conducting simultaneous, independent instrument approaches to runways spaced as close as 2500 ft.

Abbott, Terence S. Langley Research Center
NASA/TM-2002-211639, NAS 1.15:211639, L-18175
Evaluation of a Wind-tunnel Gust Response Technique Including Correlations with Analytical and Flight Test Results
Survey and Evaluation of Potential Real-Time Interactive Flight Test Facilities for the B-1
Flight Test Evaluation of the OH-58C Main Rotor Blade Erosion Tape
Flight Test Evaluation of Predicted Light Aircraft Drag, Performance, and Stability
Flight tests were carried out to assess the feasibility of

piloted steep, curved, and decelerating-approach profiles in powered-lift STOL aircraft. Several STOL control concepts representative of a variety of aircraft were evaluated in conjunction with suitably designed flight directors. The tests were carried out in a real navigation environment, employed special electronic cockpit displays, and included the development of operational procedures considered appropriate to this class of aircraft. Data are presented describing the performance achieved and the control utilization involved in flying 180 deg turning, descending, and decelerating-approach profiles to landing. The results suggest that such moderately complex piloted

instrument approaches may indeed be feasible from a pilot acceptance point of view, given an acceptable navigation environment. Systems with the capability of those used in this experiment can provide the potential of achieving instrument operations on curved, descending, and decelerating landing approaches to weather minima corresponding to CTOL Category II criteria, while also providing a means of realizing more efficient operations during visual flight conditions. (Author).

Technology is ever-changing in the field of aircraft avionics and new systems may require a different approach to testing. The Federal Aviation Administration

(FAA) revises its regulatory material as a result of system updates and therefore requirements for airworthiness testing also need to be updated.Test and Evaluation of Aircraft Avionics and Weapon Systems, 2nd Edition is a unique training book which serves as both a text and practical reference for all personnel involved in avionics and weapons system evaluation and testing, in the air and on the ground. Whether training pilots and personnel or planning to test systems, this book provides readers with the fundamentals and practical information needed to get the job done.

Real-time or real-time interactive flight testing (or

displays) is the use of rapidly processed flight test data displayed in a form most effective for engineering evaluation or analysis at a rate permitting interaction between engineering personnel on the ground and the pilot in the test aircraft. The time delays involved in making the computations and absorbing the meaning of the displayed results of a particular test must be small enough to allow the engineer to communicate his satisfaction or concerns to the flight test controller and the pilot soon enough to permit re-testing, modifications, omission of the next step, or proceeding as planned. Typical delays of 1 or 2 minutes could probably be

tolerated.

Summary of a Flight-test Evaluation of the CL-84 Tilt-wing V/STOL Aircraft

Preliminary Supersonic Flight Test Evaluation of Performance Seeking Control

Development and Evaluation of a Performance Modeling Flight Test Approach Based on Quasi Steady-state Maneuvers

Flight-Test Evaluation of STOL Control and Flight Director Concepts in a Powered-Lift Aircraft Flying Curved Decelerating Approaches (Evaluation Des Essais en Vol D'un Directeur de Vol Et Des Commands D'un

Adac Portance Assistee Evoluanten Approche Curviligne en Deceleration).

Introduction to Flight Testing Introduction to Flight Testing Provides an introduction to the basic flight testing methods employed on general aviation aircraft and unmanned aerial vehicles Introduction to Flight Testing provides a concise introduction to the basic flight testing methods employed on general aviation aircraft and unmanned aerial vehicles for courses in aeronautical engineering. There is particular emphasis on the use of modern on-board instruments and inexpensive, off-the-shelf portable devices that make

flight testing accessible to nearly any student. This text presents a clear articulation of standard methods for measuring aircraft performance characteristics. Topics covered include aircraft and instruments, digital data acquisition techniques, flight test planning, the standard atmosphere, uncertainty analysis, level flight performance, airspeed calibration, stall, climb and glide, take-off and landing, level turn, static and dynamic longitudinal stability, lateral-directional stability, and flight testing of unmanned aircraft systems. Unique to this book is a detailed discussion of digital data acquisition (DAQ) techniques, which are an integral

part of modern flight test programs. This treatment includes discussion of the analog-to-digital conversion, sample rate, aliasing, and filtering. These critical details provide the flight test engineer with the insight needed to understand the capabilities and limitations of digital DAQ. Key features: Provides an introduction to the basic flight testing methods and instrumentation employed on general aviation aircraft and unmanned aerial vehicles. Includes examples of flight testing on general aviation aircraft such as Cirrus, Diamond, and Cessna aircraft, along with unmanned aircraft vehicles. Suitable for courses on Aircraft Flight Test Engineering.

