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A Continuing Bibliography with Indexes

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December 1983

National Aeronautics and Space Administration

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Aeronautical Engineering Aeronautical Engineering Aeronautical Engineering

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NASA SP-7037(168)

AERONAUTICAL ENGINEERING

A CONTINUING BIBLIOGRAPHY WITH INDEXES

(Supplement 168)

A selection of annotated references to unclassified reports and journal articles that were introduced into the NASA scientific and technical information system and announced in November 1983 in

- *Scientific and Technical Aerospace Reports (STAR)*
- *International Aerospace Abstracts (IAA).*

NASA Scientific and Technical Information Branch 1983
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INTRODUCTION

Under the terms of an interagency agreement with the Federal Aviation Administration this publication has been prepared by the National Aeronautics and Space Administration for the joint use of both agencies and the scientific and technical community concerned with the field of aeronautical engineering. The first issue of this bibliography was published in September 1970 and the first supplement in January 1971.

This supplement to *Aeronautical Engineering -- A Continuing Bibliography* (NASA SP-7037) lists 352 reports, journal articles, and other documents originally announced in November 1983 in *Scientific and Technical Aerospace Reports (STAR)* or in *International Aerospace Abstracts (IAA).*

The coverage includes documents on the engineering and theoretical aspects of design, construction, evaluation, testing, operation, and performance of aircraft (including aircraft engines) and associated components, equipment, and systems It also includes research and development in aerodynamics, aeronautics, and ground support equipment for aeronautical vehicles.

Each entry in the bibliography consists of a standard bibliographic citation accompanied in most cases by an abstract. The listing of the entries is arranged by the first nine *STAR* specific categories and the remaining *STAR* major categories. This arrangement offers the user the most advantageous breakdown for individual objectives. The citations, and abstracts when available, are reproduced exactly as they appeared originally in *IAA* and *STAR*, including the original accession numbers from the respective announcement journals. The *IAA* items will precede the *STAR* items within each category.

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An annual cumulative index will be published.

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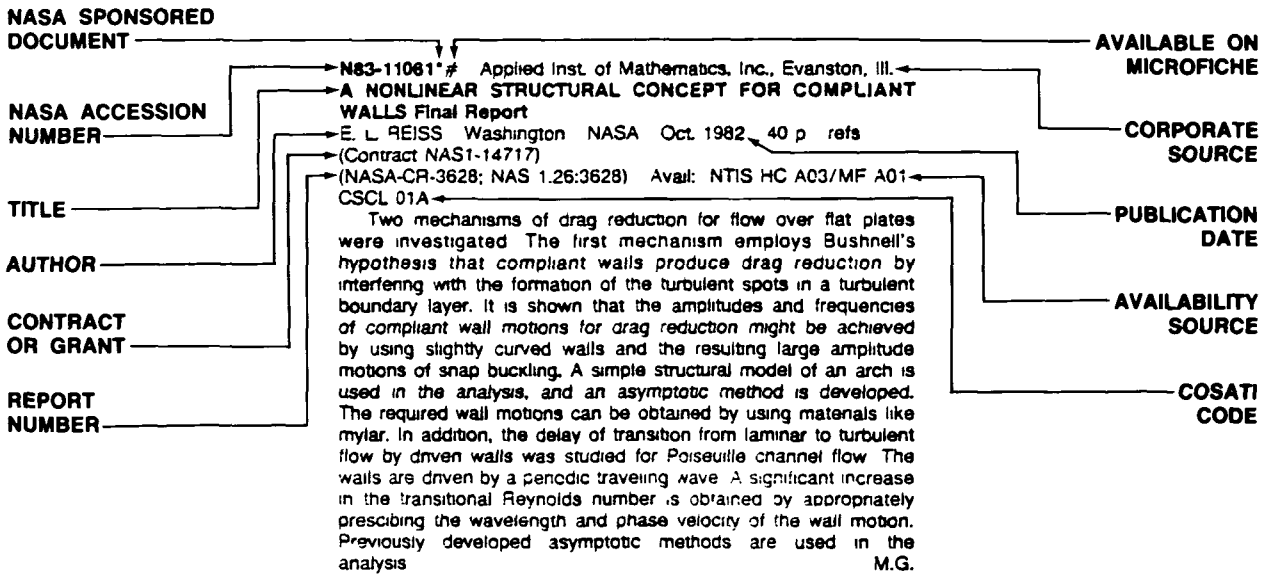

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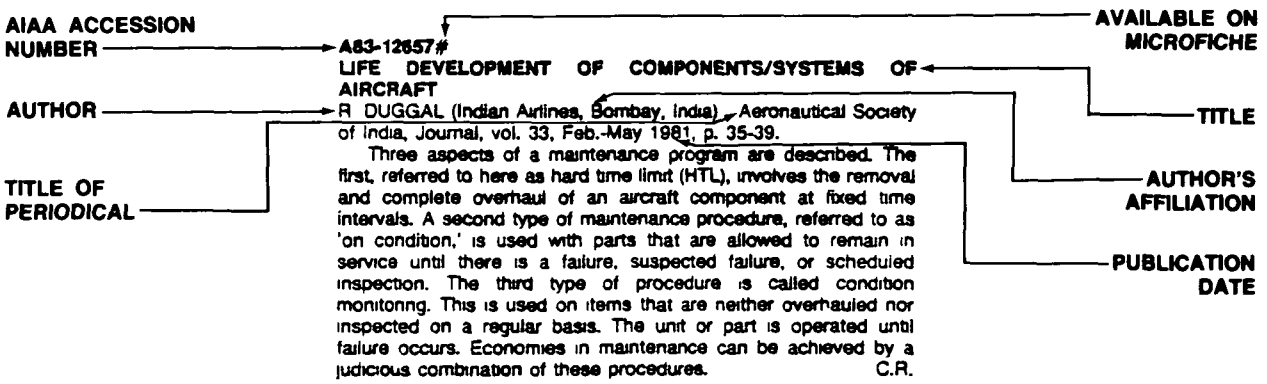

AERONAUTICAL ENGINEERING

A Continuing Bibliography (Suppl. 168)

DECEMBER 1983

01

AERONAUTICS (GENERAL)

A83-45078
IMPACT OF NEW TECHNOLOGY ON ENGINEERING AND MAINTENANCE SYSTEMS
M BENDONI (Alitalia - Linee Aeree Italiane, Rome, Italy) IN SITELCOM-82 - Telecommunications and data processing in the air transport industry; Proceedings of the Conference, Monte Carlo, Monaco, March 2-4, 1982 Neuilly-sur-Seine, Hauts-de-Seine, France, Societe Internationale de Telecommunications Aeronautiques, 1983, p 169, 171-181.

In connection with the competitive environment in which an airline operates, it must be alert to the exploitation of opportunities presented by new developments, such as, for instance, the availability of new technology Technological developments in the seventies have already led to dramatic changes in maintenance schedules and operations There will probably be more changes when the new generation of aircraft is introduced The present investigation is concerned with the design of major extensions to the present system in an Italian airline Attention is given to an accurate planning of the maintenance activities in the hangar, the division of functions into planning functions and control functions, the organization of the data bases, details concerning a functional survey, and the employed development concepts. G R

A83-45843
CERTIFICATION OF AVIONIC SYSTEMS; PROCEEDINGS OF THE SYMPOSIUM, LONDON, ENGLAND, APRIL 27, 1982
Symposium sponsored by the Royal Aeronautical Society London, Royal Aeronautical Society, 1982, 85 p

Among the topics discussed are military perspectives in the certification of avionics systems, by contrast with those of civil aviation, military avionics system acceptance criteria developed for state-of-the-art digital and multisensor systems, the quadruplex digital fly-by-wire system of the Jaguar fighter, a method for the design of fault-tolerant avionics software, and certification procedures for the digital avionics systems of such commercial aircraft as the 757, 767, and A310 airliners. Also considered are system certification methods for uniquely helicopter control-related avionics, and the certification case history of the L 1011-500 airliner's maneuver load-controlling and elastic mode-suppressing active control system O.C.

A83-45844#
MILITARY SYSTEMS ACCEPTANCE CRITERIA
T. COLDWELL and C JONES (Aeroplane and Armament Experimental Establishment, Boscombe Down, Wilts, England) IN Certification of avionic systems; Proceedings of the Symposium, London, England, April 27, 1982 . London, Royal Aeronautical Society, 1982, 7 p.

Different methods and emphases are required for the certification of mission-related and flight control-related military avionics systems In the former case, the application of digital technology has expanded the scope of weapon system assessment, with emphasis on system evolution and the definition of performance capabilities. In the case of flight systems, the introduction of high authority analog avionics has presented problems that are distinct from those related to software safety typifying digital technology A divergence between flight and mission systems is also noted with respect to assessment program timescales, with the former requiring effort during design and development and the latter during the transition from development to early service operation phases O C

A83-45875
THE APPLICATION OF SHOT PEEN FORMING TECHNOLOGY TO COMMERCIAL AIRCRAFT WING SKINS
D MOORE (McDonnell Douglas Canada, Ltd., Toronto, Canada) IN Shot peening for advanced aerospace design, Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 25-28, 1982 Warrendale, PA, Society of Automotive Engineers, Inc , 1982, p 23-28
(SAE PAPER 821456)

Shot peen forming was selected by the McDonnell Douglas Corporation as the only viable method of contouring wing skin planks for the DC10 airliner. The parameters to form the skin planks were developed by Metal Improvement Company Inc An overview of the shot peen forming operations is presented covering the technical and tooling requirements and documentation Reference is made to the subtle angular and/or dimensional changes which can occur during forming of complex contours on large skin planks The significant engineering and manufacturing advantages of the process led to incorporation of the technology in the design of the new DC9 Super 80 These criteria are expected to be equally applicable on the next generation commercial aircraft Author

A83-46925
KAMAN'S NEW DIRECTIONS
S WARTENBERG Vertiflite (ISSN 0042-4455), vol 29, Sept -Oct 1983, p. 16-21.

The developmental programs and products produced by the Kaman Corporation to diversify and grow, as well as to lessen dependence on erratic defense contracts, are described. The company produced over 400 military helicopters between 1960-1968, but never developed a new model Following 1968, diversification began into commercial aerospace, business, and industry lines Control surfaces for the F-14 and C-5B, actuators for the B-1, baffles for the Shuttle ET, and skin layups and core bonding for Sikorsky helicopters have been manufactured, together with guitars A computer simulation company has been set up to model combat conditions; another subsidiary provides computerized control systems for various applications. Kaman continues to manufacture Seasprite helicopters, composite helicopter rotor blades, and a rotor blade system with circulation control. D.H K

N83-32708# Cranfield Inst. of Tech., Bedfordshire (England) Coll. of Aeronautics
A COMBAT AIRCRAFT AVAILABILITY ASSESSMENT TECHNIQUE
C D BURLEIGH and J. P. FIELDING Nov 1982 30 p refs Presented at the 4th Euredata Conf , Venice, Spring, 1983
(ISBN-0-902937-80-4; CAR-8228) Avail: NTIS HC A03/MF A01

It has always been important for military commanders to be able to rely on their equipment being available to them during a conflict. Some recent published figures, however, showed that two modern fighter aircraft were only available for missions for 47% or 56% of the time These figures prompted a study of the causes of unavailability and the development of an availability assessment technique. Initial studies concentrated on determining probability distributions of reliability, maintainability, battle damage repair and attrition A simple operation simulation model was then derived to show an aircrafts sensitivity to the main availability parameters This model can be applied to any aircraft type provided that the necessary inputs can be calculated The simulated operations were as realistic as possible, although many assumptions had to be made. The Operation Simulation Model proved to be a satisfactory means of assessing the effectiveness of a force of aircraft under war time conditions. B.W

N83-32709# Vereinigte Flugtechnische Werke G m b H., Bremen (West Germany) Metallische Werkstoffe
DEVELOPMENT AND DEMONSTRATION OF ECONOMIC PRODUCTION SYSTEMS IN AIRFRAME CONSTRUCTION [ENTWICKLUNG UND NACHWEIS WIRTSCHAFTLICHER FERTIGUNGSVERFAHREN IM FLUGZEUGZELLENBAU]
Sep 1982 225 p In GERMAN
Avail: NTIS HC A10/MF A01

The Alpha jet pylon, the MRCA aircraft test facilities; statistical and vibratory fatigue limit characteristics of aluminum cast alloys; and compressed titanium fine cast components are treated Riveting, welding of aluminum cast alloy A357 components, superplastic transformation and diffusion welding of titanium alloys, and aluminum precision forging components are discussed.

N83-32710# Vereinigte Flugtechnische Werke G m b H , Bremen (West Germany). Metallische Werkstoffe.
ALPHA JET-PYLON
K. F SAHM *In its* Develop and Demonstration of Econ Production Systems in Airframe Construct p 6-19 Sep. 1982 In GERMAN
Avail: NTIS HC A10/MF A01

The Alpha Jet-Pylon was investigated in order to assess the possibilities of cast components design and manufacture in airframe construction. Sample tests, evaluation, vibratory fatigue limit, finishing, and statistical component tests were performed Sample tests of cast components in Precial-casting show that the high fatigue limit and dimensional accuracy requirements can also be obtained for large and complex components Worse X-ray results and dimensional deviations at the back are explained and improved by a supply modification. The results of testing of sand cast components show that dimensional stability and tensile strengths pose no problems. The weight of the not completely ground component is 21 kg higher than the Precial component, but 5 kg lower than the present series pylon. Author (ESA)

N83-32711# Vereinigte Flugtechnische Werke G.m.b.H., Bremen (West Germany). Metallische Werkstoffe.
MRCA RUN-IN FLOORS [MRCA-EINLAUFBODEN]
D. MIETRACH *In its* Develop and Demonstration of Econ. Production Systems in Airframe Construct. p 20-31 Sep. 1982 In GERMAN
Avail: NTIS HC A10/MF A01

Run-in floors made of the aluminum cast alloy A357 were manufactured for the MRCA-Tornado aircraft. This primary structural member is located in the front driving mechanism run-in and takes the run-in inner pressure Two types were ordered: Precial-cast and low pressure sand-cast. A first analysis shows that for equal weight a cost reduction of about 45% is obtained as compared to the conventional construction method. Optimization of dimensional and strength characteristics shows positive results. Author (ESA)

N83-32742# Societe Nationale Industrielle Aerospatiale, Paris (France)
AEROSPACE INDUSTRY MATERIALS: CHOICE CRITERIA AND NEEDS TO BE MET
J. BALAZARD 16 Dec. 1982 17 p In FRENCH Presented at Intern Colloq. on Mater., Energie, Aspects Previsionnels pour la Rech. et l'Ind., Sophia-Antipolis, France, 20-21 Jan. 1983
(SNIAS-831-502-101; DCT-677/82) Avail. NTIS HC A02/MF A01

Raw material, design, production, life cycle, operating and maintenance costs of aerospace industry raw materials are discussed. It is suggested that the economic consequences of technical choices determine whether composite or metal materials are used. Author (ESA)

N83-33827*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va.
PROCEEDINGS: SIXTH ANNUAL WORKSHOP ON METEOROLOGICAL AND ENVIRONMENTAL INPUTS TO AVIATION SYSTEMS
W FROST, ed , D W. CAMP, ed , and L. W. HERSHMAN, ed. Apr. 1983 140 p refs Workshop held in Tullahoma, Tenn , 26-28 Oct 1982, sponsored in cooperation with NOAA and FAA Prepared in cooperation with Tennessee Univ Space Inst , Tullahoma Original contains color illustrations
(Contract NAS8-34627)
(NASA-CP-2274; NAS 1 55.2274; FAA-RD-82-72) Avail. NTIS HC A07/MF A01 CSCL 01A

The topics of interaction of the atmosphere with aviation systems, the better definition and implementation of services to operators, and the collection and interpretation of data for establishing operational criteria relating the total meteorological inputs from the atmospheric sciences to the needs of aviation communities were addressed

N83-33841# Naval Postgraduate School, Monterey, Calif.
THE IMPACT OF RELIABILITY IMPROVEMENT WARRANTIES ON NAVAL AVIATION MAINTENANCE AT THE FLEET LEVEL M.S. Thesis
D. J SHUTT and J. H MARTIN Dec. 1982 71 p refs
(AD-A126810) Avail NTIS HC A04/MF A01 CSCL 05A

The use of reliability improvement warranties (RIW) to improve weapon system reliability and maintainability were studied. Past and present contracts to assess RIW impacts on the Naval Aviation community from an operational and supply point are reviewed The complexities of fleet level management of warranted assets, the risks posed to the contracting parties, the opinions of fleet maintenance managers, and the RIW's expected fiscal benefits, are discussed. GRA

02

AERODYNAMICS

Includes aerodynamics of bodies, combinations, wings, rotors, and control surfaces, and internal flow in ducts and turbomachinery

A83-43964#
AERODYNAMIC ASPECTS OF AIRCRAFT DYNAMICS AT HIGH ANGLES OF ATTACK
K. J ORLIK-RUECKEMANN (National Research Council, Ottawa, Canada) Journal of Aircraft (ISSN 0021-8669), vol. 20, Sept. 1983, p. 737-752. refs

Previously cited in issue 19, p. 2973, Accession no A82-39836

A83-44314#
EXPERIMENTATION WITH TURBULENT FLOWS EXPERIENCING THE EFFECTS OF AN ADVERSE PRESSURE GRADIENT [ETUDES EXPERIMENTALES D'ECOULEMENTS TOURBILLONNAIRES SOUMIS ADES EFFETS DE GRADIENT DE PRESSION ADVERSE]
J. L SOLIGNAC and O. LEUCHTER (ONERA, Chatillon-sous-Bagneux, Hauts-de-Seine, France) (NATO, AGARD, Meeting on Aerodynamics of Vortical Type Flows in Three Dimensions, Rotterdam, Netherlands, Apr 25-29, 1983) ONERA, TP, no. 1983-36, 1983, 26 p In French refs
(ONERA, TP NO. 1983-36)

Experiments were performed to examine the effects on turbulent structures produced by the adverse pressure gradients around a delta wing and about symmetric wings. Laser tomoscopy visualized the flows, and measurements were taken of the static pressure distributions and the flow velocities (using LDV techniques). The flow velocities were 14.5 and 32 m/sec for the delta wing and winglets, respectively Attention was focused on the leading edge vortex for the delta wing and the turbulence generated by the two NACA 0012 winglets, which were mounted at opposite angles of attack. The resulting turbulence structures differed mainly in velocity profiles. A quasi-cylindrical hypothesis was developed to account for vortex bursting as a function of the turbulent intensity and the adverse pressure gradient, with a threshold value defined for the onset of bursting M.S.K

A83-44358#
WING TIP DEVICES FOR ENERGY CONSERVATION AND OTHER PURPOSES EXPERIMENTAL AND ANALYTICAL WORK IN PROGRESS AT THE LOCKHEED-GEORGIA COMPANY
G. W WEBBER and T. DANSBY (Lockheed-Georgia Co , Marietta, GA) (Canadian Aeronautics and Space Institute, Annual General Meeting, 29th, Toronto, Canada, May 4, 1982) Canadian Aeronautics and Space Journal (ISSN 0008-2821), vol. 29, June 1983, p 105-120. refs

Winglet devices tested at Lockheed to reduce the drag on aircraft are described. The winglets also perform a stability, control, or active flutter suppression function, and can be added to existing aircraft. The winglets introduce a secondary surface in the tip region and interact with the trailing tip vortices, reducing the lift-dependent drag They can be applied in winglet, vortex diffuser, and sail configurations, and can feature discrete surfaces Benefits are currently highest on aircraft where the span is kept as low as possible, of particular concern with specific types of military aircraft Wind tunnel experiments with differently shaped winglets are detailed M S K

A83-44360
EXPERIMENTAL WORK ON THE AERODYNAMICS OF INTEGRATED SLENDER WINGS FOR SUPERSONIC FLIGHT
L C. SQUIRE (Cambridge University, Cambridge, England) Progress in Aerospace Sciences (ISSN 0079-6026), vol. 20, no 1, 1981, p 1-96 refs

This paper reviews an extensive program of experimental work which was aimed at the production of integrated slender wings which had volume distributions and cross-sectioon shapes compatible with the requirements of a supersonic transport aircraft The wings were also to be cambered so that they were trimmed at the cruise condition about a center of gravity position located at the aerodynamic center position at the approach condition, furthermore the camber was to be chosen so that the drag was as low as possible. The main work was carried out about 20 years ago, but the involvement in specific design applications resulted in no overall account of the program being published, although a number of reports on individual wings, or groups of wings, have appeared. This paper reviews the whole program from the initial tests on very simple delta wings with diamond cross-sections to the final tests on realistic shapes which achieved almost all of the design requirements. Author

A83-44555#
CALCULATION OF THREE-DIMENSIONAL TURBULENT BOUNDARY LAYER ON AN INFINITE SWEPT WING
Z ZHU, Y. CHEN, and C KAN (Beijing Institute of Aeronautics and Astronautics, Beijing, People's Republic of China) Acta Aerodynamica Sinica, no 1, 1983, p. 45-54 In Chinese, with abstract in English. refs

In the present report, a finite difference approach is used for computing turbulent boundary layer flow over an infinite swept wing with adverse pressure gradient. A zero-equation turbulent model with anisotropically distributed eddy viscosity is adopted in this work The model is deduced from the Michel-Schneider (1977) model and the Cebeci-Smith two-layer model A Newton method is used to handle the complicated iteration procedure. In the present task, the effects of both mixing lengths (inner and outer layer parameters are included in the Cebeci model) and anisotropic eddy viscosity coefficient are discussed The numerical results are compared with wind tunnel experiments. Author

A83-44556#
ON THE NUMERICAL SOLUTION OF HEAD-ON VEHICLE SHOCK-PLANAR INCIDENT SHOCK INTERACTION FLOW
S. LI and G ZHANG (Chinese Aerodynamic Research and Development Centre, People's Republic of China) Acta Aerodynamica Sinica, no 1, 1983, p 55-60. In Chinese, with abstract in English. refs

This paper describes the numerical method determining two-dimensional and axisymmetric flow for head-on vehicle shock-planar incident shock interaction. The complicated inviscid flow field, which contains multiple shock wave interactions, is determined by a shock-capturing finite difference approach which solves the time-dependent Euler equations The difference scheme used in this paper is a development of a self-adjusting hybrid scheme with a minimal dissipative coefficient keeping the monotony of solution The calculation results for the flow field, in which supersonic wedge, supersonic hemispheric or supersonic conical bodies intercept a planar incident shock traveling in the opposite direction at supersonic speed have shown the validity of the method. In a general way, this method may be used for the solution of a complicated flow field, which contains multiple discontinuties Author

A83-44561#
A NEW METHOD OF BOUNDARY LAYER CORRECTION IN THE DESIGN OF SUPERSONIC WIND TUNNEL NOZZLE
G DU and Y. WANG (Chinese Academy of Sciences, Institute of Engineering Thermophysics, People's Republic of China) Acta Aerodynamica Sinica, no 1, 1983, p 95-99 In Chinese, with abstract in English refs

A novel method for the correction of boundary layers in the design of wind tunnel nozzles is presented which obviates the determination of the displacement thickness. The partial differential equations for the turbulent boundary layer, moreover, can be solved directly The fundamental conservative equations are solved simultaneously by iteration between the equations between potential and boundary layer regions A practical nozzle designed by means of this method is compared with designs derived from existing theoretical and experimental methods, and the effectiveness of the present method is judged superior despite the slightly greater computer time required. O C

A83-44569#
AN EXPERIMENTAL INVESTIGATION OF TURBULENT BASE HEAT TRANSFER IN HYPERSONIC FLOW
J LI (Chinese Academy of Sciences, Mechanics Institute, Beijing, People's Republic of China) and Q LO (Beijing Special Electrical Machinery Institute, Beijing, People's Republic of China) Acta Aerodynamica Sinica, no 2, 1983, p 59-65. In Chinese, with abstract in English refs

Flight data and experimental results obtained in a shock tunnel are used to develop an engineering formula for estimating the turbulent base heat transfer of hypersonic flow Allowance is made for the influence of free flow, the cone angle, and bluntness The

data of base heat transfer obtained with side support are compared with data obtained with hanging The results reveal that the influence of side support on base heat transfer can be neglected
C R

A83-44572#
DESIGN OF TRANSONIC SHOCK-FREE AIRFOIL
F LI (Chinese Aerodynamic Research and Development Center, People's Republic of China) Acta Aerodynamica Sinica, no 2, 1983, p. 85-90 In Chinese, with abstract in English. refs

In this paper, a method for the transonic shock-free airfoil design, based on the full potential equation, using 'fictitious gas' assumption, is presented. With this method, a known airfoil can be modified and designed into a shock-free airfoil with given Mach number and incidence. Author

A83-45508*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio
AERODYNAMIC PERFORMANCE OF A FAN STAGE UTILIZING VARIABLE INLET GUIDE VANES (VIGV'S) FOR THRUST MODULATION
R. R. WOOLLETT (NASA, Lewis Research Center, Cleveland, OH) AIAA, SAE, and ASME, Joint Propulsion Conference, 19th, Seattle, WA, June 27-29, 1983. 16 p refs
(AIAA PAPER 83-1162)

An experimental research program was conducted in the Lewis Research Center's 9 x 15-foot (2.74 x 4 57 m) low speed wind tunnel to evaluate the aerodynamic performance of an inlet and fan system with variable inlet guide vanes (VIGVs) for use on a subsonic V/STOL aircraft. At high VIGV blade angles (lower weight flow and thrust levels), the fan stage was stalled over a major portion of its radius. In spite of the stall, fan blade stresses only exceeded the limits at the most extreme flow conditions. It was found that inlet flow separation does not necessarily lead to poor inlet performance or adverse fan operating conditions Generally speaking, separated inlet flow did not adversely affect the fan blade stress levels. There were some cases, however, at high VIGV angles and high inlet angles-of-attack where excessive blade stress levels were encountered An evaluation term made up of the product of the distortion parameter, K alpha, the weight flow and the fan pressure ratio minus one, was found to correlate quite well with the observed blade stress results Previously announced in STAR as N83-27957 Author

A83-45519#
COMPUTATION OF AERODYNAMIC FORCES ON BODIES WITH NON-CIRCULAR CROSS-SECTION IN SUPERSONIC VISCOUS FLOW
R U JETTMAR (U.S. Navy, Naval Surface Weapons Center, Silver Spring, MD) and W. KORDULLA (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen, West Germany) American Institute of Aeronautics and Astronautics, Atmospheric Flight Mechanics Conference, Gatlinburg, TN, Aug 15-17, 1983. 11 p refs
(AIAA PAPER 83-2077)

The parabolized Navier-Stokes (PNS) equations are used to predict the aerodynamic force coefficients on secant-ogive-cylinder (SOC) bodies with non-circular cross-section in viscous, supersonic flow Non-circular cross-sections have become important as design configuration. The aerodynamic characteristics of such bodies are not yet well explored and many current design interests make it desirable to gain some advanced knowledge of the aerodynamic characteristics of such bodies Since the solution of the full, unsteady, time-averaged Navier-Stokes equations is still limited by available computer resources, considerable interest exists for the application of the PNS equation to determine the flow field about realistic configurations. The applicability range of the PNS equations and their modeling properties is demonstrated in this paper
Author

A83-45577*# Flow Research, Inc , Kent, Wash
FINITE VOLUME CALCULATION OF THREE-DIMENSIONAL POTENTIAL FLOW AROUND A PROPELLER
W-H JOU (Flow Research, Inc , Research and Technology Div., Kent, WA) AIAA Journal (ISSN 0001-1452), vol 21, Oct 1983, p. 1360-1364 refs
(Contract NAS3-22148)

Previously cited in issue 15, p 2344, Accession A82-31933

A83-45581#
AN IMPLICIT LAMBDA SCHEME
A DADONE and M. NAPOLITANO (Bari, Universita, Bari, Italy) AIAA Journal (ISSN 0001-1452), vol 21, Oct. 1983, p 1391-1399. Sponsorship Consiglio Nazionale delle Ricerche refs
(Contract CNR-80,01120,07, AF-AFOSR-80-0047)

Previously cited in issue 15, p. 2344, Accession no A82-31940

A83-45594#
ENGINE POWER SIMULATION FOR TRANSONIC FLOW-THROUGH NACELLES
W C CHIN (Applied AeroNalysis, Houston, TX) AIAA Journal (ISSN 0001-1452), vol. 21, Oct. 1983, p 1471, 1472. refs

The results of a numerical simulation of engine-power effects on the transonic flow through a nacelle are presented. The model developed requires only minor modifications to conventional airfoil codes and is suitable for preliminary design applications A nacelle with an external shape equivalent to a 10-percent-thick symmetric parabolic-arc airfoil and a circular-cylindrical interior (chord-to-diameter ratio = 2) was investigated at Mach 0 92 and 0 98 for N = O (unpowered) and N = 3 (powered), using a 60 x 60 mesh The analytical approach, model assumptions, and numerical method are discussed. The Cp plots of the results are found to reflect the basic characteristics of powered flows, including the virtual disappearance of the external shock. The extension of this simplified approach to 3D flows (in nonaxisymmetric nacelles) is considered. T K

A83-46435* California State Univ., Long Beach.
PREDICTION OF BOUNDARY-LAYER CHARACTERISTICS OF AN OSCILLATING AIRFOIL
T CEBECI (California State University, Long Beach, CA) and L W. CARR (NASA, Ames Research Center, U.S Army, Aeromechanics Laboratory, Moffett Field, CA) IN Unsteady turbulent shear flows, Proceedings of the Symposium, Toulouse, France, May 5-8, 1981 . Berlin, Springer-Verlag, 1981, p 145-158. refs
(Contract NAS2-10799)

The evolution of unsteady boundary layers on oscillating airfoils is investigated by solving the governing equations by the Characteristic Box scheme The difficulties associated with computing the first profile on a given time line, and the velocity profiles with partial flow reversal are solved. A sample calculation is performed for an external velocity distribution typical of those found near the leading edge of thin airfoils The viability of the calculation procedure is demonstrated Previously announced in STAR as N81-28391 Author

A83-46437* Scientific Research Associates, Inc , Glastonbury, Conn.
A TURBULENT FLOW NAVIER-STOKES ANALYSIS FOR AN AIRFOIL OSCILLATING IN PITCH
S J. SHAMROTH (Scientific Research Associates, Inc., Glastonbury, CT) IN: Unsteady turbulent shear flows, Proceedings of the Symposium, Toulouse, France, May 5-8, 1981 . Berlin, Spring-Verlag, 1981, p 185-196 Army-supported research. refs
(Contract NAS1-15214)

A time-dependent compressible turbulent Navier-Stokes analysis is applied to the oscillating airfoil flow field problem. The turbulence model is based upon a turbulence energy equation. Results obtained for an airfoil oscillating in pitch are compared to data. Author

A83-46438
UNSTEADY KUTTA CONDITION OF A PLUNGING AIRFOIL
C.-M. HO and S.-H. CHEN (Southern California, University, Los Angeles, CA) IN Unsteady turbulent shear flows, Proceedings of the Symposium, Toulouse, France, May 5-8, 1981 Berlin, Springer-Verlag, 1981, p. 197-206
(Contract DAAG29-78-G-0023)

Unsteady Kutta condition is an important criterion for theoretical analyses in unsteady aerodynamics and in aerodynamic noise generations The experimental studies on this subject are very limited. In the present investigation, the stagnation streamline at the trailing edge of a NACA 0012 airfoil in plunging motion is measured from phase averaged streamwise and transverse velocity components The Kutta condition is examined for reduced frequency up to 1.0 and at different angles of attack. Author

A83-46455
HALF MODEL TESTING APPLIED TO WINGS ABOVE AND BELOW STALL
H BIPPES and M. TURK (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Goettingen, West Germany) IN Recent contributions to fluid mechanics . Berlin, Springer-Verlag, 1982, p. 22-30

For an experimental study of the flow on a rectangular wing with rear separation the half-model technique was applied Below stall unsymmetrical flow conditions due to the displacement effect of the interferent boundary layers on the wing-reflection wall intersection can be minimized by boundary layer suction Beyond stall the interacting vortex sheets, caused by separation of the three-dimensional boundary layers on the wing and the reflection wall, form a vortex system which is different from that developing on the corresponding full model The topological structure of this vortex system and its effect on the flow symmetry are discussed Author

A83-46465
CONSIDERATIONS OF THE VORTICITY FIELDS ON WINGS
E H HIRSCHEL (Messerschmitt-Boelkow-Blohm GmbH, Munich, West Germany) IN. Recent contributions to fluid mechanics . Berlin, Springer-Verlag, 1982, p. 129-137

Inviscid flow fields of lifting wings usually are calculated with the help of the Kutta condition, which forces the flow smoothly off the wing surface at the trailing edge The resulting vortex sheet behind the wing in reality carries vorticity which is created at the wing surface due to the nonslip condition How the vorticity properties of wing boundary layers fit into the picture of the potential flow model of lifting wings is qualitatively discussed, and it is shown how the vorticity vector in the boundary layers, which leave the surface at the trailing edge, corresponds to the (model) potential flow behind the wing Finally the calculated boundary layer on a swept wing is analyzed revealing additional information about the computed flow field Author

A83-46466
SLENDER WINGS WITH LEADING EDGE VORTEX-SEPARATION
S. M HITZEL (Dornier GmbH, Friedrichshafen, West Germany) IN: Recent contributions to fluid mechanics . Berlin, Springer-Verlag, 1982, p 138-150 refs

Theoretical models of the mechanisms and behavior of leading-edge vortex flows and breakdown on supersonic aircraft wings are examined The pressure distribution has been successfully predicted with a free vortex sheet between the leading edge and the feeding sheet. Higher order panel methods permit extension of the vortex sheet model to three dimensions, including the pressure distribution at the trailing edge. Vortex lattice methods have been developed to reduce the necessary computation time All cross-flow modelling includes the Kutta condition arising from vorticity continuity across the leading edge The development of more effective vector processors could favor the employment of the time-dependent Euler equations instead of the panel methods. The Euler equations model could be implemented, without modification, to flows ranging from subsonic to supersonic. D.H K.

A83-46483#
THE WAY TO THE SUPERCRITICAL WING [DER WEG ZUM SUPERKRITISCHEN FLUEGEL]
B. LASCHKA (Braunschweig, Technische Universitaet , Brunswick, West Germany) IN: Publication on the occasion of the 65th birthday of Prof Dr -Ing Erich Truckenbrodt, Scientific Colloquium, Technische Universitaet Muenchen, Munich, West Germany, February 1, 1982, Reports Munich, Technische Universitaet Muenchen, 1982, p 29-43. In German refs

Theoretical and practical factors in the aerodynamic optimization of supercritical wings for subsonic aircraft are discussed, and the development of experimental and practical designs since the 1940's is traced The improvement of the wing-profile performance using roof-top, rear-loading, and supercritical design measures is described, the application of the isobar concept to the optimization of the swept-back wing is considered, and pitch-up and buffeting phenomena are characterized The performance of different configurations is illustrated with drawings and graphs The present capabilities and near-term requirements of computers for the numerical solution of the Navier-Stokes equations and of wind-tunnel facilities for simulations at realistic Reynolds numbers are compared The primary achievements expected of the supercritical wing are seen as greater wing thickness, lift, and speed, with decreased sweepback. T K

A83-46485#
NUMERICAL AERODYNAMICS - REPLACEMENT OF ANALYTICAL SOLUTIONS AND/OR THE EXPERIMENT BY THE SUPERCOMPUTER? [NUMERISCHE AERODYNAMIK - ERSATZ ANALYTISCHER LOESUNGEN UND/ODER DES EXPERIMENTS DURCH DEN SUPERRECHNER?]
P W SACHER (Messerschmitt-Boelkow-Blohm GmbH, Ottobrunn, West Germany) IN. Publication on the occasion of the 65th birthday of Prof Dr -Ing Erich Truckenbrodt; Scientific Colloquium, Technische Universitaet Muenchen, Munich, West Germany, February 1, 1982, Reports Munich, Technische Universitaet Muenchen, 1982, p 89-108 In German refs

The development of computer-assisted numerical techniques for the solution of the fundamental equations of aerodynamics is discussed, and the relative value of computer and wind-tunnel (WT) simulations in aircraft design is evaluated The increasing cost of WT testing in both time and money is contrasted to the constant decrease in the costs of computer methods The current status of numerical methodology is explored and illustrated, and the potential sources of error in different numerical approaches are considered Significant discrepancies revealed in recent comparative WT tests and their possible causes are seen as serious problems which may not be easily correctible It is recommended that in the future computer analysis and computerized interpretation of experimental work be maximized, while WT testing should be limited to determining benchmark values for aircraft design programs and confirming new theoretical hypotheses. T K

A83-46495#
DETERMINATION OF THE SUCTION-FORCE DISTRIBUTION AND ITS EFFECT ON THE AERODYNAMIC DESIGN OF A WING FOR SUPERSONIC FLOW [ERMITTLUNG DER SAUGKRAFTVERTEILUNG UND IHRE AUSWIRKUNG AUF DIE AERODYNAMISCHE AUSLEGUNG EINES TRAGFLUEGELS BEI UNTERSCHALLSTROEMUNG]
S. N WAGNER (Muenchen, Hochschule der Bundeswehr, Neubiberg, West Germany) IN Publication on the occasion of the 65th birthday of Prof. Dr.-Ing. Erich Truckenbrodt, Scientific Colloquium, Technische Universitaet Muenchen, Munich, West Germany, February 1, 1982, Reports . Munich, Technische Universitaet Muenchen, 1982, p 443-462. In German refs

A method for the calculation of the distribution of suction force on supersonic wing surfaces is developed. The theoretical and practical importance of knowing the suction distribution is discussed. The wing theory of Wagner (1969) as modified for

wings with trailing-edge flaps and the two-dimensional profile studies of Carlson and Mack (1980) are used to calculate the induced or turbulent drag of swept-back trapezoidal wings as a function of lift, taking into account the Mach and Reynolds numbers and the relative thickness, relative degree of rear loading, and the nose radius of the particular wing section The calculated results are compared with experimental values, and it is found that significant discrepancies at high lift coefficients can be avoided. The influence of realistic changes in the values of the flow parameters is illustrated with graphs and charts comparing predicted and measured values. T.K

A83-46499
CALCULATION OF THREE-DIMENSIONAL TRANSONIC FLOW OVER THIN BODY (WING)
K. KOZEL and I. ROUSAR Zprava VZLU, no. Z-41, 1983, p 1-6. refs

The numerical solution of a three dimensional potential transonic flow over a thin body in a tunnel of rectangular cross section is presented The equation of the flow perturbation velocity potential is used along with a modified relaxation method to solve the problem Results are presented for both subsonic and supersonic inlet flow and for flow over a swept-back wing. C.D

A83-47019
WIND TUNNEL INVESTIGATIONS OF SOME THREE-DIMENSIONAL SEPARATED TURBULENT BOUNDARY LAYERS
S. SAROHIA (University College, London, England) and A. D. YOUNG (Queen Mary College, London, England) IN Three-dimensional turbulent boundary layers; Proceedings of the Symposium, Berlin, West Germany, March 29-April 1, 1982 Berlin, Springer-Verlag, 1982, p 126-137

Two kinds of separated flow were investigated, namely, that to be expected on a swept wing of large aspect ratio and that in the region of a wing-body junction In both cases, the reverse flow vortices developed large velocity components in their axial direction near the surface Reynolds stresses do not closely correlate with mean velocity components Where appropriate comparisons are made with related 2-dimensional results Author

A83-47034
THREE-DIMENSIONAL BOUNDARY-LAYER CALCULATIONS IN DESIGN AERODYNAMICS
E. H. HIRSCHEL (Messerschmitt-Boelkow-Blohm GmbH, Munich, West Germany) IN: Three-dimensional turbulent boundary layers, Proceedings of the Symposium, Berlin, West Germany, March 29-April 1, 1982 . Berlin, Springer-Verlag, 1982, p. 353-365. refs

The results of a calculation of the three-dimensional, turbulent, compressible boundary layer on the fuselage of a transport airplane are discussed. The data were found by an integral method. The interpretation of the results at the base of the fuselage is made in detail. With the help of the /tau/-minimum criterion a separation region is found. Author

N83-32740# Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.
AERODYNAMIC COMPUTATION OF THE WING-BODY-SHORT CABIN COMPOSITE
C Y. SONG *In its* Mech and Practice (Selected Articles) p 15-25 28 Mar. 1983 refs Transl into ENGLISH from Lixue yu Shijian (China), v. 4, no. 3, 1982 p 39-43
Avail: NTIS HC A03/MF A01 CSCL 01A

Extraction of aerodynamic perturbation and the decomposition of the boundary condition and the computational sequence are discussed. Author

N83-32744 Virginia Univ., Charlottesville
JET SCALING EFFECTS IN A USB PROPULSIVE LIFT CONFIGURATION Ph.D. Thesis
W. W HERLING 1982 302 p
Avail: Univ Microfilms Order No. DA8301471

Recent interest in short takeoff and landing (STOL) aircraft has prompted an investigation of scaling laws for the prediction of fluctuating surface pressures due to impinging jet flows, which is reported here. Pressure statistics in upper-surface-blown (USB) jet flows from a 1/4-scale model are compared for several Mach numbers and impingement conditions with full scale measurements from a NASA Langley installation, which consisted of a JT15D dual-flow, turbo-jet engine fitted with a rectangular nozzle exhausting internally mixed hot core and unheated bypass flow over a simulated wing with extended flap. The geometrically similar 1/4-scale model was configured to produce room temperature flows at low Mach numbers as a coaxial jet, simulating internal mixing processes, or as a single jet, representing a case of perfect mixing between internal engine flows. Overall fluctuating pressure levels when normalized by average exit plane dynamic pressure were found to be independent of Mach number and Reynolds number for the perfect mixing model Dissert Abstr

N83-32745 Wichita State Univ , Kans.
ANALYSIS OF INCOMPRESSIBLE SEPARATED FLOW AROUND AN AIRFOIL WITH A FINITE-GAP FLAP Ph.D. Thesis
R ELANGOVAN 1982 149 p
Avail: Univ. Microfilms Order No DA8300757

A computer model was developed to simulate subsonic incompressible flow around an airfoil with a finite gap flap Experimental data was used for comparison throughout the development of the computer code. The computer model consists of two sections The first section is the outer flow solution, which calculates the potential flow around an effective body with or without a closed wake This body is formed by adding the boundary layer displacement thickness to the original airfoil and flap, and a closed wake if the flow separates on the airfoil or flap The second section is the inner flow solution. This section uses a turbulent jet mixing analysis to simulate the flow bounding the wake and conserves mass and momentum within the wake The inner and outer solutions are computed iteratively until they match Results obtained from the computer program were compared with the experimental results Dissert Abstr

N83-32746 Ohio State Univ., Columbus
TRANSONIC INTERFERENCE EFFECTS IN TESTING OF OSCILLATING AIRFOILS Ph.D. Thesis
J A DAVIS 1982 340 p
Avail Univ Microfilms Order No. DA8300235

Transonic testing of NACA 64A010 airfoil models was conducted The experimental results of both fixed angle of attack and mid chord pitch oscillation testing conducted in 132 sq in transonic airfoil tunnel are reported Comparisons with both steady state and unsteady airfoil predictions were made along with other experimental data The validity of the experimental setup was examined in light of unsteady interference effects at transonic speeds. Noise surveys conducted at the start indicated no resonant edgetones for the perforated wind tunnel walls in the 0 to 120 Hz range of pitch oscillations examined. Broadband noise levels were greatest low Mach 0.5 and above Predicted tunnel resonance modes were at frequencies greater than the model pitch frequencies tested Unsteady data was examined for indications of tunnel resonance. Model and tunnel wall pressures showed that acoustic reflections were relatively weak and nonresonant with moderate attenuation at the porous-walls. Dissert Abstr.

N83-32747 ESDU International Ltd , London (England).
AVERAGE DOWNWASH AT THE TAILPLANE AT LOW ANGLES OF ATTACK AND SUBSONIC SPEEDS; AMENDMENT A
Oct. 1981 23 p refs Supersedes Aero-A 08 01 02;Aero-A 08.01.03;Aero-A.08 01.04 Sponsored by the Royal Aeronautical Society
(ESDU-80020-AMEND-A, AERO-A.08 01 02; AERO-A 08 01 03, AERO-A.08.01 04; ISBN-0-85679-303-5; ISSN-0141-397X) Avail ESDU

This Data Item is an addition to the Aerodynamic Subseries A simple method is described for estimating the average downwash angle at the tailplane for subsonic speeds and low angles of attack where the lift, pitching moment and downwash characteristics are linear, i.e where the flow is wholly attached. The method, which is semi-empirical, is a first order one allowing for the major effects of wing planform, body, wing-body interference and tailplane height. Moderate amounts of wing twist are also catered for The method applies only to wing-body-tail combinations although some assessment of the effect of rear-fuselage mounted nacelles is given ESDU

N83-32751 ESDU International Ltd , London (England)
CONTRIBUTION OF WING PLANFORM TO ROLLING MOMENT DERIVATIVE DUE TO SIDESLIP, (L SUB V) SUB W, AT SUBSONIC SPEEDS
Oct 1981 12 p refs Supersedes Aero-A 06 01 04
(ESDU-80033; AERO-A.06.01 04, ISBN-0-85679-316-7, ISSN-0141-397X) Avail: ESDU

This Data Item is an addition to the Aerodynamics Subseries A semi-empirical method is described for predicting the planform contribution to L sub V for aircraft having wings on any trapezoidal planform with aspect ratio between 1 and 12, tip chord/root chord ratio between 0 and 1 and sweepback of the mid-chord line between 0 and 60 degrees The formulae given apply also to swept forward wings for which case reference is given to theoretical data on the spanwise position of the center of pressure, which is needed to evaluate the formula. The method takes account of the effect of wing sweep on a theoretical basis and this is used to establish the zero-sweep contribution empirically from a large number of wind-tunnel test data Compressibility effects are taken into account up to the Mach number at which aerodynamic characteristics start to change rapidly. A worked example on the use of the data is included ESDU

N83-32752 ESDU International Ltd , London (England)
EFFECT OF TRAILING-EDGE FLAPS ON ROLLING MOMENT DERIVATIVE DUE TO SIDESLIP, (L SUB V) SUB F
Nov. 1980 10 p refs
(ESDU-80034, ISBN-0-85679-317-5, ISSN-0141-397X) Avail: ESDU

This Data Item is an addition to the Aerodynamics Subseries. A semi-empirical method for predicting the change in rolling moment derivative due to sideslip that occurs when wing trailing edge flaps are deployed for landing or takeoff is presented The method is applicable at incidences where there is a linear variation of rolling moment coefficient with angle of sideslip and of lift coefficient with angle of attack. The method covers wings of aspect ratios from 3 to 12 and half chord sweep angles from -10 deg to 45 deg with plain, split or slotted flaps ESDU

N83-32753 ESDU International Ltd , London (England)
PRESSURE RECOVERY OF AXISYMMETRIC INTAKES AT SUBSONIC SPEEDS
Nov 1980 29 p refs Sponsored by the Royal Aeronautical Society
(ESDU-80037, ISBN-0-85679-320-5, ISSN-0141-397X) Avail: ESDU

This Data Item is an addition to the Aerodynamic Subseries. A method is described for estimating the pressure recovery of axisymmetric intakes at subsonic speeds. The method is based on semi-empirical correlation of a wide range of experimental data including many unpublished results. The two main components of intake loss, associated with the lip and the diffuser portions of the intake, are considered separately The data is provided to estimate values for each of these components, the interaction between them, and to determine other minor components of pressure loss arising from straight portions of intake between the lip and diffuser and between the diffuser and the engine entry. The effects of nacelle incidence, which can be taken to include sideslip in crosswind conditions, are taken into account The data apply to axisymmetric intakes, such as those on pylon-mounted engine pods, with sharp or rounded lips and, with entry contraction ratios up to 1 4 ESDU

N83-32755 ESDU International Ltd , London (England)
EFFECT OF TRAILING-EDGE FLAPS ON SIDEFORCE AND YAWING MOMENT DERIVATIVES DUE TO SIDESLIP, (Y SUB V) SUB F AND (N SUB V) SUB F: AMENDMENT A
Jun 1982 16 p refs Sponsored by Royal Aeronautical Society
(ESDU-81013-AMEND-A, ISBN-0-85679-338-8; ISSN-0141-397X) Avail ESDU

This Data Item is an addition to the Aerodynamics Subseries A semi-empirical method for predicting (Y sub v) sub f and (N sub v) sub f the changes in sideforce and yawing moment derivatives due to sideslip which occur when wing trailing edge flaps are deployed for landing and takeoff are given The method applies to wing-body-tail combinations (with or without nacelles) at low subsonic speeds provided that there is a linear variation of sideforce and yawing moment coefficients with sideslip and of lift coefficient with angle of attack During the development of the method it was found that wind tunnel data showed that small changes in model geometry could result in significant changes in the magnitudes and the behavior with angle of attack of both (Y sub v) sub f (N sub v) sub f ESDU

N83-32756 ESDU International Ltd , London (England).
CONTRIBUTION OF WING PLANFORM TO DERIVATIVES OF YAWING MOMENT AND SIDEFORCE DUE TO ROLL RATE AT SUBSONIC SPEEDS (N SUB P)SUB W AND (Y SUB P)SUB W
Jun. 1981 20 p refs Sponsored in part by the Royal Aeronautical Society
(ESDU-81014, ISBN-0-85679-339-6; ISSN-0141-397X) Avail: ESDU

This Data Item is an addition to the Aerodynamics Subseries. A method is described for estimating the wing planform contribution to the derivatives of yawing moment and sideforce due to roll rate, (N sub p) sub W and (Y sub p) sub w, at subsonic speeds. The method applies to wings without dihedral, camber or twist, in the clean condition, i e with any high-lift devices retracted The method was originally developed for untapered wings but data have been provided to take into account the small effect of wing taper The method for the sideforce derivative applies only over the range of lift coefficients for which the flow is attached to the wing surface and (Y sub p) sub w varies linearly with lift coefficient The data cover an aspect ratio range from 2 to 12 and wing sweepback angles up to 60 degrees. The first-order effects of subsonic Mach number are also catered for. ESDU

N83-32759 ESDU International Ltd , London (England).
LIFT AND DRAG OF TWO STAGGERED LIFTING SURFACES AT LOW SPEEDS
Aug. 1981 27 p refs Sponsored by the Royal Aeronautical Society
(ESDU-81023, ISBN-0-85679-355-8, ISSN-0141-397X) Avail ESDU

This Data Item is an addition to the Aerodynamic Subseries A means of estimating the effect on lift and drag of the variation in geometry and disposition is described, with respect to each other and to the center of gravity, of a combination of two straight-tapered lifting surfaces trimmed in pitch and having a given margin of static stability It is a simple, but practical method suitable for application in the early stages of an aircraft design project or for the incorporation into a multivariate analysis program. The method has been programmed in BASIC and a listing is given. Two

comprehensive examples illustrating typical uses of the data are also given ESDU

N83-32760 ESDU International Ltd., London (England).
DRAG OF AXISYMMETRIC COWLS AT ZERO INCIDENCE FOR SUBSONIC MACH NUMBERS
Nov. 1981 39 p refs Sponsored by the Royal Aeronautical Society
(ESDU-81024; ISBN-0-85679-356-6, ISSN-0141-397X) Avail: ESDU

This Data Item is an addition to the Aerodynamic Subseries A simple method of estimating the drag of axisymmetric cowls at subsonic speeds is presented. The cowl is assumed to consist of a forebody and an afterbody having a sharp trailing-edge, with or without a cylindrical midbody. The forebodies considered are the widely-used NACA 1 - series although consideration is also given to improvements attainable at low speeds by means of an increased leading-edge radius. The cowl drag is assumed to consist of three components, i e. profile spillage and wave drags. The method used to predict profile drag was derived from correlations of form factors calculated using measured pressure distributions. The methods used to predict the spillage and wave drag components are, however, empirical, being based on correlations of both published and unpublished experimental data. ESDU

N83-32761 ESDU International Ltd., London (England).
LINEARIZED TWO-DIMENSIONAL OSCILLATORY AIRFORCE COEFFICIENTS AND LOAD DISTRIBUTIONS ON THIN AEROFOILS IN SUBSONIC FLOW
Nov 1981 27 p refs Sponsored by the Royal Aeronautical Society
(ESDU-81034, ISBN-0-85679-367-1; ISSN-0141-397X) Avail ESDU

This Data Item is an addition to the Aerodynamic Subseries. A method is formulated or evaluating the forces, moments and pressure distributions on a thin airfoil (strictly a flat plate) oscillating in heave and in pitch and with the oscillation of a trailing-edge control, with its hinge line at 0 8 of the airfoil chord, in subsonic flow The airforce coefficients are tabulated over frequency parameter and Mach number ranges of 0.05 to 2 and 0 to 0.9 respectively. Examples of the chordwise load distribution are presented graphically to show the effect of Mach number and frequency parameter An Appendix provides a set of conversion equations to obtain flutter derivatives from the airforce coefficients and these have been used to derive tables of flutter derivatives A second Appendix demonstrates the use of two dimensional strip theory to incorporate flutter derivatives into three dimensional flutter equations. ESDU

N83-32762 ESDU International Ltd., London (England)
LINEARISED TWO-DIMENSIONAL OSCILLATORY AIRFORCE COEFFICIENTS AND LOAD DISTRIBUTIONS ON THIN AEROFOILS IN SUPERSONIC FLOW
Mar 1982 20 p refs Sponsored by Royal Aeronautical Society
(ESDU-82005, ISBN-0-85679-383-3; ISSN-0141-397X) Avail ESDU

This Data Item is an addition to the Aerodynamics Subseries Results are presented for use in flutter calculations, obtained from a recently developed FORTRAN computer program. The program embodies a method for evaluating the forces, moments, and pressure distributions on a thin airfoil oscillating harmonically with small amplitude in supersonic flow The calculations were made for three modes of oscillation, i.e airfoil heave and pitch, and motion of a trailing edge control surface with its hinge line at 0 8 of the airfoil chord The results are presented in the form of tabulated aerodynamic force coefficients over a frequency parameter range from 0 to 2 0 and a Mach number range from 1 02 to 5.0. In addition, illustrative graphs are presented to show the effect of frequency and Mach number on oscillatory load distribution in heave and pitch. ESDU