Introduction to Flight Testing provides resources and guidance for practitioners in the rapidly-developing field of drone performance flight test and the general aviation flight test community.

NASA's Synthetic Vision Systems (SVS) Project is striving to eliminate poor visibility as a causal factor in aircraft accidents as well as enhance operational capabilities of all aircraft through the display of computer generated imagery derived from an onboard database of terrain, obstacle, and airport information. To achieve these objectives, NASA 757 flight test research was conducted at the Eagle-Vail, Colorado

airport to evaluate three SVS display types (Head-up Display, Head-Down Size A, Head-Down Size X) and two terrain texture methods (photo-realistic, generic) in comparison to the simulated Baseline Boeing-757 Electronic Attitude Direction Indicator and Navigation/Terrain Awareness and Warning System displays. The results of the experiment showed significantly improved situation awareness, performance, and workload for SVS concepts compared to the Baseline displays and confirmed the retrofit capability of the Head-Up Display and Size A SVS concepts. The research also demonstrated that the

tunnel guidance display concept used within the SVS concepts achieved required navigation performance (RNP) criteria.

This report presents flight test results on the operation of the Prewitt Scratch Strain Gage. The program involved the use of a T-37B, which was previously instrumented for use as a flight loads survey aircraft. Three scratch gages were installed on the aircraft. The flight program included individual high and low g manuevers and also manuevers taken from the Air Training Command flight syllabus. Data correlation between the electrical resistance gages and the scratch gages was acomplished

. The results indicate that the scratch strain gage is a feasible and reliable means of recording strain cycles of a character and magnitude found in a fighter aircraft structure. Automated data reduction techniques and system applications of the gage are discussed.

Flight Test Evaluation of a Method to Determine the Level Flight Performance of a Propeller-driven Aircraft

Ride Qualities Criteria Validation/pilot Performance Study: Flight Test Results

A Flight Test of Laminar Flow Control Leading-edge Systems

A Flight-test and Simulation Evaluation of the

Longitudinal Final Approach and Landing Performance of an Automatic System for a Light Wing Loading STOL Aircraft

This report presents the procedures and results of the flight testing of the Chadwick Electronic Weighing System (CHEWS). The consensus of opinions from pilot questionnaires concerning the system is discussed. A more extensive flight test program is recommended. Test flights were conducted to evaluate the capability of Differential Global

Positioning System (DGPS) to provide the accuracy and integrity required for International Civil Aviation Organization (ICAO) Category (CAT) 3 precision approach and landings. These test flights were part of a Federal Aviation Administration (FAA) program to evaluate the technical feasibility of using DGPS based technology for CAT 3 precision approach and landing applications. A United Airlines Boeing 737-300 (N304UA) was equipped with DGPS

receiving equipment and additional computing capability provided by Stanford University. The test flights were conducted at NASA Ames Research Center's Crows Landing Flight Facility, Crows Landing, California. The flight test evaluation was based on completing 100 approaches and autolandings; 90 touch and go, and 10 terminating with a full stop. Two types of accuracy requirements were evaluated: 1) Total system error, based on the Required

Navigation Performance (RNP), and 2) Navigation sensor error, based on ICAO requirements for the Microwave Landing System (MLS). All of the approaches and autolandings were evaluated against ground truth reference data provided by a laser tracker. Analysis of these approaches and autolandings shows that the Stanford University/United Airlines system met the requirements for a successful approach and autolanding 98 out of 100 approaches and autolandings,

based on the total system error requirements as specified in the FAA CAT 3 Level 2 Flight Test Plan.
Kaufmann, David N. and Ncnally, B. David Ames Research Center NASA-TM-110354, A-950066, NAS 1.15:110354 RTOP 505-64-13...
The Airborne Information for Lateral Spacing (AILS) concept is designed to support independent parallel approach operations to runways spaced as close as 2,500 feet. This report briefly

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statistically valid sample, the trends acquired in flight followed those of the simulator and therefore met the intent of validating the findings from the simulator. Results from this study showed that the design-goal mean miss-distance of 1,200 feet to potential collision situations was surpassed with an actual mean miss-distance of 1,859 feet.