N83-32763 ESDU International Ltd , London (England)
CONTRIBUTION OF FIN TO SIDEFORCE, YAWING MOMENT AND ROLLING MOMENT DERIVATIVES DUE TO SIDESLIP, (Y SUB V) SUB F, (N SUB V) SUB F, (L SUB V) SUB F, IN THE PRESENCE OF BODY, WING AND TAILPLANE
Apr. 1982 25 p refs
(ESDU-82010, ISBN-0-85679-388-4; ISSN-0141-397X) Avail: ESDU

This Data Item is an addition to the Aerodynamics Subseries A method for estimating the contribution of a fin to the sideforce, yawing moment and rolling moment derivatives due to sideslip for aircraft at subsonic speeds is provided. The data are applicable where there is a linear variation of lift coefficient with angle of attack and a linear variation of sideforce, yawing moment and rolling moment coefficients with angle of sideslip. ESDU

N83-32764 ESDU International Ltd , London (England).
CONTRIBUTION OF FIN TO SIDEFORCE, YAWING MOMENT AND ROLLING MOMENT DERIVATIVES DUE TO RATE OF YAW, (Y SUB R)SUB F, (N SUB R)SUB F, (L SUB R)SUB F
Jun. 1982 4 p refs Sponsored by the Royal Aeronautical Society
(ESDU-82017, ISBN-0-85679-392-2, ISSN-0141-397X) Avail. ESDU

This Data Item is an addition to the Aerodynamic Subseries A method is provided for estimating the contribution of a fin to the sideforce, yawing moment, and rolling moment derivatives due to rate of yaw for aircraft at subsonic speeds. The data are applicable where there is a linear variation of lift coefficient with angle of attack and a linear variation of sideforce, yawing moment and rolling moment coefficients with angle of sideslip. ESDU

N83-32768 ESDU International Ltd , London (England)
AIRCRAFT FORCES DUE TO INTERFERENCE BETWEEN A JET EFFLUX AND A SLOTTED FLAP
Nov. 1982 31 p refs
(ESDU-82034, ISBN-0-85679-415-5, ISSN-0141-397X) Avail ESDU

This Data Item is an addition to the Aerodynamics Subseries A simple method of predicting, at the project stage of the design of an aircraft, the lift, drag and pitching moment increments arising from a lift augmentation system in which the jet efflux of an underwing-mounted engine impinges on the wing and trailing-edge flaps is provided. The method is applicable to turbojet or turbofan powered aircraft with underwing nacelles and is also applicable to all trailing-edge slotted-flap systems, whether single or multi-element. The experimental data used in developing the method relate largely to transport aircraft with aspect ratios varying from about 5 to 8 and quarter-chord sweeps varying from 0 to 28 degrees Two comprehensive worked examples are included, dealing with typical twin-engine and four-engine transports. ESDU

N83-32769 ESDU International Ltd , London (England).
APPROXIMATE PARAMETRIC METHOD FOR PROPELLER THRUST ESTIMATION
Apr. 1983 17 p
(ESDU-83001, ISBN-0-85679-429-5; ISSN-0141-4054) Avail. ESDU

This data item is an addition to the performance Subseries. An approximate method of determining the uninstalled static thrust and the thrust lapse characteristics for a wide variety of constant-speed propellers is provided The method provides estimates of thrust for propellers operating at airspeeds up to 300 kn, and for which 2 or = power/sq (diameter) or = 16 hp/sq ft (16 or = power/sq (diameter) or = 128 kW/sq m and 6700 or = tipspeed or = 1000 ft/s (200 or = tipspeed or = 300 m/s) The data are intended for use in project estimations and are particularly suited to aeroplanes in the light and general aviation categories. ESDU

N83-32770 ESDU International Ltd., London (England).
CONTRIBUTION OF FIN TO SIDEFORCE, YAWING MOMENT AND ROLLING MOMENT DERIVATIVES DUE TO RATE OF ROLL, (Y SUB P) SUB F, (N SUB P) SUB F, (L SUB P) SUB F, IN THE PRESENCE OF BODY, WING AND TAILPLATE
Apr. 1983 20 p refs
(ESDU-83006; ISBN-0-85679-426-0, ISSN-0141-397X) Avail: ESDU

This Data Item is an addition to the Aerodynamics Subseries A method is provided for calculating the contributions of the vertical stabilizing fin of an aircraft to the sideforce, yawing moment, and rolling moment derivatives due to rate of roll The method is applicable for subsonic flight speeds when the flow over the aircraft is wholly subsonic and fully attached The tail assemblies covered are those where a single fin is located on top of the aircraft rear body and in the plane of symmetry, with a tailplane, if present, mounted either on the fin itself or on the rear body The aircraft is assumed to be in the 'clean' configuration with no flaps or slats deployed The method is semi-empirical. It uses theoretical calculations of the spanwise loadings arising on isolated fin - tailplane arrangements rolling at zero angle of attack to estimate the magnitude and center of pressure position of the damping force on the fin Corrections in terms of the mean sidewash occurring at the fin are made to allow for the presence of the wing and body and for angle of attack variations. The magnitudes of the corrections are deduced from comparisons with a large number of wind tunnel test results ESDU

N83-32772# Texas A&M Univ, College Station Dept of Aerospace Engineering
A CATALOG OF LOW REYNOLDS NUMBER AIRFOIL DATA FOR WIND TURBINE APPLICATIONS
S J. MILEY Feb 1982 622 p refs
(Contract DE-AC04-76DP-35333)
(RFP-3387) Avail NTIS HC A99/MF A01

Data on airfoils at low Reynolds numbers, which would be applicable to small wind energy conversion systems, were surveyed, screened, and compiled Coordinates, lift, drag, and pitching moment characteristics in both tabular and graphical form are given for each airfoil discussed Airfoil behavior and the effects of Reynolds number, surface roughness, and turbulence are also shown. Problems associated with presenting airfoil data at large angles of attack are considered as well as Airfoil characteristics and aerodynamics and the interpretation and utilization of airfoil data A.R H

N83-32776*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va
THEORETICAL AND EXPERIMENTAL INVESTIGATION OF SUPERSONIC AERODYNAMIC CHARACTERISTICS OF A TWIN-FUSELAGE CONCEPT
R M. WOOD, D S. MILLER, and K S. BRENTNER Aug. 1983 39 p refs
(NASA-TP-2184, L-15607; NAS 1.61 2184) Avail: NTIS HC A03/MF A01 CSCL 01A

A theoretical and experimental investigation has been conducted to evaluate the fundamental supersonic aerodynamic characteristics of a generic twin-body model at a Mach number of 2.70. Results show that existing aerodynamic prediction methods are adequate for making preliminary aerodynamic estimates. Author

N83-32777*# Sikorsky Aircraft, Stratford, Conn
ANALYSIS AND CORRELATION OF THE TEST DATA FROM AN ADVANCED TECHNOLOGY ROTOR SYSTEM
D. JEPSON, R. MOFFITT, K. HILZINGER, and J BISSELL Washington NASA Aug 1983 169 p refs
(Contract NAS2-10211)
(NASA-CR-3714; NAS 1.26:3714, SER-510034) Avail NTIS HC A08/MF A01 CSCL 01A

Comparisons were made of the performance and blade vibratory loads characteristics for an advanced rotor system as predicted by analysis and as measured in a 1/5 scale model wind tunnel test, a full scale model wind tunnel test and flight test The accuracy with which the various tools available at the various stages in the design/development process (analysis, model test etc) could predict final characteristics as measured on the aircraft was determined. The accuracy of the analyses in predicting the effects of systematic tip planform variations investigated in the full scale wind tunnel test was evaluated S L

N83-32780# Aeronautical Research Inst of Sweden, Stockholm Aerodynamics Dept
THE FFA WING BODY 83 COMPUTER PROGRAM. A PANEL METHOD FOR DETERMINATION OF AEROELASTIC CHARACTERISTICS AT SUBSONIC AND SUPERSONIC SPEEDS
S G HEDMAN and L. G TYSELL Feb. 1983 12 p refs
(Contract F-INK-82223-78-003-24-001)
(FFA-TN-1983-3) Avail NTIS HC A02/MF A01

A panel program for rigid airplanes was extended for the calculation of aerodynamic characteristics of configurations with elastic wings The equations for a direct solution of the deformed shape and its loading are outlined. Input modifications are described. The program was used with an iterative or a direct solution, for calculations of the aeroelastic characteristics of both low and high aspect ratio body wing configurations Good agreement with data from tests or alternate estimates is reached The direct solution method is considerably faster than the iterative Author (ESA)

N83-32781# Von Karman Inst for Fluid Dynamics, Rhode-Saint-Genese (Belgium)
WIND TUNNEL TESTING OF THREE-DIMENSIONAL MODELS IN WIND TUNNELS WITH TWO ADAPTIVE WALLS
E WEDEMEYER Oct 1982 30 p refs
(VKI-TN-147) Avail NTIS HC A03/MF A01

It is shown that wind tunnel walls can be adapted in such a way that wall interference becomes extremely small A computational method which determines the required wall deflection from pressure measurements at the walls is described It is based on the linearized perturbation potential for the disturbance flow. For a three dimensional wind tunnel model with 4.4 % blockage ratio, residual interferences are computed, and wind tunnel measurements which verify the predicted reduction of wall interferences by dimensional wall adaptation are performed. Author (ESA)

N83-33843*# Old Dominion Univ, Norfolk, Va. Dept of Mechanical Engineering and Mechanics
LINEARIZED POTENTIAL SOLUTION FOR AN AIRFOIL IN NONUNIFORM PARALLEL STREAMS Progress Report, 1 Jan. - 31 May 1983
R K. PRABHU and S. N. TIWARI Aug. 1983 43 p refs
(Contract NCC1-65)
(NASA-CR-173047, NAS 1 26:173047) Avail. NTIS HC A03/MF A01 CSCL 01A

A small perturbation potential flow theory is applied to the problem of determining the chordwise pressure distribution, lift and pitching moment of a thin airfoil in the middle of five parallel streams This theory is then extended to the case of an undisturbed stream having a given smooth velocity profile. Two typical examples are considered and the results obtained are compared with available solutions of Euler's equations The agreement between these two results is not quite satisfactory. Possible reasons for the differences are indicated Author

N83-33846*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif

AN EXPERIMENTAL STUDY OF TRANSONIC FLOW ABOUT A SUPERCRITICAL AIRFOIL. STATIC PRESSURE AND DRAG DATA OBTAINED FROM TESTS OF A SUPERCRITICAL AIRFOIL AND AN NACA 0012 AIRFOIL AT TRANSONIC SPEEDS, SUPPLEMENT

F W. SPAID (McDonnell Douglas Research Labs , St. Louis), J. A. DAHLIN (Douglas Aircraft Co., Long Beach, Calif), F. W ROOS (McDonnell Douglas Research Labs., St. Louis), and L. S STIVERS, JR Aug. 1983 225 p

(NASA-TM-81336-SUPPL; A-8762, NAS 1.15:81336-SUPPL)

Avail: NTIS HC A10/MF A01 CSCL 01A

Surface static-pressure and drag data obtained from tests of two slightly modified versions of the original NASA Whitcomb airfoil and a model of the NACA 0012 airfoil section are presented Data for the supercritical airfoil were obtained for a free-stream Mach number range of 0.5 to 0.9, and a chord Reynolds number range of 2 x 10 to the 6th power to 4 x 10 to the 6th power The NACA 0012 airfoil was tested at a constant chord Reynolds number of 2 x 10 to the 6th power and a free-stream Mach number range of 0.6 to 0.8. Author

N83-33848*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va

CONTRACTS, GRANTS AND FUNDING SUMMARY OF SUPERSONIC CRUISE RESEARCH AND VARIABLE-CYCLE ENGINE TECHNOLOGY PROGRAMS, 1972 - 1982

S HOFFMAN and M C. VARHOLIC (NASA. Lewis Research Center) Sep. 1983 80 p refs

(NASA-TM-85650, L-15611; NAS 1 15 85650) Avail: NTIS HC A05/MF A01 CSCL 01A

NASA-SCAR (AST) program was initiated in 1972 at the direct request of the Executive Office of the White House and Congress following termination of the U S. SST program The purpose of SCR was to conduct a focused research and technology program on those technology programs which contributed to the SST termination and, also, to provide an expanded data base for future civil and military supersonic transport aircraft Funding for the Supersonic Cruise Research (SCR) Program was initiated in fiscal year 1973 and terminated in fiscal year 1981. The program was implemented through contracts and grants with industry, universities, and by in-house investigations at the NASA/OAST centers. The studies included system studies and five disciplines· propulsion, stratospheric ,emissions impact, materials and structures, aerodynamic performance, and stability and control. The NASA/Lewis Variable-Cycle Engine (VCE) Component Program was initiated in 1976 to augment the SCR program in the area of propulsion. After about 2 years, the title was changed to VCE Technology program The total number of contractors and grantees on record at the AST office in 1982 was 101 for SCR and 4 for VCE. This paper presents a compilation of all the contracts and grants as well as the funding summaries for both programs Author

N83-33852*# Boeing Co., Seattle, Wash

FLIGHT TEST EVALUATION OF DRAG EFFECTS ON SURFACE COATINGS ON THE NASA BOEING 737 TCV AIRPLANE

D. GEORGE-FALVY and D. A SIKAVI Jun 1981 100 p refs Revised

(Contract NAS1-15325)

(NASA-CR-165767, NAS 1.26:165767, D6-37256-REV) Avail NTIS HC A05/MF A01 CSCL 01A

A flight test program was conducted in which the effects of various surface coatings on aerodynamic drag were investigated, results of this program are described in this report. The tests were conducted at NASA-Langley Research Center on the terminal configured vehicle (TCV) Boeing 737 research airplane The Boeing Company, as contractor with NASA under the Energy Efficient Transport (EET) program, planned and evaluated the experiment The NASA-TCV Program Office coordinated the experiment and performed the flight tests The principal objective of the test was to evaluate the drag reduction potential of an elastomeric polyurethane surface coating, CAAPCO B-274, which also has been considered for application on transport airplanes to protect leading edges from erosion The smooth surface achievable with this type of coating held some promise of reducing the skin friction drag as compared to conventional production type aircraft surfaces, which are usually anodized bare metal or coated with corrosion protective paint Requirements for high precision measurements were the principal considerations in the experiment. Author

N83-33854*# Old Dominion Univ., Norfolk, Va

LONGITUDINAL AERODYNAMIC CHARACTERISTICS OF A WING-WINGLET MODEL DESIGNED AT M = 0.8, C SUB L = 0.4 USING LINEAR AERODYNAMIC THEORY Contractor Report, Aug. 1982 - Jun. 1983

J. M. KUHLMAN Jul 1983 233 p

(Contract NSG-1357)

(NASA-CR-172186, NAS 1 26 172186) Avail: NTIS HC A11/MF A01 CSCL 01A

Wind tunnel test results have been presented herein for a subsonic transport type wing fitted with winglets. Wind planform was chosen to be representative of wings used on current jet transport aircraft, while wing and winglet camber surfaces were designed using two different linear aerodynamic design methods. The purpose of the wind tunnel investigation was to determine the effectiveness of these linear aerodynamic design computer codes in designing a non-planar transport configuration which would cruise efficiently The design lift coefficient was chosen to be 0 4, at a design Mach number of 0 8 Force and limited pressure data were obtained for the basic wing, and for the wing fitted with the two different winglet designs, at Mach numbers of 0 60, 0.70, 0 75 and 0 80 over an angle of attack range of -2 to +6 degrees, at zero sideslip. The data have been presented without analysis to expedite publication Author

N83-33856# Naval Air Development Center, Warminster, Pa. Aircraft and Crew Systems Technology Directorate

AN ENGINEERING METHOD FOR ESTIMATING THE AERODYNAMIC CHARACTERISTICS OF CIRCULATION CONTROL WINGS (CCW) Final Report

C. HENDERSON 1 Jun 1982 37 p refs

(AD-A126436; NADC-82186-60) Avail: NTIS HC A03/MF A01 CSCL 01C

A semiempirical prediction technique development for the general class of Circulation Control Wing (CCW) STOL Aircraft is presented. The application of circulation control for high lift by tangential blowing over the bluff trailing edge of airfoils was carried out principally by the DTNSRDC A large body of two dimensional airfoil data was built up with subsequent extension to three dimensional models and finally to full scale flight demonstrator aircraft The CCW capability was successfully proven in the Grumman A-6/CCW demonstrator vehicle. Development of a V/STOL Manual/DATCOM type of engineering prediction technique is made possible by the extensive DTNSRDC data base. The approach taken was to correlate all available two dimensional CCW data with appropriate geometric and flow variables. The resulting charts permit empirical prediction of 2D lift, drag and moment characteristics of candidate airfoils. Predictions of the complete 3D CCW system, normally having partial span blowing, then employs application of three dimensional factors, verified through comparisons with complete vehicle model tests GRA

03

AIR TRANSPORTATION AND SAFETY

Includes passenger and cargo air transport operations; and aircraft accidents.

A83-43971*# Pennsylvania State Univ , University Park.
AIRCRAFT TRAJECTORIES FOR REDUCED NOISE IMPACT
R G. MELTON (Pennsylvania State University, University Park, PA) and I. D. JACOBSON (Virginia, University, Charlottesville, VA) Journal of Aircraft (ISSN 0021-8669), vol 20, Sept. 1983, p 798-804 refs
(Contract NSG-1509)

Numerical optimization is used to compute the optimum flight paths, based upon a parametric form that implicitly includes some of the problem restrictions The other constraints are formulated as penalties in the cost function Various aircraft on multiple trajectories (landing and takeoff) can be considered The modular design employed allows for the substitution of alternate models of the population distribution, aircraft noise, flight paths, and annoyance, or for the addition of other features (e g , fuel consumption) in the cost function A reduction in the required amount of searching over local minima was achieved through use of the presence of statistical lateral dispersion in the flight paths Previously announced in STAR as N81-31159 T.M

A83-44318#
THEORETICAL AND EXPERIMENTAL STUDIES OF THE ELECTROMAGNETIC COUPLING MECHANISMS BETWEEN AIRCRAFT AND CONSECUTIVE LIGHTNING STRIKES, BOTH DIRECT AND NEARBY [ETUDES THEORIQUE ET EXPERIMENTALE DES MECANISMES DE COUPLAGE ELECTROMAGNETIQUE RENCONTRES SUR AERONEFS ET CONSECUTIFS ADES FOUNDROIEMENTS DIRECTS OU DE PROXIMITE]
J C. ALLIOT and P. LEVESQUE (ONERA, Chatillon-sous-Bagneux, Hauts-de-Seine, France) (Society of Electrical, Electronics and Radio Engineers, URSI, and CNET, National Symposium on Electromagnetic Compatibility, 2nd, Tregastel, France, June 1-3, 1983) ONERA, TP, no. 1983-44, 1983, 7 p In French
(ONERA, TP NO. 1983-44)

The results of ONERA experimentation with aircraft models in a cylinder used to transmit electromagnetic waves similar, though reduced in amplitude, to lightning strikes are presented Sample sections with 1 mm thick skins were placed within the test cylinder The discharge had a rise time of 35 nsec to reach 10-90 percent of the full strength of 295 A. Measurements were taken of the voltage, current, and electromagnetic field with a passband of 1.5 kHz to 180 MHz. Parasitic signals engendered by a direct strike through coupling across the structure and appearing in internal circuits originated from current diffusion across the aircraft skin and penetration of the electromagnetic field through openings such as the cockpit and access doors M.S K.

A83-44876
REFLECTIONS ON THE POTOMAC
G M BRUGGINK International Journal of Aviation Safety (ISSN 0264-6803), vol. 1, June 1983, p 5-12

The present study has the objective to examine the potential role of incident investigation in the prevention of aircraft accidents, taking into account a review of the B-737 accident on January 13, 1982 This accident involved an airliner with 74 passengers and 5 crewmembers. After takeoff from Washington National Airport, the aircraft crashed into the Potomac There were five survivors. The accident report mentioned with respect to the critical phase of the takeoff that 'air frame snow or ice contamination produced a nose-up pitching moment during rotation and lift off which was not immediately countered by the pilot'. The various factors and conditions which could possibly be related to the accident are discussed. It is concluded that numerous compromises set the stages for this accident and that none was more critical than the collective failure to react responsibly to the warning signals of directly related incidents G R.

A83-44878
GENERAL AVIATION SAFETY - HOW SAFE? ITS IMPLICATION FOR FLYING AND THEORY TRAINING
W. G COOPER (New South Wales Technical and Further Education College, New South Wales, Australia) International Journal of Aviation Safety (ISSN 0264-6803), vol 1, June 1983, p. 23-29 refs

It has been found that the private and business flying, which accounts for about 33 percent of total hours, is involved in over 50 percent of all accidents Approximately 75 percent of all fatalities involved private pilots of less than 500 hours experience The three dominant accident causes are related to continued flight into deteriorating weather, takeoff and landing away from airports, and illegal low flying Attention is given to the types of occurring accidents, approaches for minimizing the risk without loss of freedom or prohibitive cost, problems related to poor public relations, the relevance of difficult examinations, safety problems, the causes of fatal accidents, and the value of ground instruction G R

A83-44880
THE JETSTAR OVERRUN AT LUTON
W H TENCH International Journal of Aviation Safety (ISSN 0264-6803), vol 1, June 1983, p. 45-54

The present investigation is concerned with an accident in which a Jetstar N267L crashed on landing at Luton airport near London, England, on October 13, 1982. The aircraft was engaged on a private business flight from Lagos, Nigeria to Luton, where a surveillance radar approach was made to runway 08 at night in conditions of low cloud and poor visibility. Attention is given to details regarding the accident, the official report on the accident, questions concerning a diversion of the aircraft to the Gatwick airport, the condition of the Luton airport, the runway profile, the correct approaches to maintain the proper standard of safety, alternatives regarding another airport location, and problems of a fire hazard A number of safety recommendations are also presented Thus, it is suggested that there should be the introduction of an approach ban applicable to private flights and similar to those which apply to public transport flights under certain conditions of adverse weather G R

A83-45077
ARGHOS - A TOOL FOR SCHEDULE PLANNING
M DENIS (Compagnie Nationale Air France, Paris, France) IN SITELCOM-82 - Telecommunications and data processing in the air transport industry; Proceedings of the Conference, Monte Carlo, Monaco, March 2-4, 1982 Neuilly-sur-Seine, Hauts-de-Seine, France, Societe Internationale de Telecommunications Aeronautiques, 1983, p. 159, 161-167.

The acronym ARGHOS used for the considered system for schedule planning can be interpreted in English to represent 'Automated Routines for the Generation and Handling of Schedules'. Attention is given to the plotting of flights in response to requests from the marketing department, the assignment of sequences of flights to one aircraft, and the performance of these activities by ARGHOS The system consists of an information, a decision, and a communication subsystem The information subsystem stores a large amount of information. The basic structure in the data base is the aircraft rotation, a subset of data which matches a sequence of flights on a chart G R.

A83-45461*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
GROUND SIMULATION INVESTIGATION OF HELICOPTER DECELERATING INSTRUMENT APPROACHES
J. V LEBACQZ (NASA, Ames Research Center, Moffett Field, CA) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 6, Sept.-Oct 1983, p. 330-338 refs
Previously cited in issue 19, p. 2974, Accession no A82-39118

A83-45900
INTERNATIONAL FORUM FOR AIR CARGO, 11TH, NEW YORK, NY, SEPTEMBER 27-30, 1982, PROCEEDINGS
Forum sponsored by SAE, AIAA, and ASME Warrendale, PA, Society of Automative Engineers, Inc. (SAE Proceedings P-116), 1982, 304 p

The present conference on the state and further development of air cargo considers concepts aimed at the maximization of air freight use by all industries, the economic benefits to be derived from the use of air freight on a daily basis, and examples of the growing use of air freight services as a global distribution and marketing tool. Among the specific topics discussed are the role of the air forwarder, automated cargo clearance, the effects of U.S airline deregulation, air cargo terminal functions, the transportation of aerospace equipment and components, drugs, pharmaceuticals and chemicals, electronic equipment and components, live cargo and perishables, primted materials, and other merchandise, container ground handling, the interoperability of military and civil cargo systems, economic analysis, and cargo aircraft design. No individual items are abstracted in this volume
O C.

A83-46420
AIRPORTS AS A THREAT TO PUBLIC SAFETY
R. E. MONROE (Aircraft Owners and Pilots Association, Bethesda, MD) Bethesda, MD, Aircraft Owners and Pilots Association, 1982, 48 p.

The record of general aviation aircraft collisions with buildings and residences during the period 1964-1979 was examined in order to identify the incidence of these accidents as a function of airport use and the frequency and severity of third-party injuries as a consequence of airport-related accidents. It was found that of the 485 accidents during this period, about 86 percent were airport-use related, with 59 percent occurring on the airport and 41 percent occurring at off-airport sites Off-airport collisions were found to average less than 13 per year, while third-party fatalities in off-airport collisions averaged 2 1 per year and serious injuries averaged 1.3 per year. It is concluded that airport operation does not constitute a significant threat to the safety of those who live and work in the vicinity of the airport and its traffic pattern N.B

A83-46776
FLIGHT FREQUENCY DETERMINATION
D B. TEODOROVIC (Beograd, Univerzitet, Belgrade, Yugoslavia) ASCE, Transportation Engineering Journal (ISSN 0733-947X), vol. 109, Sept. 1983, p. 747-757.

An attempt has been made to determine the flight frequency between two cities. The economic effects achieved by the carrier using a particular flight frequency level are measured through the average load factor value The level of service is measured by the absolute value of the average time difference between the actual and desired time of departure. It is shown that this time difference can be approximately expressed only in the function of flight frequency, without regard to the times of departure in the course of the day and that the error which occurs is not considerable The interval in which the flight frequency should be located is also determined, as well as the corresponding interval of the average time difference between the actual and desired time of departure in order to achieve a profitable business. A numerical example illustrates the route Belgrade-Zagreb in Yugoslavia. Author

A83-46927
FAA ROTORCRAFT ICING REGULATIONS AND DIRECTIONS
D. C GASTINGER (FAA, Washington, DC) Vertiflite (ISSN 0042-4455), vol. 29, Sept -Oct. 1983, p. 26-30.

Steps taken by the FAA to ease the icing envelope requirements for rotorcraft certification are reviewed, noting that many regulations were written for worst-case scenarios for equipment three decades old The most stringent requirements involved extremes of temperature and liquid water content Comparisons were made between the FAA and U.S Army and CAA criteria for clouds based on droplet size An altitude-limited icing envelope was devised, together with a certification plan Failure modes testing was defined and a requirement for a dual power source was introduced Further improvements are recommended in terms of a limited icing amendment that is geographically dependent.
D H K

N83-32782*# Kansas Univ Center for Research, Inc , Lawrence Flight Research Lab.
A METHOD OF PREDICTING FLOW RATES REQUIRED TO ACHIEVE ANTI-ICING PERFORMANCE WITH A POROUS LEADING EDGE ICE PROTECTION SYSTEM Final Report
D. L KOHLMAN and A. E ALBRIGHT Aug 1983 25 p refs Revised
(Contract NAG3-71)
(NASA-CR-168213, NAS 1.26:168213; KU-FRL-464-5-REV-A)
Avail: NTIS HC A02/MF A01 CSCL 01C

An analytical method was developed for predicting minimum flow rates required to provide anti-ice protection with a porous leading edge fluid ice protection system The predicted flow rates compare with an average error of less than 10 percent to six experimentally determined flow rates from tests in the NASA Icing Research Tunnel on a general aviation wing section Author

N83-32783*# Ohio State Univ , Columbus. Dept of Aviation
A SUMMARY AND INTEGRATION OF RESEARCH CONCERNING SINGLE PILOT IFR OPERATIONAL PROBLEMS Final Report
G C CHAPMAN Washington NASA Aug. 1983 73 p refs
(Contract NAG1-238)
(NASA-CR-3716; NAS 1.26 3716) Avail: NTIS HC A04/MF A01 CSCL 01C

A review of seven research studies pertaining to Single Pilot IFR (SPIFR) operations was performed. Two studies were based on questionnaire surveys; two based on National Transportation Safety Board (NTSB) reports, two were based on Aviation Safety Reporting System (ASRS) incident reports, and one report used event analysis and statistics to forecast problems The results obtained in each study were extracted and integrated Results were synthesized and key issues pertaining to SPIFR operations problems were identified. The research that was recommended by the studies and that addressed the key issues is catalogued for each key issue. Author

N83-33829*# National Aeronautics and Space Administration, Washington, D C.
NASA'S AVIATION SAFETY - METEOROLOGY RESEARCH PROGRAMS
R L WINBLADE *In* NASA. Marshall Space Flight Center Proc. 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems p 17-18 Apr 1983
Avail NTIS HC A07/MF A01 CSCL 01C

The areas covering the meteorological hazards program are severe storms and the hazards to flight generated by severe storms, clear air turbulence, icing, warm fog dissipation; and landing systems. Remote sensing of ozone by satellites, and the use of satellites as data relays is also discussed. Author

N83-33859*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va.
TABULATION OF RECORDED GUST AND MANUEVER ACCELERATIONS AND DERIVED GUST VELOCITIES AND AIRPLANES IN THE NASA VGH GENERAL AVIATION PROGRAM
J W JEWEL, JR. Sep. 1983 33 p refs
(NASA-TM-84660; L-15613, NAS 1 15 84660) Avail: NTIS HC A03/MF A01 CSCL 01C

Tables of incremental gust and maneuver accelerations in 0 1g intervals (above preselected threshold values) and derived gust velocities in intervals of 4 ft/sec are presented for 95 general aviation airplanes flown for 35,286 hours in 9 types of operations Author

N83-33860# Naval Air Development Center, Warminster, Pa Aircraft and Crew Systems Technology Directorate
CENTRIFUGE TESTS OF MODIFICATIONS TO THE MA-2 AIRCREWMAN TORSO HARNESS, PHASE 1 Preliminary Report
D LORCH 4 Dec. 1982 28 p refs
(AD-A126416; NADC-82126-60) Avail: NTIS HC A03/MF A01 CSCL 01C

Inadequate aircrew restraint was cited as a factor which has caused the loss of many aircraft Several modifications of the MA-2 torso harness were tested by live subjects on the NAVAIR-DEVCEN centrifuge at an acceleration of -2Gz, and also in a -2Gx simulated flat spin in order to detemine how much improvement was made to the restraint system A 2 cm reduction in Z-displacement could be obtained with either a negative G strap or a 'V' strap over the thighs GRA

N83-33861# Mitre Corp , McLean, Va Metrek Div
POTENTIAL FUEL SAVINGS OF SPECIFIC ATC SYSTEM IMPROVEMENTS Final Report
R. A RUCKER Feb 1982 160 p refs
(Contract DOT-FA01-82-C-10003)
(AD-A126449, MTR-81W275; FAA-EM-82-11) Avail NTIS HC A08/MF A01 CSCL 21D

Procedural restrictions are often imposed by the current ATC system upon the choice of routes and altitudes that the airspace user may fly. ATC imposed delays before departure, while en route, or before landing are also a common experience. To the extent that such restrictions and delays impose fuel or time penalties, they are of concern to today's fuel/cost conscious airspace user. To the extent they are needed to resolve actual conflicts between aircraft competing for the use of common airspaces or runways, they are essential for maintaining air safety However, to the extent that they simply 'separate aircraft from otherwise empty airspace or runways', they impose unnecessary and costly penalties on the airspace users The results of two studies of these problems and some unpublished case studies are presented in an attempt to better understand the causes and consequences of specific restrictions and delays to IFR flight movements. The potential for fuel savings if the ATC system could be improved to the point where only those restrictions and delays actually needed to insure flight safety are actually imposed is estimated. These potential fuel savings are allocated as the estimated benefits of five specific ATC system functional improvements now being considered GRA

N83-33862# Naval Postgraduate School, Monterey, Calif
A COMPARISON OF AUDIO, VISUAL AND TACTILE WARNING DEVICES IN A SIMULATED FLIGHT ENVIRONMENT M.S. Thesis
R. J. LARKIN Mar 1983 45 p refs
(AD-A128200) Avail: NTIS HC A03/MF A01 CSCL 05J

An experiment was performed in which fifteen subjects responded to three separate warning devices; an audio; visual, and tactile device Reaction times to each randomly presented device were measured while each subject was simultaneously engaged in piloting a personal flight simulator. Instructions to the subjects were continually presented visually on a TV monitor and verbally through a set of earphones The mean reactions times for each device were compared using a difference of means t-test The results showed that the tactile device produced significantly faster reaction times at the alpha = .01 significance level This led to the conclusion that a tactile warning device could be effective in a flight environment where visual and auditory senses can easily be overloaded GRA

N83-33864# Feecon Corp , Westborough, Mass
AIR TRANSPORTABLE AS32/P-4 CRASH RESCUE VEHICLE Final Report, Sep. 1979 - May 1980
J. GAGLIARDO, J OREGAN, J WALKER, and A KWAN Tyndall AFB, Fla Air Force Engineering and Services Center Mar 1983 86 p
(Contract F08635-79-C-0286, AF PROJ 2505)
(AD-A128068, AFESC/ESL-TR-81-14) Avail NTIS HC A05/MF A01 CSCL 13L

The objective of this project was to develop an alternate turret configuration on the AS32/P-4 (P-4) which enables the vehicle to be air transported without disassembling the fire suppression system. Four Air Force P-4 vehicles were modified, tested, and evaluated Modifications consisted of removing the roof turret and associated compounds. The original bumper turret was replaced by a large capacity (800 GPM) non-air-asperating turret This large capacity turret can be operated either hydraulically or manually Four fire tests were conducted comparing the original configuration with the modified configuration The modification proved to be highly successful The non-air aspirating turret was shown to have twice the effective discharge range The modified vehicles can be air transported on a C-130 aircraft without disassembly of the fire suppression system Author (GRA)

04

AIRCRAFT COMMUNICATIONS AND NAVIGATION

Includes digital and voice communication with aircraft, air navigation systems (satellite and ground based); and air traffic control.

A83-44159
WIDE-BEAM ATMOSPHERIC OPTICAL COMMUNICATION FOR AIRCRAFT APPLICATION USING SEMICONDUCTOR DIODES
A K MAJUMDAR and G. H. FORTESCUE (Lockheed-California Kelly-Johnson Research and Development Center, Burbank, CA) Applied Optics (ISSN 0003-6935), vol. 22, Aug 15, 1983, p. 2495-2504 Research supported by the Lockheed-California Independent Research and Development Program. refs

A new design approach for communications systems is presented, and involves the use of a wide, angular divergent transmitting beam. Attention is given to a 1-10 km aircraft-to-aircraft data link, with the wide-angle output beam obtained with IR emitters Link budgets are quantified for transmitter, receiver, and optical path parameters, and hardware design features of the source/transmitter and detector/optical receiver are considered A night and day operating system is discussed, with account taken of the received information signal and the background radiation power. The noise terms of the system are affected by the mean square fluctuations in the background power, but an optical filter can reduce the radiation outside of the source bandwidth. Experimental results are provided for various FOV receiver performances out to 1 km. Details of a 9-channel receiver with a 5 5 deg FOV receiver performances out to 1 km. Details of a 9-channel receiver with a 5 5 deg FOV are outlined, together with techniques for FM modulation and demodulation for a laser diode M.S K

A83-44494
AVIONICS ANALYSED. IV - AIRCRAFT GREY MATTER
M. HIRST Air International (ISSN 0306-5634), vol. 25, Sept 1983, p. 149-153.

A discussion is presented on the basic design and operational principles of the computerized flight control systems employed by advanced military and commercial aircraft Such digital systems have almost entirely replaced earlier analog computer-based ones because of their far greater accuracy and reliability, lower weight, and low power consumption Attention is given to the most fundamental logical and arithmetical operations of digital computers, and the techniques used by system designers to build up increasingly complex hierarchical structures, or 'architectures', from such simple building blocks The most significant of the building block logic modules are those which can store their inputs to provide digital 'memory'. The performance advancements expected from such emerging transistor hardware technologies as Metal-Oxide-Semiconductor and Field-Effect Transistors, and Very High Speed Integrated Circuit designs, are also discussed. O C

A83-44812
CO2 LASER RANGEFINDERS
N. G SHEPHERD (Ferranti PLC, Electro-Optics Dept , Edinburgh, Scotland) IN: The Max Born Centenary Conference, Edinburgh, Scotland, September 7-10, 1982, Proceedings Bellingham, WA, SPIE - The International Society for Optical Engineering, 1983, p. 320, 321. Research supported by the Royal Signals and Radar Establishment.

In the late 1960's it was realized that aircraft providing close air support to ground activity in Northern Europe could only survive by making not more than one pass, at high speed and low altitude The implementation of such tactical procedures required new approaches with respect to target acquisition and positioning. It was found that a laser beam with its very narrow beam divergence and very short pulse length could solve the ranging problem, if the sightline could be accurately stabilized If a train of laser pulses could be fired at the target by a man on the ground, a seeker in the aircraft could pick up the scatter from the target and align its sightline automatically The Laser Ranger and Market Target Seeker is the airborne equipment developed to meet this requirement. The Nd YAG configurations initially developed have certain disadvantages, partially related to the hazard presented to the human eye The possibility to use CO2 lasers was, therefore, investigated. Developments related to the design of suitable CO2 lasers are discussed. G.R

A83-45076
SITELCOM-82 - TELECOMMUNICATIONS AND DATA PROCESSING IN THE AIR TRANSPORT INDUSTRY; PROCEEDINGS OF THE CONFERENCE, MONTE CARLO, MONACO, MARCH 2-4, 1982
Conference sponsored by the Societe Internationale de Telecommunications Aeronautiques. Neuilly-sur-Seine, Hauts-de-Seine, France, Societe Internationale de Telecommunications Aeronautiques, 1983, 357 p

Advances in telecommunications and data processing technology are considered along with the emergence of new information services, taking into account developments from microcomputers to supercomputers expected for the next ten years, videotex in the international market place, the case study of an application of a new information service, the critical evaluation of new information services, and an emerging trend in the telecommunications and data processing industries Other subjects discussed are related to the influence of the new information technology upon the airline industry, and cooperative approaches to airline information systems. Attention is given to a future reservations system, advanced airline avionics, a schedule planning system, the impact of new technology on engineering and maintenance, SITA advanced telecommunications services, the role of information services in airline management functions, a case study regarding automation at a Canadian airline, airport automation, common data bases and data processing applications, advances in air cargo information handling, and the role of cooperation in the development of airline information systems G R.

A83-45079
SITA - ADVANCED TELECOMMUNICATIONS SERVICES
G. GIRAUDBIT (SocieteInternationale de Telecommunications Aeronautiques, Neuilly-sur-Seine, Hauts-de-Seine, France) IN: SITELCOM-82 - Telecommunications and data processing in the air transport industry, Proceedings of the Conference, Monte Carlo, Monaco, March 2-4, 1982 . Neuilly-sur-Seine, Hauts-de-Seine, France, Societe Internationale de Telecommunications Aeronautiques, 1983, p 183, 185-218

The most important feature in the evolution of world telecommunications during the last quarter of this century is the progressive integration of computers and communications. The 'telematics revolution' will lead to the transformation of present separate telephone, television, and data networks into 'Integrated Services Digital Networks' (ISDN) Fifteen years ago, airlines were first to develop and deploy a civilian packet and message switching network, the SITA High Level Network The present investigation has the objective to provide a tentative assessment of SITA's prospective role in the field of new telecommunications services for the Air Transport Industry in the 80's Attention is given to an overview of SITA's telecommunication environment in the 80's, preliminary guidelines for the development of new telecommunications services, and a summary description of potential future services G R

A83-45401
IMPROVEMENT OF THE MEASUREMENT SYSTEM FOR THE SURVEY OF CLASS-II ILS INSTALLATIONS [VERBESSERUNG DES MESSSYSTEMS ZUR VERMESSUNG VON ILS-ANLAGEN DER KATEGORIE II]
K. WAECHTER (Interflug Gesellschaft fuer Internazionalen Flugverkehr mbH, Berlin, East Germany) Technisch-oekonomische Information der zivilen Luftfahrt (ISSN 0232-5012), no. 1, 1983, p 10-12. In German.

Changes in and additions to the airborne instrumentation used by Interflug in the surveying of ILS installations are reported The measurement circuits of the redundant basic instruments were simplified to allow for simple switchover from course to glidepath operation, with only one set of visual indicators on each instrument (to avoid pilot confusion) An oscilloscope, a digital readout, an active HF tester, a modulation-error measuring system, a continuous integrator to indicate the mean OM/MM and OM/ILS-reference-point amplitudes every 5 sec during the flight, and a field-intensity meter for the marker beacon have been added to the onboard instrument package. The measurement antennae have been moved to a plastic housing in the nose of the aircraft to eliminate propellor-modulation effects T.K

A83-45460*# National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif
A KALMAN FILTER ALGORITHM FOR TERMINAL-AREA NAVIGATION WITH SENSORS OF MODERATE ACCURACY
L. S CICOLANI, G. KANNING (NASA, Ames Research Center, Moffett Field, CA), and S F. SCHMIDT (Analytical Mechanics Associates, Inc., Mountain View, CA) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol 6, Sept -Oct. 1983, p. 321-329 refs

Translational state estimation in terminal area operations, using a set of commonly available position, air data, nd acceleration sensors, is described Kalman filtering is applied to obtain maximum estimation occuracy from the sensors but feasibility in real-time computations requires a variety of approximations and devices aimed at minimizing the required computation time with only negligible loss of accuracy. Accuracy behavior throughout the terminal area, its relation to sensor accuracy, its effect on trajectory tracking errors and control activity in an automatic flight control system, and its adequacy in terms of existing criteria for various terminal area operations are examined. The principal investigative tool is a simulation of the system Previously announced in STAR as N83-29193 Author

A83-45848#
CERTIFICATION OF DIGITAL SYSTEMS FOR CIVIL AIRCRAFT
A. S ASHMORE (Civil Aviation Authority, London, England) IN Certification of avionic systems, Proceedings of the Symposium, London, England, April 27, 1982 London, Royal Aeronautical Society, 1982, 12 p.

After defining the design features and functions of typical civil aviation digital systems, attention is given to their certification process. This process encompasses software verification and validation, the failure analysis of hardware and of processor instructions, and the performance analysis and flight testing of the systems The software verification procedures typically include subroutine and module debugging, together with module development by means of a simulator facility which employs either simulated or actual computers and real time aircraft simulation. It is noted that while in systems incorporating similar software, the criticality of software is equivalent to that of the hardware, it may be lower in the case of a dissimilar-software system provided that two or more dissimilar channels are clearly independent of each other. O C

A83-46338
GEODESY AND THE GLOBAL POSITIONING SYSTEM
I. I. MUELLER and B ARCHINAL (Ohio State University, Columbus, OH) IN. International Symposium on Geodetic Networks and Computations, Munich, West Germany, August 31-September 5, 1981, Proceedings Volume 4 . Munich, Verlag der Bayerischen Akademie der Wissenschaften, 1982, p. 28-36 refs

U.S. efforts to develop geodetic receivers capable of performing positioning measurements with cm accuracy using a fully operational GPS system as references are described. The GPS spacecraft (18) will broadcast on L-band frequencies, with signal coding to identify individual spacecraft. The radio signal will carry timing marks from rubidium and cesium clocks, and will permit positioning determination through pseudo-range, Doppler, and interferometric techniques. The accuracy of the implementation of any of the methods will be largely determined by the DOD release of information on the GPS full signal characteristics to non-DOD users It is concluded that the interferometric methods will yield accuracies of 3 cm with a high confidence level for long baselines, and 1 cm accuracy for baselines of 100 length M.S.K.

A83-46930
THE EMERGING NEED FOR IMPROVED HELICOPTER NAVIGATION
N. T FUJISAKI (FAA, Washington, DC) Vertiflite (ISSN 0042-4455), vol 29, Sept -Oct 1983, p. 40-45.

Recent trends in helicopter capabilities are reviewed with respect to navigational requirements More rotorcraft are expected to be IFR, and area navigation (RNAV) has permitted taking advantage of the helicopter's ability to fly in a straight line anywhere, usually at low altitudes. However, the proliferation of rotorcraft is limiting the rate of RNAV implementation. Unstructured, direct routes between heliports are recommended, together with ATC for vertical capacity. New instruments are needed on board for measuring air speed because of the omnidirection capabilities of rotorcraft. VOR/DME and VHF navigation aids are not reliable with helicopters and FAA work is proceeding on Loran-C in offshore and mountainous regions On-board weather radar is also useful, with terrain recognition techniques, for nonprecision approaches. Inertial navigation systems, the GPS, and intelligent avionics systems are expected to ameliorate many current navigational difficulties D H K

A83-46952
NATIONAL AEROSPACE MEETING, ARLINGTON, VA, MARCH 22-25, 1983, PROCEEDINGS
Meeting sponsored by the Institute of Navigation. Washington, DC, Institute of Navigation, 1983, 155 p.

Topics discussed include GPS navigation using three satellites and a precise clock, differential operation of NAVSTAR GPS, vector motion of the relative navigation grid, and the application of time transfer using NAVSTAR GPS. Papers are presented on the current status of the MLS program, the status of the TCAS program, and the status of area navigation, as well as on improved system reliability through master independent operation. Attention is also given to the influence of reference system disparity on navigation and positioning, to post-flight compensation for a master navigator error, to flight test evaluation of Loran-C in Alaska, and to GPS user errors resulting from one 'bad' satellite in the navigation solution C R

A83-46953#
USE OF COMMERCIAL OMEGA/VLF IN NAVAL AVIATION
F C. SAKRAN, JR (U.S. Naval Air Test Center, Patuxent River, MD) IN National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings Washington, DC, Institute of Navigation, 1983, p 1-8 refs

The criteria governing the selection of a commercial Omega navigation system (ONS) are set forth, and a description is given of the equipment that was chosen Also described are the tests used in validating the suitability of the ONS in the host vehicle An account is given of the navigational performance as measured in flight tests with emphasis placed on the enhancements gained through very low frequency communication signals to augment Omega positioning A comparison is made between the Omega/VLF positioning error and that of Omega-only positioning The flight test program has demonstrated that the ONS satisfies mission long-range navigation requirements, system interfaces, and installation constraints in KA-3B, KA-6D, P-3B, and P-3C aircraft C R

A83-46954#
MINIMIZING PILOT WORK LOAD IN AN ADVANCED DEVELOPMENT, LOW-COST OMEGA/VLF/RNAV SYSTEM
N. M. STRAHL and E. T. ZAK (Litton Systems, Inc., Canoga Park, CA) IN National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings . Washington, DC, Institute of Navigation, 1983, p. 9-16

The LTN-3000 is designed to provide a single-pilot airborne vehicle direct routing navigation capability under instrument flight regulation conditions in an air traffic control environment The system comprises an antenna coupler unit (ACU), a receiver processor unit (RPU), and a control display unit (CDU) The CDU uses a two-line data display that has sixteen alphanumeric characters per line, discrete annunciators, and nine operational control keys The way in which in-flight navigation data is organized for easy presentation is described, noting that access is through a central control button Also described is the organization for data entry and easy preflight (or in-flight) verification of previously stored data The entry-verification function is also designed around a single central control button. The operation of the system is described by citing a tyical flight plan that includes ATC diversion In this way, the work load of the pilot in an operational context is demonstrated C R

A83-46955#
FLIGHT TEST EVALUATION OF LORAN-C IN ALASKA
E D. MCCONKEY and L D KING (Systems Control Technology, Inc., West Palm Beach, FL) IN National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings Washington, DC, Institute of Navigation, 1983, p. 17-22.

The flight tests were carried out in order to evaluate a Loran-C receiver, namely the Teledyne TDL-711 as an enroute navigation aid in Alaska and to collect data for submission to the FAA in support of an application for a Supplemental Type Certificate A total of 6300 data miles were flown in Alaska between September 1 and September 10, 1982. The TDL-711 gave very poor results within at least a 60 nautical-mile radius of Anchorage Position errors of more than 15 nautical miles were not uncommon The accuracy of the system in the Fairbanks area was also poor One of the most serious problems encountered is that the system can acquire an track an erroneous signal and calculate erroneous guidance without giving any indication of this to the operator. This error is reflected in a position and guidance error through the coordinate conversion process Propagation modeling error is

second probable source of time difference error observed during the test. It is noted that this error was most apparent when operating near Nome and Kodiak. At these locations, the magnitude of the modeling error came close to 5-6 microseconds This error in turn resulted in position errors of the order of 0.9 nautical mile at these locations. C R

A83-46956#
IMPROVED SYSTEM RELIABILITY THROUGH MASTER INDEPENDENT OPERATION
R W. B JANES (Internav Ltd , Sydney, Nova Scotia, Canada) IN: National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings . Washington, DC, Institute of Navigation, 1983, p. 23-27

It is noted that in Loran-C systems positional information has traditionally been derived from two time differences measured between signals from a fixed triad of a master and two secondaries A station outage of the master therefore means the loss of all positional information. If a secondary is lost, a new secondary must be acquired or there must be a shift in position resulting froma change in geometry and land paths Master independence would eliminate the problem of master outage on all chains except those having only three stations It is noted that a two-chain Loran C receiver that computes position from various combinations of stations is in essence immune to a single station outage in areas where two Loran C chains are receivable In a master-independent receiver that is tracking two chains with four stations each, 12 time differences are being measured This number is reduced to nine with the loss of any one station on either chain, even a master In fact, as long as any four out of the eight stations are operational, positional information is available, although the accuracy may be diminished as the choice of geometry has been lost C R

A83-46957#
COPING WITH IMPULSE INTERFERENCE IN AN ADVANCED DEVELOPMENT, LOW-COST OMEGA/VLF RNAV SYSTEM
W. I. RUSSELL and E T ZAK (Litton Systems, Inc , Aero Products Div , Canoga Park, CA) IN: National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings Washington, DC, Institute of Navigation, 1983, p. 28-32.

It is noted that susceptibility to near-field radiation occurs when transmitters are keyed, a situation that generates a transient signal or impulse noise signal. Since an Omega/VLF receiver design incorporates high signal processing gains and narrow-bandwidth filtering, impulse noise can lead to receiver gain stage saturation and/or filter ringing This in turn causes erroneous or lost phase sampling measurements Similar data loss can result from impulse noise sources, such as lightning, precipitation, static, and other man-made electrical disturbances A description is given of the implementation of an adaptive noise blanker technique that reduces the susceptibility of an Omega/VLF RNAV system to impulse noise. C R.

A83-46958#
CURRENT STATUS OF THE MLS PROGRAM
L. L. PROSSER (FAA, Washington, DC) IN National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings . Washington, DC, Institute of Navigation, 1983, p 33-37

The Microwave Landing System (MLS) is on the verge of implementation in the National Airspace System as a replacement for the Instrument Landing System (ILS). The present plan calls for the establishment of 1,250 systems by the year 2,000 The first ten years of MLS implementation will serve as a transition period in which both ILS and MLS will be extensively used. The MLS implementation strategy is based on the establishment of MLS network of 4 to 7 facilities. Each network is centered on a major hub airport and the satellites are selected from regional airports that have commuter airline service with the hub. The MLS implementation program will take advantage of the increased reliability of digital electronics systems together with the reduced costs of those systems to provide the capability for all weather service at most MLS-equipped airports Author

A83-46960#
STATUS OF AREA NAVIGATION
G H QUINN (FAA, Washington, DC) IN. National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings Washington, DC, Institute of Navigation, 1983, p. 41, 42.

The two main advantages offered by RNAV are (1) reduced flight time resulting from adherence to the shortest or best route between the origin and destination and (2) reduced fuel consumption. Among the other advantages are more efficient use of airspace, reduced pilot workload, and weather avoidance. It is projected that within the next few years more than 20 percent of the civil aviation fleet will have an RNAV capability based on a variety of radionavigation and self-contained aids Whereas the FAA has existing documents covering the use of RNAV systems in general, there is a lack of published guidance that deals with some of the specific systems. VOR/DME will remain the most widely used RNAV system, with the use of Loran-C increasing rapidly during the next several years Omega/VLF-based RNAV will be employed to some extent on domestic routes by higher cost business An FAA system for handling requests for approval of RNAV avionics has been established and should reduce differences in approval criteria in various geographic regions. C R.

A83-46961#
A STRATEGY FOR BUILDUP TO THE OPERATIONAL NAVSTAR GPS CONSTELLATION
P. KRUH, W. F BRADY, and D L SCHMITT (Aerospace Corp , El Segundo, CA) IN National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings . Washington, DC, Institute of Navigation, 1983, p 43-48 refs

The factors determining a strategy for the buildup to the operational constellation are discussed, and information is provided on the navigation capabilities that could be available during the transition from testing to actual operation The test configuration gives several hours of navigation availability over selected regions of the earth As the constellation is built up, availability to users will increase, with respect to both duration and area of coverage Half way through the buildup, complete worldwide two-dimensional navigation availability will be attained. When the buildup is completed, there will be continuous worldwide three-dimensional navigation availability Even though there are no formal requirements for performance during the buildup, there is strong interest in achieving the maximum availability at each stage The performance measures, constraints, and objectives used in determining the buildup strategy are discussed. C.R

A83-46963#
EXPERIMENTAL RESULTS OF USING THE GPS FOR LANDSAT 4 ONBOARD NAVIGATION
W. P. BIRMINGHAM, B. L. MILLER, and W L STEIN (U S Naval Surface Weapons Center, Dahlgren, VA) IN: National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings Washington, DC, Institute of Navigation, 1983, p 54-57. refs

The first use of the Navstar Global Positioning System (GPS) by a spaceborne user occurred with the launch of NASA's Landsat 4 on July 16, 1982 One of the experimental packages onboard Landsat 4 is the Global Positioning System Package (GPSPAC) A brief description of the GPSPAC is presented and the operational history of the GPSPAC experiment onboard Landsat 4 is outlined The responsibility for the control of the GPSPAC experiment and for the validation of its results resides at the Goddard Space Flight Center (GSFC) The role of the Naval Surface Weapons Center (NSWC) primarily is to aid GSFC in achieving the objectives of the GPSPAC experiment Results of NSWC's evaluation of the GPSPAC performance are presented Author

A83-46964#
APPLICATIONS OF TIME TRANSFER USING NAVSTAR GPS
A. J VAN DIERENDONCK and W. C. MELTON (Stanford Telecommunications, Inc., Sunnyvale, CA) IN: National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings Washington, DC, Institute of Navigation, 1983, p. 58-64 refs

With the GPS, time can be reinitialized at any time. The cost of precise (cesium) clocks, because of the technology involved, will steadily rise, whereas GPS time transfer systems will decrease in cost. At the present time, the GPS system is available for time transfer only for about 16-20 hours per day. As the number of satellites increases, however, the time transfer will become continuous long before the GPS is declared fully operational It is then that the GPS time transfer systems will be able to replace many of the precise clocks now in use The way in which GPS time transfer satisfies the time-keeping requirements of various timing applications is discussed. C R.