Flight Test and Evaluation of Omega Navigation for General Aviation

Initial Flight Test Evaluation of the F-15 ACTIVE Axisymmetric Vectoring Nozzle Performance

Flight Test Evaluation of Synthetic Vision Concepts at a Terrain Challenged Airport

A Flight Test Evaluation of the Ball-Bartoe Jetwing Propulsive Lift Concept

During this flight test evaluation, Polyurethane and stainless steel erosion tapes were tested. Hover and level flight performance tests and qualitative handling qualities tests were conducted to determine

the effects of applying these leading edge erosion tapes to the main rotor blades of the test JOH-58C. Hover and level flight performance were slightly improved by the installation of the stainless steel tape and slightly degraded by the installation of the polyurethane tape. No significant changes in handling qualities were noted as a result of the erosion tape installations. One shortcoming related to the difficult installation of the erosion tapes was noted.

Comprehensive textbook which introduces the fundamentals of aerospace engineering with a flight test perspective Introduction to Aerospace

Engineering with a Flight Test Perspective is an introductory level text in aerospace engineering with a unique flight test perspective. Flight test, where dreams of aircraft and space vehicles actually take to the sky, is the bottom line in the application of aerospace engineering theories and principles. Designing and flying the real machines are often the reasons that these theories and principles were developed. This book provides a solid foundation in many of the fundamentals of aerospace engineering, while illuminating many aspects of real-world flight. Fundamental aerospace engineering subjects that are covered include aerodynamics, propulsion,

performance, and stability and control. Key features: Covers aerodynamics, propulsion, performance, and stability and control. Includes self-contained sections on ground and flight test techniques. Includes worked example problems and homework problems. Suitable for introductory courses on Aerospace Engineering. Excellent resource for courses on flight testing. Introduction to Aerospace Engineering with a Flight Test Perspective is essential reading for undergraduate and graduate students in aerospace engineering, as well as practitioners in industry. It is an exciting and illuminating read for the aviation enthusiast seeking

deeper understanding of flying machines and flight test.

Flight Test Evaluation of the Airborne Information for Lateral Spacing (AILS) Concept

Flight Test Evaluation of an RAF High Altitude Partial Pressure Protective Assembly

Flight Test Evaluation of the Stanford University/United Airlines Differential GPS Category 3 Automatic Landing System

Pilot Subjective Evaluation of Workload During a Flight Test Certification Programme

A Flight-test and Simulation Evaluation of the Longitudinal Final Approach and Landing

Performance of an Automatic System for a Light Wing Loading STOL Aircraft Equipped with Wing Spoilers

A full envelope database of a thrust-vectoring axisymmetric nozzle perfomance for the Pratt & Whitney Pitch/Yaw Balance Beam Nozzle (P/YBBN) is being developed using the F-15 Advanced Control Technology for Integrated Vehicles (ACTIVE) aircraft. At this time, flight research has been completed for steady-state pitch vector

angles up to 20 deg. at an altitude of 30,000 ft from low power settings to maximum afterburner power. The nozzle performance database includes vector forces, internal nozzle pressures, and temperatures all of which can be used for regression analysis modeling. The database was used to substantiate a set of nozzle performance data from wind tunnel testing and computational fluid dynamic analyses. Findings from initial flight research at Mach 0.9 and 1.2 are

presented in this paper. The results show that vector efficiency is strongly influenced by power setting. A significant discrepancy in nozzle performance has been discovered between predicted and measured results during vectoring.

The need for military aircraft that will operate from short unimproved airfields, and the decks of smaller aircraft carriers has increased in recent years due to a changing world

situation and the shrinking of the dollar. Such aircraft need to be fuel efficient, quiet, maneuverable, have low infrared signature, and carry a large useful load. The Ball-Bartoe 'Jetwing' is a single engine upper surface blowing concept which offers the possibility of achieving these objectives. The 'Jetwing' concept achieves supercirculation lift and STOL performance by ducting all engine air through the leading edge of the wing

and ejecting it over the top surface of the wing through a slot nozzle. This nozzle extends along approximately 70% of the wing span. A Coanda flap is mounted at the trailing edge of the blown portion of the wing. In addition to the main wing, a smaller wing panel is mounted above the slot nozzle. The air passage between the main wing and the smaller upper wing acts as an ejector to reduce installed thrust losses. For high speed applications

that concept may be used without this upper wing. A thrust reversing method is also incorporated into the concept. The thrust is reversed by rotating the top of the slot nozzle so as to close the nozzle and open a reverse flow path. This report covers the flight test program of the Jetwing research airplane.