A83-46965#
THE NAVSTAR GPS
R.W. BLANK (Rockwell International, Collins Government Avionics Div., Cedar Rapids, IA) IN National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings . Washington, DC, Institute of Navigation, 1983, p 65-72. USAF-supported research

The design seeks to maximize subsystem and circuit card common laity while providing flexibility to address a wide range of user platforms at the lowest acquisition, installation, and support cost. A GPS user system comprises an antenna subsystem to receive the transmitted GPS signals and translate them into analog electrical signal tracking, data decoding, navigation solution computation, and data interface A control display unit and data loader can be optionally added to facilitate, respectively, operator interface and the mission-unique data load capability. C.R.

A83-46966#
POST-FLIGHT COMPENSATION FOR A MASTER NAVIGATOR ERROR
C. L. HUNT (USAF, Central Inertial Guidance Test Facility, Holloman AFB, NM) IN: National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings . Washington, DC, Institute of Navigation, 1983, p. 73-77.

An account is given of the development of a post-flight Kalman filter processor that duplicates the real-time filter of a midcourse guidance system undergoing a test Besides computing the navigation solution, the post-flight filter is able to identify and compensate for the effects of a master navigator error on a transfer-of-alignment process. The post-flight filter validation is described, as is the procedure used in compensating for the master navigator's error effect. Flight tests performed on the Low Cost Inertial Guidance System (LCIGS) are described. The tests sought to determine which of two alignment maneuvers, namely coordinated half-S turn (CST), or straight and level acceleration-deceleration (A-D), produced the smallest radial position error after ten minutes of navigation It was found that there was no significant statistical difference between the two maneuvers C.R.

A83-46967#
COMPARISON OF SIMPLE POSITION RESETS AND KALMAN FILTER POSITION UPDATES FOR CORRECTING INERTIAL NAVIGATION SYSTEM ERRORS
R. W. HOSTETTLER (U S. Naval Avionics Center, Indianapolis, IN) IN. National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings . Washington, DC, Institute of Navigation, 1983, p. 78-83.

It is pointed out that aircraft inertial navigation systems have improved the ability of on-board computers to accurately and continuously estimate the position and velocity. However, there are error sources in inertial systems that propagate into position and velocity errors. Two methods that use externally obtained position data for correcting inertial navigation system errors are considered. These are Kalman filter position updates and simple position resets. It is shown that the Kalman filter position update mechanization provides optimum performance under all normal operating conditons and significantly improved navigation performance over the position rest mechanization C.R.

A83-46968#
DIFFERENTIAL OPERATION OF NAVSTAR GPS
R. M. KALAFUS, J. VILCANS, and N. KNABLE (U S. Department of Transportation, Transportation Systems Center, Cambridge, MA) IN: National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings . Washington, DC, Institute of Navigation, 1983, p. 97-106 Research sponsored by the U.S Coast Guard and Research and Special Programs Administrations. refs

Selective Availability is seen as introducing significant pseudorange errors which vary more rapidly than other biaslike errors. Differential operation can ameliorate these errors to a great extent. It is found that NAVSTAR GPS Standard Positioning Service accuracy for a marine user will average 350-480 m under Selective Availability, depending on the receiver design. It is considered unlikely that Selective Availability will cause carrier or code loop loss of lock or other erratic receiver behavior Differential operation under Selective Availability can attain navigation accuracies of approximately 15 m for a good marine receiver and can readily provide Non-Precision Approch service It is contended that differential corrections should take the form of pseudorange corrections rather than latitude/longitude corrections To counteract Selective Availability, the data update rate will need to be about once every 28 seconds for high-accuracy marine applications and once every 2-3 minutes for Non-Precision Approach air applications C.R.

A83-46969#
COLLINS AVIONICS NAVSTAR GPS ADVANCED DIGITAL RECEIVER
J W. MURPHY and M. D. YAKOS (Rockwell International, Collins Government Avionics Div., Cedar Rapids,IA) IN: National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings Washington, DC, Institute of Navigation, 1983, p. 107-116

Emphasis is placed on the signal-processing techniques employed in the receiver. A design approach is chosen which allows digital implementation of the tracking loops, including digitally controlled carrier and code oscillators Particular attention is given to jamming immunity and the flexibility of signal search and reacquisition in the presence of jamming and signal blockage Tracking threshold extension is effected by closing the code loop through the navigation Kalman filter. Information from all satellites is employed in order to optimally aid code tracking on a jammed channel. Each channel is able to provide measurements of pseudorange and deltarange (integrated Doppler) to high degrees of accuracy. Digitally controlled carrier and code oscillators furnish 0.002 meter resolution in carrier phase and 0.02 meter resolution in code position C.R

A83-46970#
GPS NAVIGATION USING THREE SATELLITES AND A PRECISE CLOCK
M. A STURZA (Litton Systems, Inc., Aero Products Div., Canoga Park, CA) IN: National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings . Washington, DC, Institute of Navigation, 1983, p. 117-126. refs

A formula is presented for computing the position dilution of precision (PDOP) and its components, the horizontal dilution of precision (HDOP) and the vertical dilution of position (VDOP), as a function of three-satellite geometry and clock stability The formula is used in plotting HDOP and VDOP versus time for representative high-quality quartz crystals and low-cost rubidium clocks for two scenarios of satellite geometry. The stability and environmental sensitivity of high-quality quartz crystal and low-cost rubidium clocks are assessed. GPS navigation with three satellites and a precise clock is shown to have one-half to one-third the position accuracy of four-satellite GPS navigation before and after the outage, depending on the quality of the clock. GPS navigation with three satellites and a precise clock following the end of the four-satellite visibility window provided by NAVSTAR's 3, 4, 5, and

6 is shown to provide up to 30 minutes of additional GPS navigation, depending on performance requirements and clock stability. C.R

A83-46971#
GPS USER ERRORS RESULTING FROM ONE 'BAD' SATELLITE IN THE NAVIGATION SOLUTION
R J. ESPOSITO (FAA, Technical Center, Atlantic City Airport, NJ) IN National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings . Washington, DC, Institute of Navigation, 1983, p. 127-141. refs

Equations for the NAVSTAR Global Positioning System user position and time errors are developed for the situation where the standard deviations in the pseudorange measurement errors are indepenent but not equal. The predicted user behavior in position and time is examined when the ranging error from one satellite has a standard deviation and bias error larger than those (equale errors) from the other three satellites in view Calculations are obtained for two user locations when NAVSTAR satellites 3-6 are visible, and the poor performance is permuted among the satellites. Also analyzed is the case of three satellites plus an altimeter, with the larger error in the altimeter measurement. It is shown that the user errors are dependent upon the satellite geometry and the magnitudes of each pseudorange residual and its variance. It is determined that the dilution of precision parameters may be utilized to estimate the upper limits of the GPS user errors and to describe the quality of the satellite constellation. N.B.

N83-32784# Lincoln Lab., Mass. Inst. of Tech., Lexington.
TRAFFIC ALERT AND COLLISION AVOIDANCE SYSTEM (TCAS): A FUNCTIONAL OVERVIEW OF MINIMUM TCAS 2
J. D. WELCH and V A. ORLANDO 8 Apr. 1983 77 p refs
(Contract F19628-80-C-0002; DOT-FA72-WAI-817; FAA PROJ 054-241-04)
(ATC-119; FAA-PM-83-10) Avail. NTIS HC A05/MF A01

The Traffic Alert and Collision Avoidance System (TCAS) is a beacon-based airborne collision avoidance system that is able to operate in all airspace without reliance on ground equipment. The TCAS concept encompasses a range of capabilities that include TCAS 1, a low-cost, limited-performance version, and TCAS 2, which is intended to provide a comprehensive level of separation assurance in all current and predicted airspace environments through the end of this century. A functional overview of the TCAS 2 including operating features, a description of the avionics package, and examples of surveillance data obtained with experimental TCAS equipment are provided. Author

N83-32785# Bundesanstalt fuer Flugsicherung, Frankfurt am Main (West Germany).
ACTIVITIES OF THE FEDERAL ADMINISTRATION OF AIR NAVIGATION SERVICES (BFS) Annual Report, 1982
1982 25 p In ENGLISH and GERMAN Original contains color illustrations
Avail: NTIS HC A02/MF A01

The West German air traffic control service is presented. Airspace structure; multiple radar coverage; and air traffic display by radar are described The aeronautical information service and aeronautical telecommunication service are introduced. The air navigation engineering service; joint flight inspection unit; and electronic data processing facilities are reviewed. Author (ESA)

N83-32786# National Aerospace Lab., Amsterdam (Netherlands) Information Div.
INTERFACING THE ROLM 1602B FOR THE METRO NAVIGATION SYSTEM
J. M P. C. M. VISSER 26 Jan. 1983 15 p refs Presented at 1st European ROLM Users Group Conf., 5-7 Oct 1981, Offenbach, West Germany
(NLR-MP-81062-U) Avail: NTIS HC A02/MF A01

An airborne computer configuration, based on a ROLM 1202B computer, was developed for acquisition of position data and for the development of real time position algorithms. Several ROLM interfaces were developed for input and output of data in ARINC and IRIG-B format. By housing the interfaces in the ROLM 1602B itself, minimal additional volume was required. Advantages of a microprocessor based interface include adaptability for various kinds of data-inputs; a minimum number of different interfaces to be developed; and validation and preselection of the data, thereby minimizing the overhead in data acquisition. Author (ESA)

N83-33870# Burroughs Corp., Paoli, Pa. Federal and Special Systems Group.
SYSTEM DESCRIPTION FOR AUTOMATED RADAR TERMINAL AIR TRAFFIC CONTROL SYSTEM (ARTS II): ENHANCEMENTS. SYSTEM DECRIPTION, REVISION A Final Report
15 Oct. 1982 61 p
(Contract DTFA01-82-C-10008)
(AD-A128896, DOT/FAA/PM-83/19) Avail NTIS HC A04/MF A01 CSCL 17I

This document provides a system description of the ARTs IIA hardware and software. ARTS IIA is an expansion of the existing Automated Radar Terminal System (ARTS II) The expansion provides a safety package that includes beacon target tracking, minimum safe altitude warning and aircraft conflict alert The warning and alert functions include the addition of an aural alarm and additional display data. An integrated target generator has been added to provide test and training modes of operation. Data extraction and reduction functions have been included to aid in the development testing. To provide for increased performance and memory capacity, the computer has been upgraded and new software developed Except for the processor, all ARTS II hardware has been retained. Brief descriptions of this hardware and the aural alarm unit are contained in Section 1 Section 2 contains a description of the existing, modified and new software functions. Section 3 contains the system performance requirements.
Author (GRA)

05

AIRCRAFT DESIGN, TESTING AND PERFORMANCE

Includes aircraft simulation technology.

A83-43901
THE TASKS AND ORGANIZATION OF THE FLIGHT TESTING OF AIRPLANES AND HELICOPTERS [ZADACHI I STRUKTURA LETNYKH ISPYTANII SAMOLETOV I VERTOLETOV]
A. D. MIRONOV, A. A. LAPIN, G. SH. MEEROVICH, and IU I. ZAITSEV Moscow, Izdatel'stvo Mashinostroenie, 1982, 144 p. In Russian. refs

Current practices are surveyed, with attention given to organization, tasks, and goals. The principles for organizing and planning flight tests, together with the use of modeling, are discussed. Attention is also given to setting up measurement systems and means for automating the processing and analysis of experimental results. A brief historical survey of flight testing is included. C.R.

A83-43966#
ANALYSIS OF AIRCRAFT DYNAMIC BEHAVIOR IN A CRASH ENVIRONMENT
G. WITTLIN (Lockheed-California Co., Burbank, CA) (Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers, Part 2, p. 316-325) Journal of Aircraft (ISSN 0021-8669), vol. 20, Sept. 1983, p. 762-769. Army-sponsored research. refs

Previously cited in issue 13, p. 2022, Accession no. A82-30161

A83-43967#
OPTIMUM CONFIGURATION FOR A 10-PASSENGER BUSINESS TURBOFAN JET AIRPLANE
M. ARONSON (Aronson Industries, Orlando, FL) Journal of Aircraft (ISSN 0021-8669), vol 20, Sept. 1983, p 770-776. refs
Previously cited in issue 06, p 810, Accession no. A82-17905

A83-43970*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va.
INTERIOR NOISE CONSIDERATIONS FOR ADVANCED HIGH-SPEED TURBOPROP AIRCRAFT
J. S MIXSON, F FARASSAT, J. D LEATHERWOOD (NASA, Langley Research Center, Hampton, VA), R. PRYDZ, and J. D. REVELL (Lockheed-California Co., Burbank, CA) Journal of Aircraft (ISSN 0021-8669), vol. 20, Sept. 1983, p. 791-797. refs
Previously cited in issue 17, p 2685, Accession no. A82-35018

A83-43972#
BONDED ALUMINUM HONEYCOMB - AIRCRAFT FLIGHT SURFACE PRIMARY STRUCTURE APPLICATION
T. R. LOGAN (Boeing Commercial Airplane Co., Seattle, WA) and U. SOUDAK (Israel Aircraft Industries, Ltd , Lod, Israel) (Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers, Part 2, p. 151-156) Journal of Aircraft (ISSN 0021-8669), vol. 20, Sept 1983, p 805-809. refs
Previously cited in issue 13, p 2021, Accession no. A82-30145

A83-43973#
APPARENT-MASS COEFFICIENTS FOR ISOSCELES TRIANGLES AND CROSS SECTIONS FORMED BY TWO CIRCLES
C.-Y. CHOW (Colorado, University, Boulder, CO) and M -K HUANG Journal of Aircraft (ISSN 0021-8669), vol. 20, Sept. 1983, p. 810-816. refs
(Contract AF-AFOSR-82-0037)
In applying inviscid slender-body theory to the calculation of aerodynamic forces on two special types of fuselage, conformal mapping techniques are used to find the exact expressions for the apparent-mass coefficients of their cross sections The fuselage cross sections considered here either are formed by two circular arcs or have the shape of isosceles triangles. The exact solutions are used to check the applicability of approximating methods using area-equivalence, width-equivalence, and height-equivalence rules. It is found that the area-equivalence rule can hardly be used to estimate the normal forces on all of the cross sections considered in this paper. Author

A83-44570#
EXTRACTING THE COMPREHENSIVE CHARACTERISTICS IN TERMS OF SIMILAR PARAMETERS FROM FLIGHT TEST
Y. DONG, S. HE, and X. LU (Flight Test Research Institute, People's Republic of China) Acta Aerodynamica Sinica, no. 2, 1983, p. 66-76. In Chinese, with abstract in English.
The flight performance of an aircraft is determined on the basis of the excess thrust. This is in contrast to the conventional method of the polar curve and thrust measurement. Representative comprehensive characteristics of similar parameters at maximum and afterburning conditions of the engine and at subsonic and transonic flight are obtained by means of various maneuvers. These are then used in calculating factors for evaluating aircraft performance, for example, maximum speed, normal turn, zooming pull-up, and wind-up turn. Attention is also given to the effects of acceleration, deceleration, and climb on the engines. C.R.

A83-44875
COMPOSITE HELICOPTER STRUCTURE TESTED FOR CRASHWORTHINESS
Aerospace Engineering (ISSN 0736-2536), vol. 3, June 1983, p. 25-28
The results of drop testing of three-bulkhead helicopter cabin structures made of fiberglass/epoxy, Kevlar/epoxy, and graphite/epoxy composites are reported. The tests were performed in a drop tower, at a velocity of 9 m/sec and roll attitudes of 0 and 20 deg, conforming to MIL-STD-1290. The zones of crushable structure below the cabin floor and the attenuating passenger seats were found to perform successfully, limiting the decelerative load to the anthropomorphic dummies' pelvic areas to noninjurious levels as defined by the U.S. Army Aircraft Crash Survival Design Guide (TR99-22) The cabin was considered reusable, after replacement of the crushable subfloor structures, after both the flat and the roll tests. The graphite/epoxy transmission blocks were made 30 percent thicker because they were subject to greater vertical loads than had been predicted T K.

A83-45470*# National Aeronautics and Space Administration. Flight Research Center, Edwards, Calif.
EXPERIENCE WITH FLIGHT TEST TRAJECTORY GUIDANCE
E. L DUKE, M R. SWANN, E K. ENEVOLDSON, and T. D. WOLF (NASA, Flight Research Center, Edwards, CA) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol. 6, Sept.-Oct 1983, p. 393-398. refs
Previously cited in issue 3, p. 325, Accession no. A82-14379

A83-45514#
REENGINING THE KEY TO AIRCRAFT RENEWAL
M A. ZIPKIN (United Technologies Corp , Government Products Div., West Palm Beach, FL) AIAA, SAE, and ASME, Joint Propulsion Conference, 19th, Seattle, WA, June 27-29, 1983. 8 p. (AIAA PAPER 83-1372)
A discussion is undertaken of the performance improvements, operating cost reductions, and aircraft operational life extensions to be expected from the reengining of selected military aircraft with state-of-the-art turbofan and turbojet engines. One such current reengining program involves the replacement of the KC 135 fleet's J-57 engines with the low specific fuel consumption CFM 56 commercial airliner engine Attention is given to the improvements accruing to the use of the PW 1120 turbojet derivative of the F 100 low bypass turbofan engine in the F-4, the use of the PW 1128 F 100 growth-derivative turbofan in the F-14, the use of four PW 2037 high bypass turbofans in place of eight J 57s in the B-52, and the application of the PW 3005 technology demonstrator turboshaft engine in such diverse military aircraft as the CH-47 helicopter, P-3 patrol aircraft, C-130 cargo aircraft and E-2 early warning aircraft. O.C.

A83-45845#
FLIGHT CLEARANCE OF THE JAGUAR FLY BY WIRE AIRCRAFT. I
E. DALEY (British Aerospace PLC, Aircraft Group, Preston, Lancs., England) and R. B. SMITH (Marconi Avionics, Ltd., Combat Aircraft Controls Div., Rochester, Kent, England) IN: Certification of avionic systems; Proceedings of the Symposium, London, England, April 27, 1982 . London, Royal Aeronautical Society, 1982, 16 p. Research sponsored by the Ministry of Defence.
Attention is given to the design validation and airworthiness procedures employed in the flight clearance of the Jaguar fly-by-wire (FBW) aircraft, which is equipped with a quadruplex digital FBW avionics system that required the elimination of any safety-critical common mode defects. The flight testing of the aircraft included its subjection to high current pulse testing that simulated the effect of lightning strikes. Consideration is presently given to the testing tasks discharged by the airframe manufacturer, who undertook responsibility for overall system design, rather than those of the FBW system manufacturer, who was responsible for the flight control system exclusively. O C.

A83-46347#
DESIGN IMPACT OF COMPOSITES ON FIGHTER AIRCRAFT. I - THEY FORCE A FRESH LOOK AT THE DESIGN PROCESS
J. F. SCHIER and R. J. JUERGENS (McDonnell Aircraft Co., St Louis, MO) Astronautics and Aeronautics (ISSN 0004-6213), vol. 21, Sept. 1983, p. 44-49, 75.

Current applications and properties of advanced composite materials for parts in military aircraft are described. Each application involves the design of a different material, defined by studies involving lamination plate theory. Strength may be enhanced by thickening a part, rather than varying the ply, and adhesives can form the bond between a composite and a metal component Several uses include the F-115 empennage, the F/A-18 horizontal stabilizer, and the AV-8B forward fuselage. The material is usually carbon-epoxy, with cocuring of various parts providing a significant reduction in the total number of components and fasteners, compared to equivalent aluminum components The comosites are also formed into the AV-8B box-beam and inner and outer wing skins. Finite element analysis were employed to determine the overall load distributions. D.H.K.

A83-46349#
DESIGNED TO BE STALLED
W. M. CALLEGARI (Fairchild Republic Co , Farmingdale, NY) Astronautics and Aeronautics (ISSN 0004-6213), vol. 21, Sept 1983, p. 60-68.

The design features, available configurations, and performance characteristics of the T-46A trainer, scheduled for operational status in 1988, are presented. The design constraints included the USAF design mission, a 300 n mi diversion at the end, 3.5 percent takeoff gradient on one engine, and fuel consumption limits. An H-tail was selected with wing aspect ratios of 7 5-9.0, together with a proven turbofan engine mounted for easy change-out, a shoulder-high wing, high-lift airfoil, good ground clearance, and an aluminum primary structure. Use was made of straight tapers, single curvatures, and constant cross-sections, as well as composites for secondary structures. A split fuselage fuel tank eliminates center of gravity control and the landing gear has an independent release mechanism. Initial tests indicate that the student pilot will not be able to enter an uncontrollable spin. The environmental control system permits flights to 50,000 ft and cockpit temperature maintained at 80 F or below, even in direct sunlight. D H K.

A83-46350*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
SAFE STRUCTURES FOR FUTURE AIRCRAFT
H. G. MCCOMB, JR. (NASA, Langley Research Center, Structures and Dynamics Div., Hampton, VA) Astronautics and Aeronautics (ISSN 0004-6213), vol. 21, Sept. 1983, p. 72-75. refs

The failure mechanisms, design lessons, and test equipment employed by NASA in establishing the airworthiness and crashworthiness of aircraft components for commercial applications are described The composites test programs have progressed to medium primary structures such as stabilizers and a vertical fin. The failures encountered to date have been due to the nonyielding nature of composites, which do not diffuse loads like metals, and the presence of eccentricities, irregular shapes, stiffness changes, and discontinuities that cause tension and shear. Testing to failure, which always occurred in first tests before the design loads were reached, helped identify design changes and reinforcements that produced successful products. New materials and NDE techniques are identified, together with aircraft structural design changes that offer greater protection to the passengers, fuel antimisting agents, and landing gear systems. D.H K.

A83-46489#
PROBLEMS IN DETERMINING AIRCRAFT POLAR CURVES FROM TEST-FLIGHT DATA [ZUR PROBLEMATIK DER FLUGZEUGPOLARENERMITTLUNG AUS FLUGVERSUCHSMESSDATEN]
H. FRIEDEL (Dornier GmbH, Friedrichshafen, West Germany) IN Publication on the occasion of the 65th birthday of Prof. Dr -Ing. Erich Truckenbrodt, Scientific Colloquium, Technische Universitaet Muenchen, Munich, West Germany, February 1, 1982, Reports . Munich, Technische Universitaet Muenchen, 1982, p 183-211. In German. refs

The ability of different test-flight maneuvers to generate the data necessary for the calculation of the polar parameters of an aircraft is evaluated, starting from the fundamental equilibria of forces. The methods of measurement for speed, altitude, thrust, acceleration, angle of attack, and aircraft mass are characterized and compared. The evaluation of steady-state flight tests is discussed, and the advantages of non-steady-state maneuvers such as delayed stalling, buffeting-limit curves, acceleration, rollercoasters, and wind-up turns are illustrated with data from the Alpha-Jet development program. T.K.

A83-46691#
A MATHEMATICAL MODEL ON THE THERMAL BEHAVIOUR OF AN AIRCRAFT CABIN
X. YUAN Aachen, Rheinisch-Westfaelische Technische Hochschule, Fakultaet fuer Maschinenwesen, Dr.-Ing Dissertation, 1982, 109 p. refs

The aircraft considered are military aircraft. The thermal state of the cockpit is studied through macroexamination and is described by the cabin thermal capacity, which in turn is determined from experiment. The model of cockpit temperature makes it possible, with a single equation, to calculate the steady- and transient state air conditioning loads of the cabin. When compared with previous experimental results, the theory is found to yield results which differ by less than 6 percent. Gagge's (1971) two-node model is then used in calculating cockpit-human thermoregulation. The air supply parameters of the cabin are evaluated for steady-state heat transfer. The process of temperature change in the cockpit-human system in transient state heat transfer is also evaluated. C R.

A83-46924
F-16XL SHOWS ADVANCES IN RANGE, RIDE
R R ROPELEWSKI Aviation Week and Space Technology (ISSN 0005-2175), vol. 119, Sept. 26, 1983, p. 62, 63, 66 (1 ff.). refs

An assessment is made of the performance improvements accruing to the F-16 fighter through its F-16XL derivative's incorporation of a fuselage-lengthening plug and a cranked-arrow delta wing, which together more than double lifting area, allow an 82-percent increase in internal fuel volume, and offer numerous hardpoints for external stores Attention is given to the acceleration, climb, and maneuver characteristics of the two prototype F-16XLs currently being flight tested, with emphasis on the maneuver turn rates and load factors typical of combat in both the air-to-air and air-to-ground modes. The F-16XL is in competition with the F-15E for the U S Air Force's dual role fighter mission requirement, and a decision on the production of one or both of the aircraft may be made by the end of 1983. The F110 turbofan engine with which the F-16XL may be fitted has a thrust rating of up to 29,000 lbs. O.C.

A83-46926
PNEUMATIC ROTOR BLADE DEICING
L. A. HAWORTH (U.S Army, Washington, DC) Vertiflite (ISSN 0042-4455), vol. 29, Sept -Oct. 1983, p. 22-25

The results of joint NASA and U.S. Army tests of a pneumatic boot deicing system (PBDS) for helicopter blades are reported. The boots were made of erosion resistant polyurethane elastomer and applied to the leading edge of a UH-1H rotor blade Ice removal was effected by inflation of chordwise and spanwise tubes using engine bleed air in a 2 sec inflation-deflation cycle. Attention was given to structural loads, performance and handling qualities effects, and behavior during in-flight encounters with an icing spray

mist The tests revealed flight speed in a vented condition of the PBDS that caused excessive vibration, increased the autorotative descent rates during autoinflation of the PBDS, and symmetric ice shedding The PBDS concept was concluded feasible for helicopter rotor systems, provided several noncritical design features were altered. D.H.K.

A83-46928* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif
THE INTEGRATED TECHNOLOGY AND FLIGHT RESEARCH ROTOR TECHNOLOGY DEMONSTRATORS FOR THE 1985-1995 TIMEFRAME
W. BOUSMAN, R POWELL, and E. SETO (NASA, Ames Research Center, Moffett Field, CA) Vertiflite (ISSN 0042-4455), vol. 29, Sept.-Oct. 1983, p 32-35

The purposes and progress in the Integrated Technology Rotor/Flight Research Rotor (ITR/FRR) Project, a joint effort by the U.S. Army and NASA, are outlined. The project goal is to integrate the disciplines of rotor design, aerodynamics, structures, materials, dynamics, and acoustics, to remove the risks in applying the technology, and to develop an advanced flight research rotor which permits significant variation in the rotor properties Composite rotors are believed to be capable of displaying infinite fatigue lifetimes with fail-safe characteristics, and bearingless hubs simplify hub designs. The programs will also consider the flight control, propulsion, and structures. Concept definition contracts are presently distributed among five companies, and preliminary designs will lead to model tests in 1984 M S.K.

A83-46929
RESEARCH AND DEVELOPMENT OF HELICOPTERS IN EUROPE
B STEVERDING (U.S. Army, Washington, DC) Vertiflite (ISSN 0042-4455), vol. 29, Sept.-Oct. 1983, p 36-39

Industrial and government research practices for helicopters in Europe and the U.S. are compared. In Europe, four aerospace companies have the capability of designing and producing new machinery to specification for the military Off-the-shelf components are used almost exclusively in order to reduce risk, resulting in uniformity of product, obslescence at the start of production, and consultation with university expertise only on vexatious problems Government contracts are issued to academic groups for long-term research in specific areas. Research done at the European governments' centers is not systems oriented, and often involves individuals' continuing interest in particular topics It is concluded that European research is devoted more to continuity than innovation, while the overall levels of competence and techniques are equivalent to those of U S. researchers and facilities. European ideas and methods are pooled between governments and industrial concerns at a rate sufficient to maintain a critical mass of creative activity. The recent U.S. policy on limiting technical information exchange with Europe is suggested to be detrimental. D.H.K

N83-32787 ESDU International Ltd., London (England).
THE USE OF DATA ITEMS ON AIRCRAFT PERFORMANCE ESTIMATION
Oct. 1980 15 p refs Sponsored by the Royal Aeronautical Society
(ESDU-80026; ISBN-0-85679-309-4; ISSN-0141-4054) Avail: ESDU

This Data Item is an addition to the Aircraft Performance Subseries. The reasons for estimating aircraft performance are described. The methods and data available in the ESDU Aircraft Performance Subseries are reviewed and a summary of the data dealing with particular topics are presented in block diagram form Although individual parts of the Subseries are necessarily directed to particularly topics, many contain information of wider applicability than is suggested by their titles and the more substantial of such cases are noted. ESDU

N83-32788 ESDU International Ltd , London (England)
SIMPLIFIED FORMS OF PERFORMANCE EQUATIONS
Nov. 1980 9 p refs Sponsored by the Royal Aeronautical Society
(ESDU-80032, EG-0/0; ISBN-0-85679-315-9; ISSN-0141-4054)
Avail: ESDU

This Data Item is an addition to the Aircraft Performance Subseries. Simplified forms of airplane performance equations and the numerical constants associated with different sets of commonly used units are presented. These equations complement the more fundamental and detailed treatments given in other parts of the Aircraft Performance Subseries and are intended for use in project design work with jet or propeller driven aircraft, although, in the case of some low speed airplanes, they are adequate for most other purposes. The along flight path performance equation incorporating a simple parabolic drag law is presented in alternative forms depending on whether speed is expressed in terms of equivalent airspeed or Mach number. Further versions present the variables in the form of non dimensional groups which are, themselves, of importance in the presentation of measured performance data. ESDU

N83-32789 ESDU International Ltd , London (England)
ESTIMATION OF WINDMILLING DRAG AND AIRFLOW OF TURBO-JET AND TURBO-FAN ENGINES
Jul. 1981 17 p refs Sponsored by the Royal Aeronautical Society
(ESDU-81009, ISBN-0-85679-334-5; ISSN-0141-4054) Avail ESDU

This Data Item is an addition to the Aircraft Performance Subseries. A method for estimating the internal drag airflow of turbojet and turbofan engines in windmilling and, to a lesser extent, locked-rotor conditions for use in the assessment of aircraft performance with one or more engines inoperative are presented The data can be used for any flight conditions although those of greatest interest are likely to be during takeoff, climb, and landing. They can, of course, also be used for cruise conditions, for example, ferry flights or drift-down with one or more engines inoperative. Other installation effects are considered. The data presented may be combined with intake spillage drag data to give an estimate of the total drag increment arising from an inoperative engine. Information relating to the empirical development of the methods using a one dimensional flow theory as a basis is given ESDU

N83-32790 ESDU International Ltd., London (England)
REPRESENTATION OF DRAG IN AIRCRAFT PERFORMANCE CALCULATIONS
Sep 1981 26 p refs Supersedes EG-1/1
(ESDU-81026; EG-1/1; ISBN-0-85679-356-6; ISSN-0141-4054)
Avail: ESDU

This Data Item is an addition to the Aircraft Performance Subseries Methods used to represent airframe drag for performance calculations for all flight conditions in terms of the general functional relationships between the variables are described. Several analytical variants of the familiar parabolic relationship between lift and drag are introduced, their limitations pointed out and some useful derived expressions presented and plotted The airplane and component drag data available elsewhere in the ESDU Aerodynamics, Performance, and Transonic Aerodynamics Subseries are summarized. Examples of the drag characteristics of particular airplanes are also given in the Addenda to ESDU 81026 to illustrate the methods of representation discussed Each addenum gives the relationship between lift and drag coefficients for a particular airplane and in most cases curves are included to show the variation of drag with speed or Mach number at a typical weight and altitude. The airplane, particular features of the data and/or additional notation are described. ESDU

N83-32791 ESDU International Ltd., London (England).
ESTIMATION OF ROLLING MOMENT DERIVATIVE DUE TO SIDESLIP FOR COMPLETE AIRCRAFT AT SUBSONIC SPEEDS
Oct. 1981 19 p refs Sponsored in part by the Royal Aeronautical Society
(ESDU-81032-AMEND-A; ISBN-0-85679-364-7, ISSN-0141-397X) Avail: ESDU

This Data Item is an addition to the Aerodynamics Subseries. The estimation of the rolling moment derivative due to sideslip for complete aircraft at subsonic speeds is illustrated. This report shows how to combine the ESDU methods for prediction the contributions of the separate parts of the aircraft. Cruise, landing and take-off configurations are covered. These prediction methods are applicable where there is a linear variation of lift coefficient with angle of attack and of rolling moment coefficient with angle of sideslip. B W.

N83-32792 ESDU International Ltd., London (England).
ACCELERATION FACTORS FOR CLIMB AND DESCENT RATES AT CONSTANT EAS, CAS, M
Nov. 1981 12 p refs Supersedes ESDU-70023
(ESDU-81046; ESDU-70023; ISBN-0-85679-379-5, ISSN-0141-4054) Avail: ESDU

This Data Item is an addition to the Aircraft Performance Subseries. Algebraic, numerical and graphical forms of acceleration factors are given which provide a simple, direct method of taking into account the acceleration of an aircraft along the flight path in the calculation of instantaneous (or point) rates of climb and descent. The particular cases considered are climb or descent at constant equivalent airspeed (EAS) constant calibrated airspeed (CAS) and constant Mach number. The general relationships for these acceleration factors are given while separate tables give the numerical forms of the equations appropriate to the International Standard Atmosphere and associated off standard atmospheres. ESDU

N83-32793 ESDU International Ltd., London (England).
FIRST APPROXIMATION TO TAKE-OFF DISTANCE TO 50 FT (15.2M) FOR LIGHT AND GENERAL AVIATION AIRPLANES
Nov. 1982 12 p refs
(ESDU-82033; ISBN-0-85679-413-9; ISSN-0141-4054) Avail: ESDU

This Data Item is an addition to the Aircraft Performance Subseries. The take off distance to 50 ft (15.2 m) of light and general aviation airplanes from hard, level, dry runways in still air was estimated. Two methods are given: a rapid method which uses engine power to give estimates of the takeoff distance for a restricted range of propeller-driven airplanes only. The other, more general, method requires the use of powerplant thrust in place of engine power and so embraces a greater variety of airplanes, including those powered by turbojet and turbofan engines. For each method recommended, lines are given for different classes of aircraft together with an indication of the spread of the data used Approximately 60 to 65 percent of the data used (56 airplanes) lie with + or - 10 percent of the recommended lines. ESDU

N83-32794# Aeronautical Research Labs., Melbourne (Australia)
PRELIMINARY KINEMATIC CONSISTENCY CHECKING OF HELICOPTER FLIGHT DATA
N. E. GILBERT and M J. WILLIAMS Jan. 1983 31 p refs
(ARL-AERO-NOTE-414; AR-002-935) Avail: NTIS HC A03/MF A01

A simplified approach to kinematic consistency checking applied to Sea King helicopter flight trials data is given. Prompt implementation of the method was possible, pending longer term development of systems identification technique suitable for application in a general way to helicoper data. This has allowed the formation of a trials data bank with reasonable confidence in the kinematic quantities so that validation of the Sea King mathematical model can continue. In the process adopted, measurements are first digitally filtered to remove noise. Alternative values of kinematic quantities are then derived from the smoothed measurements, using numerical differentiation or integration. For quantities obtained by integration, two separate iteration cycles are used, thus enabling kinematic equations to be integrated independently by 'separation of variables' using the trapezoidal formula. S L.

N83-32796*# Virginia Polytechnic Inst. and State Univ., Blacksburg.
DEVELOPMENT OF A MULTILEVEL OPTIMIZATION APPROACH TO THE DESIGN OF MODERN ENGINEERING SYSTEMS Ph.D. Thesis
J F. M. BARTHELEMY Hampton, Va. NASA. Langley Research Center Aug. 1983 238 p refs
(Contract NAG1-145)
(NASA-CR-172184, NAS 1.26:172184) Avail: NTIS HC A11/MF A01 CSCL 01C

A general algorithm is proposed which carries out the design process iteratively, starting at the top of the hierarchy and proceeding downward Each subproblem is optimized separately for fixed controls from higher level subproblems. An optimum sensitivity analysis is then performed which determines the sensitivity of the subproblem design to changes in higher level subproblem controls. The resulting sensitivity derivatives are used to construct constraints which force the controlling subproblems into chosing their own designs so as to improve the lower levels subproblem designs while satisfying their own constraints The applicability of the proposed algorithm is demonstrated by devising a four-level hierarchy to perform the simultaneous aerodynamic and structural design of a high-performance sailplane wing for maximum cross-country speed. Finally, the concepts discussed are applied to the two-level minimum weight structural design of the sailplane wing. The numerical experiments show that discontinuities in the sensitivity derivatives may delay convergence, but that the algorithm is robust enough to overcome these discontinuities and produce low-weight feasible designs, regardless of whether the optimization is started from the feasible space or the infeasible one. Author

N83-32797# Air Force Inst. of Tech., Wright-Patterson AFB, Ohio
AEROELASTIC STABILITY OF A FORWARD SWEPT WING WITH WING TIP STORES M.S. Thesis - Purdue Univ.
W. G STEELE Dec 1982 72 p refs
(AD-A125457; AFIT-CI-NR-82-69T) Avail NTIS HC A04/MF A01 CSCL 20D

When studying stability of an aircraft, a quasi-steady aerodynamic model is often used. In this study, the results of a stability analysis of an unrestrained flexible forward swept wing aircraft using an unsteady aerodynamic formulation are compared to results obtained with a similar, but quasi-steady, aerodynamic formulation In addition, the potential effects of wing tip stores on forward swept wing aircraft stability are explored Author (GRA)

N83-32798# Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Brunswick (West Germany). Abt. Mathematische Verfahren und Datentechnik.
RESULTS OF BEAVER AIRCRAFT PARAMETER IDENTIFICATION
E. PLAETSCHKE (Technische Hogeschool, Delft), J. A. MULDER, and J H. BREEMAN (NLR, Amsterdam) Feb. 1983 46 p refs
(DFVLR-FB-83-10) Avail: NTIS HC A03/MF A01; DFVLR, Cologne DM 15,50

Different design methods led to five test signals which were implemented via an electrohydraulic control system in a flight test program with a De Havilland DHC-2 aircraft. Aircraft parameters were calculated using the maximum likelihood method, and flight path reconstruction followed by linear regression analysis. Each test signal was repeated 10 times, allowing an evaluation based on sample statistics. Input signal type has a considerable effect on parameter estimation accuracy. High frequency signals compare favorably to lower frequency signals for this aircraft. The structure of the mathematical model used does affect the parameter

estimation results in terms of sample mean and variance High accuracy instrumentation techniques reduce the effect of the data analysis procedure on parameter estimation results.
Author (ESA)

N83-32799# National Aerospace Lab , Amsterdam (Netherlands). Structures and Materials Div
THE ANALYSIS OF LOAD-TIME HISTORIES BY MEANS OF COUNTING METHODS
J. B. DEJONGE 13 Aug. 1982 19 p refs Submitted for publication
(NLR-MP-82039-U) Avail NTIS HC A02/MF A01

The range pair-range (rainflow) counting method for helicopter fatigue analysis is described. The method splits up a load-time history into separate load cycles, having a specific amplitude or range and a specific mean. The counting result can be directly applied in cumulative fatigue damage calculations according to Miner's rule and in simple crack growth calculations. Methods exist to generate load sequences to be applied in fatigue tests or for application in more complex crack growth calculation methods from the matrix. The counting method is insensitive to the size of range filter applied to the signal The method is the most appropriate one to define the fatigue content of a loading sequence. Author (ESA)

N83-32800# Societe Nationale Industrielle Aerospatiale, Suresnes (France). Lab. Central
DAMAGE TOLERANCE [LA TOLERANCE AUX DOMMAGES]
J. HILAIRE and J. ODORICO 31 May 1983 30 p In FRENCH Presented at Journees Aciers Speciaux, Bourget, France, 1983
(SNIAS-831-551-103; DCQ/LC.45449/83) Avail NTIS HC A03/MF A01

The evolution of the safe life, fail-safe, and damage tolerance design criteria for civil and military airplanes and helicopters is traced. Crack propagation, fracture toughness, and fatigue threshold are defined Nondestructive testing during production and maintenance are summarized. Author (ESA)

N83-33875*# Virginia Polytechnic Inst and State Univ., Blacksburg. Dept. of Chemistry.
A FUNDAMENTAL APPROACH TO THE STICKING OF INSECT RESIDUES TO AIRCRAFT WINGS Semiannual Technical Report
N. S. EISS, JR. and J. P. WIGHTMAN Jul. 1983 17 p refs
(Contract NAG1-300)
(NASA-CR-173063; NAS 1 26 173063) Avail: NTIS HC A02/MF A01 CSCL 01C

The sticking of insect residues to aircraft wings is investigated The major topics of this review are: Experimentally tested methods, testing techniques, the effect of surface roughness height on aerodynamic drag, materials tested and, the adhesive properties of insect body fluids are reviewed S L.

N83-33876*# Kentron International, Inc , Hampton, Va.
EFFECT OF ADVANCED TECHNOLOGY AND A FUEL EFFICIENT ENGINE ON A SUBSONIC-CRUISE EXECUTIVE JET WITH A SMALL CABIN
F. L. BEISSNER, JR., W. A. LOVELL, A. W ROBINS, and E E SWANSON Aug. 1983 58 p refs
(Contract NAS1-16000)
(NASA-CR-172190, NAS 1.26 172190) Avail: NTIS HC A04/MF A01 CSCL 01C

An analytical study of a supersonic-cruise, executive, jet aircraft indicated the effects of using advanced technology. The twin-engine, arrow-wing vehicle was configured with a cabin of minimum practical size to hold one pilot, eight passengers, and their baggage. The primary differences between this configuration that of a previous report were the reduction in cabin size and the use of engines that are more fuel-efficient. Both conceptual vehicles are capable of forming the same mission. The current vehicle has a range of 3,350 nautical miles at Mach 2.3 cruise and 2,700 nautical miles at Mach 0.9. The concept description includes configuration definition, aerodynamic and propulsion-system characteristics, and mass properties Performance analyses are documented for intercontinental and transcontinental flight profiles. In the latter case, a reduction in sonic-boom overpressure from 1.3 to 1 0 pounds per square foot was achieved by varying the flight profile slightly from that for optimum performance. Author

N83-33877# Toronto Univ (Ontario). Inst for Aerospace Studies.
A STUDY OF LATERAL FLIGHT PATH PERTURBATIONS OF STOL AIRCRAFT IN THE PLANETARY BOUNDARY LAYER
M. A NAHON Jun. 1983 136 p refs
(UTIAS-TN-240; ISSN-0082-5263) Avail: NTIS HC A07/MF A01

A wind tunnel investigation of the characteristics of turbulence encountered by STOL aircraft during steep descents was performed. The experimental results were used as input to a mathematical model of the linearized lateral equations of motion of a typical STOL aircraft, yielding the root-mean-square dispersion of the lateral state variables from a nominal flight path Single and four point aircraft approximation were considered; the former accounting only for side gusts, and the latter including rolling, and longitudinal and lateral yawing gust gradients. The single-point approximation proved to be inadequate for estimating lateral dispersions from the glidescope. Dispersion contributions due to rolling, and longitudinal and lateral yawing gust gradients were separated for the four point approximation. Author

N83-33878# Cranfield Inst. of Tech , Bedfordshire (England) College of Aeronautics.
A NOTE ON THE ESTIMATION OF LONGITUDINAL AND LATERAL AIRCRAFT DERIVATIVES USING SEMI-EMPIRICAL METHODS
R THORNE May 1983 39 p refs
(CAR-8312, ISBN-0-902937-85-5) Avail: NTIS HC A03/MF A01

A number of semi-empirical and theoretical techniques are used to estimate the longitudinal and lateral aerodynamic derivatives of a twin turboprop aircraft, the HP Jetstream. Estimates of the aircraft derivatives are performed for aircraft in a typical cruise condition. Longitudinal parameters are calculated using classical theory and lateral derivatives are calculated using the semi-empirical methods of ESDU. Author

N83-33879# Naval Ship Research and Development Center, Bethesda, Md Aviation and Surface Effects Dept.
SHORT TAKEOFF PERFORMANCE USING A GRAVITY ASSIST SKI JUMP Final Report
R. J. FUREY Mar 1983 33 p refs
(AD-A126456, DTNSRDC-83/020, DTNSRDC/AERO-1281)
Avail NTIS HC A03/MF A01 CSCL 01C

A modified or gravity assist ski jump was developed, through an application of the calculus of variations, to provide for the shortest takeoff roll for a thrust vector control type vertical or short takeoff and landing (V/STOL) aircraft that will maintain a better than minimum required rate of climb The equations of motion are programmed to model the takeoff performance using a ski jump. The model compares well with the ski jump test results of the AV-8A aircraft. It is shown that reduction of 30% in required ground roll and 20% in distance to a 50 ft altitude, while maintaining a better than minimum required rate of climb, with the modified ramp. A simple modified ramp, using a pair of standard multiple girder bridging (MGB) ramps, provides similar improvements in takeoff performance. GRA

N83-33880# United Technologies Corp , Stratford, Conn Aircraft Div.
X-WING 25 FOOT DIAMETER LOCKHEED MODEL WHIRL TEST REPORT Progress Report, Feb. - Oct. 1982
J. P. PERSCHBACHER 17 Jan 1983 223 p refs
(Contract MDA903-81-C-0281)
(AD-A128959; SER-510072) Avail: NTIS HC A10/MF A01 CSCL 01C

This test on the Lockheed designed 25 foot diameter X-Wing rotor had four purposes: (1) to expand the operating envelope to tip speeds of 700 ft/sec and CT/o of .20; (2) to investigate track

and balance sensitivities; (3) to evaluate the control system response characteristics at the higher disc loading; (4) to correlate CCHAP and CRUISE 4 analytical predictions with test data; and (5) to evaluate downwash on the close proximity fuselage. GRA

N83-33881# Utah Univ., Salt Lake City Dept. of Computer Science
INTERACTIVE SPLINE MODELLING Final Report, 1 Sep. 1982 - 28 Feb. 1983
E. COHEN 27 Apr. 1983 7 p refs
(Contract DAAG29-82-K-0176)
(AD-A128841; ARO-19941.1-MA) Avail: NTIS HC A02/MF A01
CSCL 12A

This contract has initiated explorations into the advantages of interactive environments for developing computer based spline representations and the types of moderately complex objects for which it might be suitable. Additionally mathematical tools for surface fitting and modification in an interactive environment are investigated in the context of modelling a helicopter in this environment. Author (GRA)

N83-34098# Ministry of Defence, Harefield (England) Directorate of Future Systems.
AN ASSESSMENT OF THE IMPORTANCE OF SMALL CRACK GROWTH TO AIRCRAFT DESIGN
R. F. W ANSTEE *In* AGARD Behaviour of Short Cracks in Airframe Components 9 p Apr. 1983 refs
Avail: NTIS HC A10/MF A01

The application of small crack propagation data to the design of aircraft structures is discussed. No deliberate attempt is made to cover peculiarities of engine construction. It is intended to generate a questioning attitude to exactly how small crack data will be applied and to what benefit. It is concluded that cracks do not greatly affect either inspection periodicity or total fatigue life of aircraft designed to current design specification rules. The application of small crack data is confined to only a few design conditions. The MIL 83444 may well account for small crack effects in the way the durability crack size was derived A more accurate understanding of small crack growth behavior applied to propagation calculations should also be applied to a revision of the MIL Spec derivation, which would result in the same cycle count to attain the long crack condition as the present specification would demand Benefits in the understanding of the fatigue process are likely to be developed from small crack investigations. Potentially large benefits in life cycle costs could be derived from an improved understanding of fatigue. Accurate interpretation of small crack behavior will depend upon a number of advances in experiment and analysis Such advances are unlikely to come about without a deliberate attempt to bring together the component parts in a well designed and properly progressed investigation. R.J.F

N83-34099# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
USE OF SMALL CRACK DATA TO BRING ABOUT AND QUANTIFY IMPROVEMENTS TO AIRCRAFT STRUCTURAL INTEGRITY
J. M. POTTER and B. G. W. YEE (General Dynamics Corp., Fort Worth, Tex.) *In* AGARD Behaviour of Short Cracks in Airframe Components 13 p Apr 1983 refs
Avail: NTIS HC A10/MF A01

The general procedures used in the derivation of small crack data are described and growth data for different structural manufacturing methods are presented. The data will be presented in terms of equivalent initial flaw size populations, crack growth rate, and initiation life to a specific length for fractographically measured cracks within the range of 01 to 1 millimeter in length. Procedures to utilize the small crack data for developing and verifying changes in fastener systems and manufacturing methods for improving the fatigue performance of aircraft structures are discussed. R.J.F

N83-34110# Battelle Memorial Inst., Columbus, Ohio.
DISCUSSION OF THE SHORT CRACK EFFECT IN AIRFRAME MATERIALS AND COMPONENTS
B. LEIS *In* AGARD Behaviour of Short Cracks in Airframe Components 12 p Apr 1983 refs
Avail: NTIS HC A10/MF A01

This meeting has brought together a number of diverse interests, each with a different perspective on what a short crack is The literature relevant to the short effect suggests that a short crack is any crack is any crack whose growth can't be correlated with handbook growth rate data using fracture mechanics technology, specifically linear elastic fracture mechanics (LEFM). The short crack effect is of interest to alloy designers because it may be a key to improving materials in the future. It is of interest to the scientist because it does not follow the commonly used analysis framework of LEFM. But most importantly for AGARD, it is of concern to the engineer in that the short crack literature indicates LEFM predictions of growth rate (when integrated crack size), inspection interval, and possibly critical crack size are often nonconservative in the presence of this effect. The engineer can avoid the problems associated with the short crack effect by careful consideration of the key assumption he makes in applying LEFM The key assumption is that equal changes in the value of the stress intensity factor mean equal amounts of crack advance (equal crack driving force). That is, the concept of similitude is invoked. On the surface, the concept of similitude is straightforward - however, its implementation in practical situations related to LEFM is not 1. As detailed in a recent report, a breakdown in the similitude concept is central to the apparent short crack effect The following summarizes the central issues related to similitude are discussed. B.W.

06

AIRCRAFT INSTRUMENTATION

Includes cockpit and cabin display devices; and flight instruments.

A83-44687
DEVELOPMENT OF TERRAIN-FOLLOWING DISPLAYS FOR THE TORNADO AIRCRAFT
G. A. WARD and J M DAVIES (Easams, Ltd., Camberley, Surrey, England) Displays (ISSN 0141-9382), vol. 4, April 1983, p. 73-76.

A ground-based simulation system for the development of terrain-following displays is described. The method has been used to develop such displays for the Tornado aircraft and enables development decisions to be made by relatively inexpensive mathematical modelling without recourse to flight trials. Examples of use of the facility are given in assessing experimental changes, assessing failure cases and warning mechanization, and in providing training material. Author

A83-44688
APPLICATION AND EXPERIENCE OF COLOUR CRT FLIGHT DECK DISPLAYS
N. W. WITT and E STRONGMAN (Royal Aircraft Establishment, Clapham, Beds., England) Displays (ISSN 0141-9382), vol. 4, April 1983, p. 77-82. refs

Attention is given to a British program of research which is aimed at the development and evaluation of avionic systems that can contribute to improving the operating efficiency and airspace utilization of civil transport aircraft. The program utilizes the flight test facilities provided by a BAC 1-11 research aircraft. The aircraft is equipped with a wide range of experimental avionics related to flight control, area navigation, flight management, and color CRT flight deck displays. The system architecture is considered, taking into account aspects of primary flight display and navigation display. In the course of flight evaluation of CRT displays in the BAC 1-11, approximately 60 hours of flying were carried out with

nonochrome CRTS followed by over 300 hours with the full color units. It was found the large format color CRT cockpit displays employed provide enhanced presentation of primary flight information and, in addition, improve the interface between complex avionics and the flight deck crew. G R.

A83-44689
FOUR-DIMENSIONAL FLIGHT MANAGEMENT USING COLOUR CRT DISPLAYS
M. F. LEFFLER and R. M. HEIMBOLD (Lockheed-California Co., Burbank, CA) Displays (ISSN 0141-9382), vol. 4, April 1983, p 83-87.

The development considered in the present investigation represents an extension of the existing L-1011 Tristar flight management system (FMS). The historical background of the flight management system is briefly examined In 1972, an American aircraft manufacturer achieved certification for a development, called area navigation (RNAV), which improved two-dimensional flight. In 1977, a three-dimensional system was developed. In addition to the two-dimensional features, the vertical flight profile was introduced to conduct a flight with a minimum expenditure of fuel. The next step was a four-dimensional FMS to eliminate terminal area delays, the fourth dimension being time Attention is given to details regarding the four-dimensional FMS, aspects of CRT instrumentation, alerting systems, and future flight stations G R.

A83-44690
WIDE FIELD OF VIEW HEAD-UP DISPLAYS
J. R BANBURY (Royal Aircraft Establishment, Farnborough, Hants., England) (NATO, AGARD, Conference on Advanced Avionics and the Military Aircraft Man/Machine Interface, Blackpool, England, Apr. 26-29, 1982) Displays (ISSN 0141-9382), vol 4, April 1983, p. 89-96. refs

The head-up displays currently fitted to production aircraft have a restricted field of view caused by the relatively small diameter of the collimating optics. There is a growing interest in alternative designs which make a greater field of view available to the pilot Several possible design options for achieving a wide field are outlined The new methods usually rely on the properties of diffractive optical elements to achieve a satisfactory performance with respect to accuracy, photometric efficiency and sunlight rejection. Some advantages arising from the particular characteristics of diffractive elements are considered As wide field of view displays become more readily available it is important to establish whether the additional cost and bulk of the equipment is justified by gains in operational efficiency. The paper concludes outlining some possible uses of the larger field. Previously announced in STAR as N83-18285 B.W.

A83-44692
COMPARISON OF COLOR AND BLACK-AND-WHITE VISUAL DISPLAYS AS INDICATED BY BOMBING PERFORMANCE IN THE 2B35 TA-4J FLIGHT SIMULATOR
R. S. KELLOGG, R. S KENNEDY, and R. R WOODRUFF Displays (ISSN 0141-9382), vol. 4, April 1983, p. 106, 107.