A new boundary-layer rake has been designed and built for flight testing on the NASA Dryden Flight Research

Center F-15B/Flight Test Fixture. A feature unique to this rake is its curved body, which allows pitot tubes to be more densely clustered in the near-wall region than conventional rakes allow. This curved rake design has a complex three-dimensional shape that requires innovative solid-modeling and machining techniques. Finite-element stress analysis of the new design shows high factors of safety. The rake has passed a ground test in

which random vibration measuring 12 g rms was applied for 20 min in each of the three normal directions. Aerodynamic evaluation of the rake has been conducted in the NASA Glenn Research Center 8x6 Supersonic Wind Tunnel at Mach 0-2. The pitiot pressures from the new rake agree with conventional rake data over the range of Mach numbers tested. The boundary-layer profiles computed from the rake data have been shown to have the

standard logarithmic-law profile. Skin friction values computed from the rake data using the Clauser plot method agree with the Preston tube results and the van Driest II compressible skin friction correlation to approximately plus/minus 5 percent.

Flight Test Evaluation of a Scratch Strain Gage

Subsonic Flight Test Evaluation of a Performance Seeking Control Algorithm on an F-15 Airplane

Introduction to Flight Testing
Flight Test Technique for Evaluation of Gust Load Alleviation Analysis Methodology

A flight test evaluation of the Whittaker A/A24U-6 Structural Loads Data Recording System was conducted to determine the capability of the recorder to acquire flight loads data for use in the Air Fore Structural Integrity Program. The system consists of a small, eight-channel, airborne, digital tape recorder; a magnetic tape magazine; and a ground playback converter. A 24-flight

evaluation program was conducted using an F-102 aircraft to acquire a nominal sample of VGH flight loads data. Measurements of identical acceleration peaks were successfully correlated on both systems by signals from a precise, master, timereference source recorded by both systems. The Whittaker system was found to be a reliable means of recording both 6 cps and 12 cps vertical acceleration data. Comparisons of acceleration frequency distributions indicated that those data obtained from the Whittaker recorder had essentially the same distribution function as data obtained

simultaneously by the oscillograph recorder. Pressure transducers used to measure airspeed and altitude were judged to be less accurate and less reliable than the rest of the Whittaker system. It is concluded that overall system accuracy can be increased by increasing the digital count of the acceleration, airspeed, and altitude measurements to seven digital bits. (Author). A seventy hour flight test program was accomplished to determine the suitability and accuracy of a low cost Omega navigation receiver in a general aviation aircraft. An analysis was made of signal availability in

two widely separated geographic areas. Comparison was made of the results of these flights with previous work focused on VOR/ DME. Conclusions are drawn from the test experience that indicate developmental system improvement is necessary before a competent fail safe or fail soft area navigation system is offered to general aviation.

Test flights were conducted to evaluate the capability of Differential Global Positioning System (DGPS) to provide the accuracy and integrity required for International Civil Aviation Organization (ICAO) Category (CAT) III precision approach and landings. These

test flights were part of a Federal Aviation Administration (FAA) program to evaluate the technical feasibility of using DGPS based technology for CAT III precision approach and landing applications. An IAI Westwind 1124 aircraft (N24RH) was equipped with DGPS receiving equipment and additional computing capability provided by E-Systems. The test flights were conducted at NASA Ames Research Center's Crows Landing Flight Facility, Crows Landing, California. The flight test evaluation was based on completing 100 approaches and landings. The navigation sensor error accuracy requirements were based

on ICAO requirements for the Microwave Landing System (MLS). All of the approaches and landings were evaluated against ground truth reference data provided by a laser tracker. Analysis of these approaches and landings shows that the E-Systems DGPS system met the navigation sensor error requirements for a successful approach and landing 98 out of 100 approaches and landings, based on the requirements specified in the FAA CAT III Level 2 Flight Test Plan. In addition, the E-Systems DGPS system met the integrity requirements for a successful approach and landing or stationary trial for all 100

approaches and landings and all ten stationary trials, based on the requirements specified in the FAA CAT III Level 2 Flight Test Plan. Kaufmann, David N. and Mcnally, B. David Ames Research Center NASA-TM-110368, NAS 1.15:110368, A-950096 ...

Flight Test Evaluation of the E-Systems Differential GPS Category 3 Automatic Landing System

A Flight-test Evaluation of a Go-around Control System for a Twin-engine Powered-lift STOL Airplane

Introduction to Aerospace Engineering with a Flight Test Perspective