Ten highly qualified and experienced instructor pilots were tested with respect to bombing performance in the General Electric 2B35 full color wide screen flight simulator Half the pilots flew with color first and then black-and-white and the other half with the reverse order. Repeated bombing runs were made and circular bombing errors obtained. Under the conditions of the study, no statistically significant differences were shown between performances in color and those in black-and-white. Author

A83-44830
EVOLUTION OF MAP DISPLAY OPTICAL SYSTEMS
A. BOOT (Ferranti PLC, Navigation Systems Dept., Edinburgh, Scotland) IN. The Max Born Centenary Conference, Edinburgh, Scotland, September 7-10, 1982, Proceedings Bellingham, WA, SPIE - The International Society for Optical Engineering, 1983, p 512-520

The development of Ferranti optically projected map displays from the early V bomber and the TSR2 displays to those of the Harrier and Concorde is traced. An account is also given of the improvements in the combined map and electronic displays (COMED) This account shows how the earlier design that was fitted to the Tornado has evolved into the COMED design that is fitted to the F-18 and Jaguar aircraft. For each of these display systems, particular features of optical design interest are delineated, and the effect that they have had on the design as a whole is assessed. Included here are the use of prisms for both optical rotation and translation, techniques for the maximization of luminance, the problems associated with contrast enhancement (particularly with polarizing filters in the presence of optically active materials), the use of aerial image combining systems and the effect of the pilot interface on the system parameter. C R

A83-44877
FLIGHT DATA RECORDERS - AN INVESTIGATOR'S TOOL
International Journal of Aviation Safety (ISSN 0264-6803), vol 1, June 1983, p 13-21. refs

It is pointed out that the aircraft accident investigator has now more sophisticated Flight Data Recorders (FDR's) and Cockpit Voice Recorders (CVR's) fitted in many of today's aircraft to assist him in his studies as to the probable cause of an accident. Aspects concerning the evolution and the utilization of FDR's and CVR's are discussed Attention is given to the importance of having equipment which is able to survive aircraft crashes, unfortunate delays concerning the implementation of accident investigation recommendations, the generation of computer-graphic displays of the aircraft motion and simulated flight instrument panels from current flight recorder data, the recording of relevant sounds, and the stages which must be observed by the accident investigator in using a cockpit voice recording G R.

A83-45605
SPACE TECHNOLOGY - THE ART AND SCIENCE OF ERGONOMICS
M A FISCHETTI IEEE Spectrum (ISSN 0018-9235), vol 20, Sept. 1983, p 66, 67

The necessities and technological capabilities that have driven the development of spacecraft avionics displays, which were patterned after aircraft displays in the Mercury capsules, to the Shuttle avionics, which serve as a basis for designing new aircraft displays, are reviewed The Friendship 7 was equipped with toggle switches and needle gages for controls Since then, digital electronics have replaced electromagnetic equipment in the instruments, on-board diagnostic capabilities have increased with denser electronic packaging, and an inertial reference system with laser gyroscopes has replaced gimballed gyros Needle gages have been displaced by color CRT displays for flight control, radar, and computer data and text. M.S.K

A83-45618* National Aeronautics and Space Administration Langley Research Center, Hampton, Va
LABORATORY EVALUATION OF AN AIRBORNE OZONE INSTRUMENT THAT COMPENSATES FOR ALTITUDE/SENSITIVITY EFFECTS
G. L GREGORY, C H HUDGINS, and R A. EDAHL, JR. (NASA, Langley Research Center, Hampton, VA) Environmental Science and Technology (ISSN 0013-936X), vol. 17, Feb 1983, p 100-103.

One problem encountered in the use of air-quality instrumentation on aircraft is the variation of instrument sensitivity with pressure as the result of altitude changes of the aircraft Many instruments experience sensitivity changes of as much as a factor of 2 at altitudes of 6 km. Discussed are recent modifications

to a chemiluminescent (ethylene) ozone detector that allow the instrument to automatically compensate for pressure/sensitivity effects. The modification provides automated mass flow rate control for both the sample and ethylene gas flows The flow control systems maintain flow rate to within 15 percent for a 100-torr instantaneous pressure change, and flow rates are returned to the desired set points within 10 s after the pressure change. During simulated altitude changes (300 m/min from mean sea level to 3-km altitude), flow rates were controlled to within 3 percent of the set point. Laboratory data are summarized verifying the operation of the instrument for a pressure range of 760 torr (sea level) to 350 torr (approximately 20,000 ft) and an ozone concentration range from 20 to approximately 700 ppb Author

A83-46640
INFRARED FIBER EARLY WARNING RECEIVER
J A. HARRINGTON (Hughes Research Laboratories, Malibu, CA) and S. HANSSEN (U.S. Navy, Pacific Missile Test Center, Point Mugu, CA) IN: Advances in infrared fibers II, Proceedings of the Second Meeting, Los Angeles, CA, January 26-28, 1982 . Bellingham, WA, SPIE - The International Society for Optical Engineering, 1982, p. 128-135.
(Contract N00123-80-C-1564)

A research effort is under way to fabricate and test a 10-m-long infrared fiber capable of detecting and transmitting pulsed CO2 laser energy. In the first phase of the program, a series of optical and mechanical tests were performed on extruded polycrystalline KRS-5 (TlBrI) fibers in the temperature range -40 to 40 C In the second phase, a simple demonstration device consisting of a 10-m-long fiber and a HgCdTe detector was fabricated and tested. Tests on the demonstration device show that the fibers may be used to form the basis of an IR fiber receiver To achieve a wide field-of-view, however, a specially configured fiber end or a bundle of fibers must be used. Also, a bundle of fibers must be used to achieve the sensitivity required with some sensor applications.
V.L

A83-46959#
STATUS OF THE TCAS PROGRAM
W. L. HYLAND (FAA, Washington, DC) IN: National Aerospace Meeting, Arlington, VA, March 22-25, 1983, Proceedings Washington, DC, Institute of Navigation, 1983, p. 38-40.

The TCAS (Traffic Alert and Collision Avoidance) concept encompasses TCAS II, which is intended to provide a comprehensive level of a separation assurance in all airspace, and TCAS I, a low-cost alternative. A distinction is also made between the Minimum TCAS II and the Enhanced TCAS II. The former is capable of providing resolution advisories in the vertical plane (climb, descent) in airspace densities of up to 0.3 aircraft per square nautical mile. Traffic advisories on aircraft in the area include the clock position, or bearing, of the intruding aircraft. The Minimum TCAS II employs the mode S data formats in transmitting advisories to nearby TCAS I aircraft. The Enhanced TCAS II uses more accurate intruder bearing data in order to reduce unnecessary alarms through miss distance filtering and to generate horizontal resolution advisories As a minimum, TCAS I is able to receive and display the traffic advisories by TCAS II and sense the presence of nearby aircraft by detecting their secondary surveillance radar transmission (replies) at 1090 MHz. TCAS I and TCAS II both have integral transponders capable of operating on mods A, C, and S. C.R.

N83-32801# Vereinigung Cockpit e.V., Frankfurt am Main (West Germany).
PHANTOMS IN COMPLEX AIRBORNE SYSTEMS [PHANTOMERSCHEINUNGEN BEI KOMPLEXEN BORDSYSTEME]
1982 30 p Partly in ENGLISH and GERMAN
Avail: NTIS HC A03/MF A01

Phantom phenomena - unexplainable nonreproducible malfunctions in electronic airborne equipment - were statistically investigated These phenomena were observed in Boeings, DC 10, and A-300 aircraft, and are due to the more and more frequent use of electronics in cockpits The number of reported phantoms is listed for each type of aircraft. A clear increase is observed in aircraft of recent (advanced technology) generations. The number of phantoms per Aircraft Technical Analyses group is also given and is the highest for autopilot/flight director, flight controls, instruments, and navigation As possible causes, stress factors, electromagnetic compatibility and alpha and cosmic radiation are discussed. Author (ESA)

N83-32802# Societe Nationale Industrielle Aerospatiale, Les Mureaux (France).
EVOLUTION OF LAUNCH VEHICLE AVIONICS
M. G. SALESSY 1982 33 p In FRENCH Presented at CNES Colloq. Intern sur l'Evolution des Moyens de Lancements Spatiaux en France, Paris, 19-21 Jan. 1982
(SNIAS-831-422-121) Avail: NTIS HC A03/MF A01

Slides which summarize a lecture on launch vehicle avionics are reproduced. Ariane 5 avionics needs are discussed Improvements in systems reliability rather than in overall performance are expected. Increasing use of digital data busses is forecast. Author (ESA)

N83-33882* National Aeronautics and Space Administration. Hugh L. Dryden Flight Research Center, Edwards, Calif.
AIRCRAFT BODY-AXIS ROTATION MEASUREMENT SYSTEM Patent
K. T COWDIN, inventor (to NASA) 14 Jun 1983 10 p Filed 11 Mar 1981 Supersedes N81-22048 (19 - 13, p 1718)
(NASA-CASE-FRC-11043-1, US-PATENT-4,387,513; US-PATENT-APPL-SN-242790; US-PATENT-CLASS-33-322; US-PATENT-CLASS-74-5 34) Avail US Patent and Trademark Office CSCL 01D

A two gyro four gimbal attitude sensing system having gimbal lock avoidance is provided with continuous azimuth information, rather than roll information, relative to the magnetic cardinal headings while in near vertical attitudes to allow recovery from vertical on a desired heading. The system is comprised of a means for stabilizing an outer roll gimbal that is common to a vertical gyro and a directional gyro with respect to the aircraft platform which is being angularly displaced about an axis substantially parallel to the outer roll gyro axis A means is also provided for producing a signal indicative of the magnitude of such displacement as an indication of aircraft heading. Additional means are provided to cause stabilization of the outer roll gimbal whenever the pitch angle of the aircraft passes through a threshold prior to entering vertical flight and destabilization of the outer roll gimbal upon passing through the threshold when departing vertical flight.
Official Gazette of the U.S. Patent and Trademark Office

N83-33883*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio.
THE NASA HIGH ACCURACY FUEL FLOWMETER (HAFF) DEVELOPMENT PROGRAM
H. F. HOBART 1983 6 p refs Presented at CECON '83, Cleveland, 4-5 Oct 1983; sponsored by IEEE
(NASA-TM-83484; E-1807, NAS 1.15:83484) Avail: NTIS HC A02/MF A01 CSCL 01D

The high accuracy fuel flowmeter development program is described. A flightworthy meter that measures mass flowrate of aircraft fuels to within + or - 0.25% of reading over a 50.1 range of flow is developed. A study of measurement techniques to achieve this goal yielded three candidates: (1) a dual turbine flowmeter with density and viscosity compensation; (2) an angular momentum flowmeter with a motor-driven, spring-restrained turbine and viscosity shroud, and (3) a vortex precission flowmeter with density and viscosity compensation. An experimental study of each technique was completed and the first two candidates were selected for prototype development. S.L.

07

AIRCRAFT PROPULSION AND POWER

Includes prime propulsion systems and systems components, e g., gas turbine engines and compressors; and on-board auxiliary power plants for aircraft.

A83-44308#
THE RESPONSE OF A COMPRESSOR TO A PERIODIC PRESSURE VARIATION IN THE OUTPUT REGION [REPONSE D'UN COMPRESSEUR AUNE VARIATION PERIODIQUE DE PRESSION DANS LE PLAN DE SORTIE]
J PAULON (ONERA, Chatillon-sous-Bagneux, Hauts-de-Seine, France) ONERA, TP, no 1983-29, 1983, 14 p. In French.
(ONERA, TP NO. 1983-29)

A transfer function was developed from linear theory and compared with experimental results for a monostage compressor undergoing a periodic variation in the flow pressure at the exit end of a downstream diffuser. The compressor was configured with a movable disk and a fixed disk located relative to one another so that the flow could be treated as one-dimensional. Pressure transducers were implanted to measure the steady and unsteady parts of the flow, and the rotation speed of the blades was varied The theoretical model developed was similar to the equations for a relaxation phenomena occurring among turbine blades when a memory phenomenon is present in the velocity evolution. The model produced satisfactory predictions of the perturbation attenuation downstream from the compressor and is recommended for use by manufacturers and users. M.S K.

A83-44309#
A REVERSE FLOW CHAMBER FOR SMALL TURBOMACHINES [FOYER AFLUX INVERSE POUR PETITES TURBOMACHINES]
A. MESTRE (ONERA, Chatillon-sous-Bagneux, Hauts-de-Seine, France) and G. LAGAIN (Turbomeca, S A - Brevets Szydlowski, Bizanos, Pyrenees-Atlantiques, France) ONERA, TP, no. 1983-30, 1983, 14 p. In French.
(ONERA, TP NO. 1983-30)

The design and test results of a bench scale reverse flow chamber for a turbine combustor are described, including data for combustion at atmospheric pressure. The chamber consisted of a flame tube and an annular section. The flame tube featured apertures for combustion air, dilution air, and cooling, with the fuel passing through eight prevaporization channels before entering the chamber. Ignition was effected using electric sparks at high energies. Measurements were made of the air and fuel intake during combustion, the pressure of the flow leaving the chamber, and the temperature and composition of the combustion products Mechanical pulverization of the kerosene fuel was also examined. Prevaporization yielded higher performance, a more even temperature distribution, lower pollutant emissions, and better efficiency, while mechanical injection produced a better cold start M.S.K.

A83-44874
COUNTER-ROTATION PROPELLERS - A FEASIBILITY STUDY
Aerospace Engineering (ISSN 0736-2536), vol. 3, June 1983, p 11-15

Attention is given to the design features and projected performance characteristics of a counterrotation propfan rotor configuration, which are compared to the corresponding characteristics of single rotation propfan and turbofan rotors answering to comparable performance requirements. The counterrotation rotor promises to recover the energy imparted by high disk-loading, small diameter, high tip speed rotors to the airstream in the form of swirl flow, which is then lost to the work of propulsion The counterrotation rotor proposed employs a total of 12 swept-tip blades, with the front/rear sets of six rotors splitting the turboshaft engine's power 55/45 percent. A cruise efficiency of 89.1 percent is predicted for this design, by comparison to about 80 percent for single rotation propfans. Attention is given to established counterrotation gearbox design principles. O.C.

A83-45515*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
DYNAMIC DISTORTION IN A SHORT S-SHAPED SUBSONIC DIFFUSER WITH FLOW SEPARATION
R. STUMPF, H E. NEUMANN, and C C. GIAMATI (NASA, Lewis Research Center, Cleveland, OH) AIAA, SAE, and ASME, Joint Propulsion Conference, 19th, Seattle, WA, June 27-29, 1983. 19 p. refs
(AIAA PAPER 83-1412)

An experimental investigation of the time varying distortion at the diffuser exit of a subsonic HiMAT forebody and inlet was conducted at Mach 0.9 in the Lewis 8 by 6 foot Supersonic Wind Tunnel. A transitory separation was detected within the subsonic diffuser. Vortex generators were installed to eliminate the flow separation. Results from a study of the instantaneous pressure variations at the diffuser exit are presented. The time unsteady total pressures at the diffuser exit are computer interpolated and presented in the form of a movie showing the transitory separation. Limited data showing the instantaneous distortion levels are also presented. Previously announced in STAR as N83-26838 Author

A83-45600#
ELECTRONIC CONTROL OF AIRCRAFT TURBINE ENGINE
T SATOH and M KISHIMOTO Ishikawajima-Harima Engineering Review (ISSN 0578-7904), vol 23, March 1983, p. 85-91 In Japanese, with abstract in English refs

The evolution of engine-mounted digital electronic control for aircraft turbine engines is reviewed, describing engine test results using an FJR710 engine in the test cell. The development of full authority digital electronic control and the benefits that can be derived from it are discussed. C.D.

A83-46491#
DEMANDS ON THE AIR SYSTEM OF MODERN AIRCRAFT ENGINES [ANFORDERUNGEN AN DAS LUFTSYSTEM MODERNER FLUGTRIEBWERKE]
P. PUCHER (*Motoren- und Turbinen-Union Muenchen GmbH*, Munich, West Germany) IN: Publication on the occasion of the 65th birthday of Prof Dr.-Ing. Erich Truckenbrodt; Scientific Colloquium, Technische Universitaet Muenchen, Munich, West Germany, February 1, 1982, Reports . Munich, Technische Universitaet Muenchen, 1982, p. 357-378 In German

The design of forced-air systems for cooling, sealing, mounting-thrust compensation, and clearance control in gas turbine aircraft engines is discussed and illustrated. Subjects discussed include the thermodynamic cyclic processes of a modern engine, sealing off the main flow against air and hot-gas losses, prevention of hot-gas incidence on the turbine disk, labyrinth design, bleeding cooling and sealing air from the compressor, sealing mounting cavities, temperature lowering with initial-whirl orifices, and coordination of thermal-expansion effects It is recommended that the system be optimized as a whole, using iterative algorithms which account for fluid-mechanical, thermal, solid-mechanical, and thermodynamic parameters under different operating conditions, at an early point in the design process. T K.

N83-32733# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
TESTS FOR INLET DISTORTION IN A TWO-SPOOL TURBOJET ENGINE ON THE GROUND TEST BED
J. FENG (Shenyang Liming Machinery Co) *In its* Acta Aeron. et Astronautica Sinica (FTD-ID(RS)T-0664-82) p 113-133 4 Mar. 1983 refs Transl. into ENGLISH from Hang Kong Xuebao (China), v. 2, no. 1, 1981 21 p
Avail: NTIS HC A10/MF A01 CSCL 21E

The effects of the inlet total pressure distortion on the performance and stability of a two spool turbojet engine with a three stage low pressure compressor and three stage high pressure compressor, a medium supercharging ratio and afterburning. The steady state circumferential pressure distortion is created by the

90 deg fan shaped mesh. The relational curve of the mesh with different blockage ratios or distortion amplitude produced by the congruent mesh which follows the engine's inlet rate of flow is determined. E A K

N83-32803 Defence Research Information Centre, Orpington (England).
DURABILITY OF PROPELLER SHAFT INTERFERENCE FITS UNDER VARIABLE CYCLIC LOADING
A. S. FEDOROV, E. M. PASUMANSKII, and E. V. BIRULYA May 1983 13 p refs Transl. into ENGLISH of Sudostroenie (USSR), no. 6, 1977 p 22-25
(DRIC-T-6880, BR88015) Avail: Issuing Activity

Fatigue phenomena in interference fits subjected to variable loads were studied on a model propeller shaft under varying cyclic bending stresses. An expression for durability up to 1000 million cycles for carbon steel shafts was derived. Results show that the number of cycles in one programmed loading block exerts only an insignificant influence on the relative durability The number of stress amplitude levels in programmed loading does not affect the relative durability. Author (ESA)

N83-32804*# General Electric Co., Evendale, Ohio Aircraft Engine Business Group
V/STOL PROPULSION CONTROL ANALYSIS: PHASE 2, TASK 5-9
Nov. 1981 152 p refs
(Contract NAS3-22057)
(NASA-CR-165523; NAS 1 26 165523, R81AEG759) Avail: NTIS HC A08/MF A01 CSCL 21E

Typical V/STOL propulsion control requirements were derived for transition between vertical and horizontal flight using the General Electric RALS (Remote Augmented Lift System) concept. Steady-state operating requirements were defined for a typical Vertical-to-Horizontal transition and for a typical Horizontal-to-Vertical transition Control mode requirements were established and multi-variable regulators developed for individual operating conditions. Proportional/Integral gain schedules were developed and were incorporated into a transition controller with capabilities for mode switching and manipulated variable reassignment A non-linear component-level transient model of the engine was developed and utilized to provide a preliminary check-out of the controller logic An inlet and nozzle effects model was developed for subsequent incorporation into the engine model and an aircraft model was developed for preliminary flight transition simulations. A condition monitoring development plan was developed and preliminary design requirements established. The Phase 1 long-range technology plan was refined and restructured toward the development of a real-time high fidelity transient model of a supersonic V/STOL propulsion system and controller for use in a piloted simulation program at NASA-Ames. Author

N83-32805*# National Aeronautics and Space Administration, Washington, D. C.
COMPARATIVE EVALUATION OF GAS-TURBINE ENGINE COMBUSTION CHAMBER STARTING AND STALLING CHARACTERISTICS FOR MECHANICAL AND AIR-INJECTION
I. N. DYATLOV Feb. 1983 12 p refs Transl into ENGLISH from the book "Gorenie v Potoke" Kazan, USSR, 1970 p 160-169 Original language doc. announced as A71-28954 Transl. by Scientific Translation Service, Santa Barbara, Calif. Original doc. prep. by Kazanskiy Aviationny Inst., USSR
(NASA-TM-77024; NAS 1.15:77024) Avail: NTIS HC A02/MF A01 CSCL 21E

The effectiveness of propellant atomization with and without air injection in the combustion chamber nozzle of a gas turbine engine is studied. Test show that the startup and burning performance of these combustion chambers can be improved by using an injection during the mechanical propellant atomization process. It is shown that the operational range of combustion chambers can be extended to poorer propellant mixtures by combined air injection mechanical atomization of the propellant. S.L.

N83-32809*# National Aeronautics and Space Administration, Washington, D. C.
REAL-TIME SIMULATION OF JET ENGINES WITH DIGITAL COMPUTER. 1: FABRICATION AND CHARACTERISTICS OF THE SIMULATOR
K. NISHIO, N. SUGIYAMA, T KOSHINUMA, T. HASHIMOTO, T OHATA, and H ICHIKAWA Jun. 1983 61 p refs Transl. into ENGLISH of rept. NAL-TR-283 Tokyo, Jul 1972 37 p Translation also announced as N73-15820 Transl by Kanner (Leo Associates), Redwood City, Calif. Original doc. prep by National Aerospace Lab., Tokyo
(Contract NASW-3541)
(NASA-TM-77081; NAS 1.15:77081) Avail NTIS HC A04/MF A01 CSCL 21E

The fabrication and performance of a real time jet engine simulator using a digital computer are discussed. The use of the simulator in developing the components and control system of a jet engine is described. Comparison of data from jet engine simulation tests with actual engine tests was conducted with good agreement Author

N83-32810*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio
PROPELLER PERFORMANCE AND WEIGHT PREDICTIONS APPENDED TO THE NAVY/NASA ENGINE PROGRAM
R M. PLENCNER, P. SENTY, and T. J WICKENHEISER Jul. 1983 41 p refs
(NASA-TM-83458, E-1773; NAS 1.15:83458) Avail. NTIS HC A03/MF A01 CSCL 21E

The Navy/NASA Engine Performance (NNEP) is a general purpose computer program currently employed by government, industry and university personnel to simulate the thermodynamic cycles of turbine engines NNEP is a modular program which has the ability to evaluate the performance of an arbitrary engine configuration defined by the user In 1979, a program to calculate engine weight (WATE-2) was developed by Boeing's Military Division under NASA contract. This program uses a preliminary design approach to determine engine weights and dimensions. Because the thermodynamic and configuration information required by the weight code was available in NNEP, the weight code was appended to NNEP Due to increased emphasis on fuel economy, a renewed interest has developed in propellers. This report describes the modifications developed by NASA to both NNEP and WATE-2 to determine the performance, weight and dimensions of propellers and the corresponding gearbox The propeller performance model has three options, two of which are based on propeller map interpolation Propeller and gearbox weights are obtained from empirical equations which may easily be modified by the user. Author

N83-32811*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio
CURRENT AND FUTURE TECHNOLOGY IN RADIAL AND AXIAL GAS TURBINES
H E. ROHLIK 27 Aug 1983 45 p refs Presented at Seminar on Fluid Dyn. of Turbomachinery, Ames, Iowa, 18-27 Jul. 1983; sponsored by ASME
(NASA-TM-83414; E-1702, NAS 1.15:83414) Avail. NTIS HC A03/MF A01 CSCL 21E

Design approaches and flow analysis techniques currently employed by aircraft engine manufacturers are assessed. Studies were performed to define the characteristics of aircraft and engines for civil missions of the 1990's and beyond. These studies, coupled with experience in recent years, identified the critical technologies needed to meet long range goals in fuel economy and other operating costs. Study results, recent and current research and development programs, and an estimate of future design and analytic capabilities are discussed Author

N83-32812# Tennessee Univ. Space Inst., Tullahoma. Dept. of Aerospace and Mechanical Engineering.
UNSTEADY SWIRLING FLOWS IN GAS TURBINES Final Technical Report, 1 Apr. 1978 - 31 Dec. 1982
M KUROSAKA Mar. 1983 16 p refs
(Contract F49620-78-C-0045; AF PROJ 2307)
(AD-A128386; AFOSR-83-0426TR) Avail: NTIS HC A02/MF A01 CSCL 21E

The overall objective was to acquire fundamental understanding of phenomena characterized by violent fluctuation induced by swirling flow - the 'vortex whistle', often found to occur in various aircraft engine components. By conducting a comprehensive and systematic investigation into the 'vortex whistle', it was intended to achieve the following specific goals (1) by performing analysis to predict the frequency of the vortex whistle and verifying it against the experimental results, one can detune the natural frequencies of engine components away from it in order to ensure their structural integrity, and (2) by appealing to the mechanism of acoustic streaming induced by the vortex whistle, we explained, through both analysis and experiment, the transformation of steady radial profile - in particular the total temperature separation or the Ranque-Hilsch tube effect; the implications of this are that the radial distortion of the flow field may have strong bearing on the 'steady' aero data obtained in the swirling flow environment of gas turbines Author (GRA)

N83-33884* National Aeronautics and Space Administration Ames Research Center, Moffett Field, Calif.
NOISE SUPPRESSOR FOR TURBO FAN JET ENGINES Patent
D. Y. CHENG, inventor (to NASA) (Santa Clara Univ., Calif.) 8 Feb 1983 8 p Filed 13 Feb 1976 Supersedes N76-118131 (15 - 9, p 1082) Sponsored by NASA
(NASA-CASE-ARC-10812-1; US-PATENT-4,372,110, US-PATENT-APPL-SN-657903; US-PATENT-CLASS-60-262; US-PATENT-CLASS-60-269; US-PATENT-CLASS-60-271; US-PATENT-CLASS-239-265.17, US-PATENT-CLASS-181-213)
Avail: US Patent and Trademark Office CSCL 21E

A noise suppressor is disclosed for installation on the discharge or aft end of a turbo fan engine Within the suppressor are fixed annular airfoils which are positioned to reduce the relative velocity between the high temperature fast moving jet exhaust and the low temperature slow moving air surrounding it Within the suppressor nacelle is an exhaust jet nozzle which constrains the shape of the jet exhaust to a substantially uniform elongate shape irrespective of the power setting of the engine Fixed ring airfoils within the suppressor nacelle therefore have the same salutary effects irrespective of the power setting at which the engine is operated.

Official Gazette of the U.S. Patent and Trademark Office

N83-33885# Applied Physics Lab , Johns Hopkins Univ., Laurel, Md Chemical Propulsion Information Agency.
COMPUTATIONAL METHODS FOR RAMJETS. JPM SPECIALIST SESSION
D. S. EGGLESTON, ed. Feb. 1983 66 p refs Meeting held in Monterey, Calif , 15 Feb. 1983
(Contract N00024-83-C-5301)
(AD-A128297; CPIA-PUBL-373) Avail: NTIS HC A04/MF A01 CSCL 21E

This publication is a collection of papers presented at the 15 February 1983 specialist session on computational methods for ramjets. The session was held in conjunction with the 1983 Joint Army-Navy-NASA-Air Force (JANNAF) Propulsion Meeting (JPM) at the Naval Postgraduate School, Monterey, California. The papers deal with the application of computational models and numerical methods to the computer solution of inlet and combustor flow field properties in ramjet and supersonic combustion ramjet engines.

N83-33886# California Inst. of Tech., Pasadena.
LINEAR THEORY OF PRESSURE OSCILLATIONS IN LIQUID FUELED RAMJET ENGINES
F E. C. CULICK and V YANG *In* APL Computational Methods for Ramjets p 1-8 Feb. 1983 refs
Avail NTIS HC A04/MF A01 CSCL 21E

Low frequency pressure oscillations in ramjet engines are treated within the one-dimensional approximation. The engine is treated in two main parts: the inlet-section, containing relatively high speed flow, and the combustion chamber. A linearized analysis of a normal shock exposed to acoustic waves provides the upstream boundary condition. Most of the work reported here has been concerned with the combustion chamber. A simple model of the steady flow in a dump combustor has been worked out, comprising three regions: the flow of unburnt reactions; the region containing products of combustion, and the recirculation zone. Combustion is assumed to occur in an infinitesimally thin sheet; an infinitesimally thin shear layer separates the recirculation zone from the remainder of the flow field Acoustic fields in the inlet and the combustion chamber are formed separately and joined at the dump plane to provide a transcendental equation for the computer wave number. Results for the frequencies of oscillations and the pressure distributions compare well with experimental data taken at the Naval Weapons Center, China Lake B.W

N83-33887*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va
NUMERICAL STUDY OF SCRAMJET AND RAMJET FLOW FIELDS
A. KUMAR and J. P. DRUMMOND *In* APL Computational Methods for Ramjets p 9-24 Feb 1983 refs
Avail NTIS HC A04/MF A01 CSCL 21E

Two computer programs have been developed to numerically calculate complex, two-dimensional flow fields in scramjets. The first program is written for inlet analysis whereas the second program is written primarily for combustor analysis. Both programs solve the full two-dimensional Navier-Stokes equations by a well-known explicit, predictor-corrector technique. Turbulence is modeled by an algebraic eddy-viscosity model The combustor program also includes one or more species conservation equations to calculate mixing and reacting flows The hydrogen/air chemistry in this program is modeled by a complete reaction model. The combustor program has been recently modified to analyze axisymmetric ramjet dump combustor flow field Results from these computer programs are presented that predict the flow in several scramjet inlet configurations, two model scramjet engine configurations, and in a dump combustor simulator. Computed results are also compared with available experimental data to allow assessment of the programs Author

N83-33889# Applied Physics Lab., Johns Hopkins Univ., Laurel, Md
CALCULATION OF INVISCID AIR CAPTURE AND ADDITIVE DRAG FOR 3-D SUPERSONIC INLET FLOWS
M. D. GRIFFIN *In its* Computational Methods for Ramjets p 41-50 Feb. 1983 refs
Avail NTIS HC A04/MF A01 CSCL 21E

A method for the computation of air capture ratio and additive drag for supersonic inlets is presented. A streamline tracing approach is used, where stored data for the inlet shock-layer flowfield is used to define a stream tube at the cowl lip This stream tube is then integrated backwards to the external bow shock, at which point the air capture envelope is defined. The additive drag is available as the integral of pressure over the axial component of this envelope. The method allows an arbitrary approach to the computation of the original flowfield data. The present work illustrates the application of the method to annular scramjet inlet configurations, but such an inlet design is not required, and the method can be used whenever a cowl lip geometry can be defined, and flowfield data computed from the freestream to the cowl lip Author

N83-33890# Cooper Union, New York. School of Engineering
AN ASSESSMENT OF GLOBAL AND QUASI-GLOBAL MODELS OF HYDROCARBON AND HYDROGEN COMBUSTION KINETICS FOR REACTING FLOW-FIELD CALCULATIONS
W CHINITZ *In* APL Computational Methods for Ramjets p 51-60 Feb. 1983 refs
Avail: NTIS HC A04/MF A01 CSCL 21E

The current availability of global and quasi-global chemical kinetic mechanisms describing hydrocarbon and hydrogen oxidation kinetics is critically reviewed. The advantages and disadvantages of both types of mechanisms are discussed and it is concluded that from the viewpoint of minimizing computer run times and computer storage requirements global models should be utilized whenever possible. Their primary limitation, however, is their inability to adequately represent species histories, particularly intermediate species. It is concluded that global models are available for hydrogen and hydrocarbon (propane and higher hydrocarbons) combustion in oxygen or air, and quasi-global models are available for the same hydrocarbons (aliphatic and cyclic). However, it is emphasized that, whenever possible, all global and quasi-global models should be checked against results obtained from complete mechanisms, since such checks may reveal inconsistencies in some aspects of the model Author

N83-33891*# Princeton Univ., N. J. Dept of Mechanical and Aerospace Engineering
A FUEL-EFFICIENT CRUISE PERFORMANCE MODEL FOR GENERAL AVIATION PISTON ENGINE AIRPLANES Ph.D. Thesis. Final Report
R. C. H. PARKINSON Aug. 1983 400 p refs
(Contract NGL-31-001-252)
(NASA-CR-172188, NAS 1.26:172188; REPT-1527-T) Avail: NTIS HC A17/MF A01 CSCL 21E

A fuel-efficient cruise performance model which facilitates maximizing the specific range of General Aviation airplanes powered by spark-ignition piston engines and propellers is presented. Airplanes of fixed design only are considered. The uses and limitations of typical Pilot Operating Handbook cruise performance data, for constructing cruise performance models suitable for maximizing specific range, are first examined. These data are found to be inadequate for constructing such models A new model of General Aviation piston-prop airplane cruise performance is then developed This model consists of two subsystem models the airframe-propeller-atmosphere subsystem model; and the engine-atmosphere subsystem model. The new model facilitates maximizing specific range; and by virtue of its implicity and low volume data storge requirements, appears suitable for airborne microprocessor implementation. Author

N83-33892*# National Aeronautics and Space Administration, Washington, D. C
WINDMILLING OF THE ROTOR OF A TURBOJET ENGINE WITH AN AXIAL-FLOW COMPRESSOR UNDER FLIGHT CONDITIONS
J. BORGON Jul. 1983 11 p refs Transl into ENGLISH from Tech. Lotnicza i Astronautyczna (Poland), v. 30, Nov. 1975 p 34-36 Original language document was announced as A76-15825 Transl. by Kanner (Leo) Associates, Redwood City, Calif
(Contract NASW-3541)
(NASA-TM-77087, NAS 1.15:77087) Avail: NTIS HC A02/MF A01 CSCL 21E

The concept of rotor windmilling is understood to mean rotation of the rotor caused solely by the energy of the air (not gas) streaming through the apertures between the blades (under conditions of power shut-off) under the action of dynamic pressure. The concept of windmilling is analyzed for an engine with an axial-flow compressor, showing that windmilling must be taken into account in such cases as in-flight reignition of the engine. A graph-analytic method for determining the range of windmilling is proposed. Author

N83-33893*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio
PRELIMINARY TESTS OF AN ADVANCED HIGH-TEMPERATURE COMBUSTION SYSTEM
J D. WEAR, A M. TROUT, J. M SMITH, and R. E. JACOBS Sep. 1983 33 p refs
(NASA-TP-2203, E-1633; NAS 1.60:2203) Avail: NTIS HC A03/MF A01 CSCL 21E

A combustion system has been developed to operate efficiently and with good durability at inlet pressures to 4.05 MPa (40 atm), inlet air temperatures to 900 K, and exhaust gas temperatures to 2480 K. A preliminary investigation of this system was conducted at inlet pressures to 0.94 MPa (9 atm), a nominal inlet air temperature of 560 K, and exhaust gas temperatures to 2135 K. A maximum combustion efficiency of 98.5 percent was attained at a fuel-air ratio of 0.033; the combustion efficiency decreased to about 90 percent as the fuel-air ratio was increased to 0.058 An average liner metal temperature of 915 K, 355 kelvins greater than the nominal inlet air temperature, was reached with an average exhaust gas temperature of 2090 K. The maximum local metal temperature at this condition was about 565 kelvins above the nominal inlet air temperature and decreased to 505 kelvins above with increasing combustor pressure. Tests to determine the isothermal total pressure loss of the combustor showed a liner loss of 1 1 percent and a system loss of 6 5 percent. Author

N83-33894*# Mechanical Technology, Inc., Latham, N. Y.
T55 POWER TURBINE ROTOR MULTIPLANE-MULTISPEED BALANCING STUDY
M. R MARTIN Feb. 1982 118 p refs
(Contract NAS3-19408)
(NASA-CR-167891, NAS 1.26.167891; MTI-83TR55) Avail: NTIS HC A06/MF A01 CSCL 21E

A rotordynamic analysis of the T55-L-11C engine was used to evaluate the balancing needs of the power turbine and to optimize the balancing procedure. As a result, recommendations were made for implementation of a multiplane-multispeed balancing plan. Precision collars for the attachment of trial weights to a slender rotor were designed enabling demonstration balancing on production hardware The quality of the balance was then evaluated by installing a high speed balanced power turbine in an engine and running in a test cell at the Corpus Christi Army depot. The engine used had been tested prior to the turbine changeout and showed acceptable overall vibration levels for the engine were significantly reduced, demonstrating the ability of multiplane-multispeed balancing to control engine vibration Author

N83-34832# Stuttgart Univ (West Germany). Sonderforschungsbereich 85
PROFILE DESIGN FOR CASCADES [PROFILENTWURE FUER GITTER]
F X. WORTMANN *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 p 290-324 1983 refs In GERMAN
Avail: NTIS HC A99/MF A01

Optimization calculations for blade profiles of subsonic axial compressors were made and the unsteady profile and cascade flow was calculated. The optimization aims at a highly loaded cascade behind the blades with a large constant velocity domain on the suction side The instability point is calculated with a modified semiempirical van Driest theory The boundary layer calculation is performed with the Walz-Geropp-Felsch integral method. The compressible flow is reduced to an incompressible flow with the Karman-Tsien rule. The pressure distribution along the profile is obtained for separated steady flow The influence of separated flow on the cascade in relative motion is investigated by calculating the separated flow on a flat plate of finite thickness. Unsteady forces and moments on the profile are calculated. Author (ESA)

N83-34838# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.
THE EFFECT OF THE REYNOLDS NUMBER ON TURBOMACHINES [REYNOLDSZAHLEINFLUSS AUF STROEMUNGSMASCHINEN]
W. HUCK *In its* Thermodyn. and Flow Mech. Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 p 534-556 1982 refs In GERMAN
Avail. NTIS HC A99/MF A01

A method to predetermine the behavior of compressors in a broad Reynolds number domain was developed. The blade geometry in the middle cross section or in several coaxial cross sections has to be known The numerical calculation uses the duct flow method. Semiempirical correlations are used for the energy conversion in the cascade. The influence of the Reynolds number on energy loss and cascade deflection occurs especially for small Mach numbers and standard streaming angles. The high losses occurring for large angles and Mach numbers do not considerably increase with decreasing Reynolds number. A comparison between measured and calculated flow characteristics shows that the numerical method must be improved.
Author (ESA)

08

AIRCRAFT STABILITY AND CONTROL

Includes aircraft handling qualities, piloting, flight controls; and autopilots

A83-43965#
AEROSERVOELASTICITY IN THE TIME DOMAIN
M. A. CUTCHINS (Auburn University, Auburn, AL), J. W. PURVIS (Sandia National Laboratory, Albuquerque, NM), and R. W. BUNTON (USAF, Eglin AFB, FL) (Structures, Structural Dynamics and Materials Conference, 22nd, Atlanta, GA, April 6-9, 1981, and AIAA Dynamics Specialists Conference, Atlanta, GA, April 9, 10, 1981, Technical Papers, Part 2, p. 580-590) Journal of Aircraft (ISSN 0021-8669), vol. 20, Sept. 1983, p 753-761 Research supported by Auburn University. refs
(Contract F08635-78-C-0027)
Previously cited in issue 12, p. 1950, Accession no A81-29489

A83-44315#
NONLINEAR CONTROL LAW FOR PILOTING AIRCRAFT IN THE AIR-TO-GROUND ATTACK PHASE [SUR UNE LOI DE COMMANDE NON-LINEAIRE POUR LE PILOTAGE DES AVIONS EN PHASE D'ATTAQUE AIR-SOL]
B. D. VU and O. L. MERCIER (ONERA, Chatillon-sous-Bagneux, Hauts-de-Seine, France) (NATO, AGARD, Symposium on Integration of Fire Control, Flight Control and Propulsion Control Systems, 36th, Toulouse, France, May 17-20, 1983) ONERA, TP, no 1983-37, 1983, 11 p. In French. refs
(ONERA, TP NO 1983-37)

A control law, based on the concept of piloting by aiming, is presented for implementation in the control laws of fighter aircraft during a cannon attack on a ground target. The law is incorporated into an architecture which governs a weapon aiming system, a fire control system, and the flight control system. The goal of the algorithm is to direct the weapon and the aircraft toward the target the pilot has selected The kinematic and dynamic equations are defined, together with the laws for the fire control and flight control systems. A simulation performed with the control law demonstrated that the new law could be implemented while safeguarding normal piloting operations. M S K.

A83-45462*# Purdue Univ., Lafayette, Ind.
AN OPTIMAL CONTROL APPROACH TO PILOT/VEHICLE ANALYSIS AND THE NEAL-SMITH CRITERIA
D. K SCHMIDT and B. J. BACON (Purdue University, West Lafayette, IN) Journal of Guidance, Control, and Dynamics (ISSN 0731-5090), vol 6, Sept -Oct. 1983, p 339-347. refs
(Contract NAG4-1)
Previously cited in issue 19, p 2983, Accession no A82-39125

A83-45846#
FLIGHT CLEARANCE OF THE JAGUAR-FLY-BY-WIRE AIRCRAFT. II
R. B. SMITH (Marconi Avionics, Ltd , Rochester, Kent, England) IN. Certification of avionic systems; Proceedings of the Symposium, London, England, April 27, 1982 London, Royal Aeronautical Society, 1982, 10 p. Research supported by the Ministry of Defence (Procurement Executive) and British Aerospace PLC

The Integrated Flight Control System of the Jaguar fly-by-wire aircraft has as its primary integrity requirement that it possess a dual fault failure survival capability This requirement is addressed by means of a quadruplex configuration. A flight test assessment of this design has shown it to achieve a safety-critical risk level of 2 64 x 10 to the -7th/flight hour. It is noted that the failure survival characteristics of the system are primarily dependent on its architecture, together with the performance of its voter/monitors and actuators With respect to the development of high integrity software, the present appraisal has shown that the greatest single source of error is in the design definition phase. O.C

A83-45849#
HELICOPTER AVIONIC SYSTEMS CERTIFICATION
F G. RIVERS (Westland Helicopters, Ltd., Yeovil, Somerset, England) IN: Certification of avionic systems; Proceedings of the Symposium, London, England, April 27, 1982 . London, Royal Aeronautical Society, 1982, 17 p

The state-of-the-art in helicopter control systems, together with the relationship which such systems' requirements bear to the inherently unstable flight characteristics of helicopters, are presently illustrated through consideration of the case of the Westland 30-100 aircraft The automatic flight control system (AFCS) employed stabilizes the helicopter in pitch, roll and yaw about long term datums of pitch and roll attitudes and heading, using a series actuator that imparts dynamic stability and which is duplexed in all control axes. The certification process for such an AFCS system ensures that the aircraft is able to fly under the direction of virtually all pilots, on all occasions, upon consideration of system and engineering design features followed by the ground and flight testing of all consequences of equipment failure. O.C.

A83-45850#
CERTIFICATION OF THE LOCKHEED 1011-500 ACTIVE CONTROL SYSTEM
K. G. WILKINSON IN: Certification of avionic systems; Proceedings of the Symposium, London, England, April 27, 1982 London, Royal Aeronautical Society, 1982, 9 p.

The Automatic Control System (ACS) required for the reduction of maneuver and gust loads experienced by the extended wing/outboard aileron of the L 1011-500 airliner must respond to this aircrafts short period response mode and suppress elastic response in the first symmetric wing bending mode Attention is given to this digital ACS's software verification/validation, failure and performance analyses' results, and equipment approval.
O.C.

N83-33896*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RESTRUCTURABLE CONTROLS
R. J MONTOYA, comp. (Research Triangle Inst., Research Triangle Park, N.C.), W E. HOWELL, comp., W. T BUNDICK, comp., A. J OSTROFF, comp., R M. HUESCHEN, comp, and C. M BELCASTRO, comp. Aug. 1983 189 p refs Workshop held in Hampton, Va, 21-22 Sep. 1982
(NASA-CP-2277, L-15638, NAS 1.55:2277) Avail. NTIS HC A09/MF A01 CSCL 01C

Restructurable control system theory, robust reconfiguration for high reliability and survivability for advanced aircraft, restructurable controls problem definition and research, experimentation, system identification methods applied to aircraft, a self-repairing digital flight control system, and state-of-the-art theory application are addressed.

N83-33898*# Honeywell Systems and Research Center, Minneapolis, Minn
ROBUST RECONFIGURATION FOR HIGH RELIABILITY AND SURVIVABILITY FOR ADVANCED AIRCRAFT
T. B. CUNNINGHAM *In* NASA. Langley Research Center Restructurable Controls p 43-80 Aug. 1983
Avail. NTIS HC A09/MF A01 CSCL 01C

Flight control system (FCS) reliability is discussed in terms of sensors, computers and actuators. The servo/actuation bottleneck is discussed. FCS survivability is considered. Preliminary survivability issues. A Grumman study vehicle, R-14, and YF-16 aircraft configurations are studied. Goals of control are reviewed. N.W.

N83-33899*# Kansas Univ., Lawrence.
RESTRUCTURABLE CONTROLS PROBLEM DEFINITION AND FUTURE RESEARCH
D. R DOWNING *In* NASA. Langley Research Center Restructurable Controls p 81-98 Aug. 1983
Avail NTIS HC A09/MF A01 CSCL 01C

Restructurable controls, failure classification, airframe design, failure type, control system type, post failure mission, plant identification, controller design techniques, and restructurable control concept validation tools are considered Author

N83-33900*# Calspan Corp., Buffalo, N. Y.
EXPERIMENTAL EXPERIENCE AT CALSPAN
E. G. RYANSKI *In* NASA. Langley Research Center Restructurable Controls p 99-114 Aug 1983
Avail: NTIS HC A09/MF A01 CSCL 01C

A partial list of controllers, multiple means of generating forces and moments available; control power requirements; new aircraft design vs existing configuration; critical technology areas, parameter identification; and types of failure or emergency for reconfiguration are considered. N.W.

N83-33902*# Air Force Wright Aeronautical Labs, Wright-Patterson AFB, Ohio.
SELF-REPAIRING DIGITAL FLIGHT CONTROL SYSTEM
D. P. RUBERTUS *In* NASA. Langley Research Center Restructurable Controls p 133-160 Aug. 1983 refs
Avail NTIS HC A09/MF A01 CSCL 01C

Self-repairing digital flight control systems and aircraft battle damage repair are addressed. Author

N83-33904*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
NASA/FAA EXPERIMENTS CONCERNING HELICOPTER IFR AIRWORTHINESS CRITERIA
J. V. LEBACQZ Jul. 1983 20 p refs
(NASA-TM-84388; A-9440, NAS 1.15 84388) Avail: NTIS HC A02/MF A01 CSCL 01C

A sequence of ground and flight simulation experiments was conducted as part of a joint NASA/FAA program to investigate helicopter instrument flight rules (IFR) airworthiness criteria. The first six of these experiments are described and the results summarized. Five of the experiments were conducted on large amplitude motion base simulators; V/STOLAND UH-1H variable stability helicopter was used in the flight experiment. Airworthiness implications of selected variables that were investigated across all of the experiments are discussed, including the level of longitudinal static stability, the type of stability and control augmentation, the addition of flight director displays, and the type of instrument approach task. Among the specific results reviewed are the adequacy of neutral longitudinal statics for dual pilot approaches and the requirement for pitch and roll attitude stabilization in the stability and control augmentation system to achieve flying qualities evaluated as satisfactory. S L

N83-33905# Kuhn (Richard E), Newport News, Va
ON THE PREDICTION OF THE LATERAL/DIRECTIONAL CHARACTERISTICS OF DISTRIBUTED JET STOL CONFIGURATIONS Final Report
R. E KUHN Dec 1982 96 p refs
(Contract N62269-82-C-0220; WF41400000)
(AD-A128902; NADC-81275-60) Avail: NTIS HC A05/MF A01 CSCL 01A

A method for estimating the lateral/directional stability characteristics of jet flap STOL transport configurations at high power-on lift coefficients is presented. In addition to inducing a large stabilizing sidewash at the vertical tail powered lift reduces the directional instability contribution of the wing/body, increases the wing body side force and tends to reduce (depending on the amount of geometric dihedral incorporated) the high level of effective dihedral normally associated with swept wings at high lift coefficients Author (GRA)

09

RESEARCH AND SUPPORT FACILITIES (AIR)

Includes airports, hangars and runways, aircraft repair and overhaul facilities, wind tunnels, shock tube facilities; and engine test blocks.

A83-44306#
THE S2CH SUBSONIC WIND TUNNEL AND ITS UTILIZATION FOR DETAILED STUDIES OF HELICOPTER ROTORS
B. COSTES (ONERA, Chatillon-sous-Bagneux, Hauts-de-Seine, France) (Subsonic Aerodynamic Testing Association, Annual Business Meeting, 19th, College Station, TX, Apr. 18-20, 1983) ONERA, TP, no. 1983-27, 1983, 12 p.
(ONERA, TP NO. 1983-27)

The capabilities of the ONERA S2Ch subsonic wind tunnel at Meudon are detailed, together with sample data obtained with a helicopter test rig. The S2Ch is equipped with a diffuser, a 1.5 MW fan, and can supply a 120 m/sec flow. The helicopter test rig is configured for vertical flapping and lead-lag motions, collective pitch, and measurements of torque, differential pressures, flapping and lead-lag angles, pitch link loads, flapping and torsion moments, and power requirements. Data acquisition is at speeds as high as 96 kHz with LDV employed to assess flow local and instantaneous velocities. The results of investigations of the helicopter tip vortex path and circulation estimation are provided, demonstrating that a blade displays a peak velocity on the tangential component and alters the velocity direction of the vertical component M.S.K.

A83-44307#
THE ONERA WIND TUNNELS AT MODANE CENTRE AND AT LE FAUGA CENTRE AND THEIR UTILIZATION IN SUBSONIC RANGE
J. CHRISTOPHE (ONERA, Chatillon-sous-Bagneux, Hauts-de-Seine, France) (Subsonic Aerodynamic Testing Association, Annual Business Meeting, 19th, College Station, TX, Apr 18-20, 1983) ONERA, TP, no. 1983-28, 1983, 46 p. refs (ONERA, TP NO. 1983-28)

The equipment, functions, and performance of the ONERA wind tunnel facilities at Modane-Avrieux and Le Fauga-Mauzac are described. ONERA is a scientific and technical public establishment, financially autonomous, serving the research and applications needs of both the military and civilian aerospace community in France The two test facilities together provide feature continuous, glowdown, and cascade wind tunnels, nozzle static test benches, engine simulator test benches, a subsonic pressurized wind tunnel, and a propulsion research laboratory Hydroelectric power furnishes the electricity at Modane, where the wind tunnels can run several hours at a time Data is collected through transducers, photography, 40 channel sensor inputs, and a maximum sampling rate of 60,000/sec. Tests are run with models on a sting, half models, and on a three-strut set-up. Sample results with a canard, air intakes, and on the Airbus are outlined. M.S.K.

A83-44571#
SOMETHING ABOUT TO IMPROVE THE ACCURACY OF TESTING IN LOW SPEED WIND TUNNEL
J. FAN (Harbin Aerodynamic Research Institute, Harbin, People's Republic of China) Acta Aerodynamica Sinica, no 2, 1983, p 77-84. In Chinese, with abstract in English refs

The main results of a comparative test of 3m x 3m and 2.5m x 3.5m low-speed wind tunnels are presented The principle factors influencing the accuracy of test data in the tunnels are analyzed The main measure for improving the accuracy of test data is outlined in relation to the low-speed wind tunnels in current use in China. The necessity of developing the equipment and surveying instruments in order to improve significantly the accuracy of test data is stressed. It is recommended that use be made of the sting system, the box strain gage balance, the model status angle meter, and the digital data acquisition and reduction system C.R.

A83-45029
AIRFIELD COATINGS INCORPORATING POLYMER MATERIALS - REPAIR AND MAINTENANCE [AERODROMNYE POKRYTIIA S PRIMENENIEM POLIMERNYKH MATERIALOV REMONT I SODERZH'ANIE]
IA. I. SHVIDKO and E L MARIANOV Moscow, Izdatel'stvo Transport, 1982, 89 p In Russian refs

The experience gained in using polymer materials for the routine repair and maintenance of concrete airfields is summarized Information is presented on the types of polymer materials and on their properties, with an account given of their performance The protection afforded by the various materials is compared Compounds used at low temperatures are discussed, and attention is also given to radiation stability. C.R.

A83-45576*# Virginia Associated Research Center, Newport News.
COMBINED FOUR-WALL INTERFERENCE ASSESSMENT IN TWO-DIMENSIONAL AIRFOIL TESTS
W. B. KEMP, JR. (Virginia Associated Research Center, Newport News, VA) and J. B. ADCOCK (NASA, Langley Research Center, National Transonic Facility Aerodynamics Branch, Hampton, VA) AIAA Journal (ISSN 0001-1452), vol 21, Oct. 1983, p 1353-1359. refs

Previously cited in issue 10, p. 1556, Accession no A82-24662

A83-45866
DESIGN OF THE EASTERN AIR LINES PLATING SHOP
F WALKER (Burns and McDonnell Engineering Co., Miami, FL) IN Annual Airline Plating and Metal Finishing Forum, 18th, Orlando, FL, March 16-18, 1982, Proceedings Warrendale, PA, Society of Automotive Engineers, Inc., 1982, p 15-18.

Eastern's new plating shop has an uncluttered overhead in the tank areas, all plating lines are in one room, and second floor plating areas are above full access pit areas The shop has downdraft ventilation, more than one hundred tanks 3 feet x 5 feet and larger, and was built into an existing structure. This was accomplished in a cost effective design which was constructed on time and within budget and which provides a shop that is easy to maintain, monitor, and modify. Special attention was given to meeting environmental regulations. Author

A83-46484#
CRYOGENIC-WIND-TUNNEL TECHNOLOGY - A WAY TO MEASUREMENT AT HIGHER REYNOLDS NUMBERS [KRYO-WINDKANAL-TECHNOLOGIE - EIN WEG ZUR MESSUNG BEI HOEHEREN REYNOLDS-ZAHLEN]
J W BECK (Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Oberpfaffenhofen, West Germany) IN: Publication on the occasion of the 65th birthday of Prof. Dr.-Ing Erich Truckenbrodt; Scientific Colloquium, Technische Universitaet Muenchen, Munich, West Germany, February 1, 1982, Reports Munich, Technische Universitaet Muenchen, 1982, p. 53-81, 83-87 In German refs

The goals, design, problems, and value of cryogenic transonic wind tunnels being developed in Europe are discussed. The disadvantages inherent in low-Reynolds-number (Re) wind-tunnel simulations of aircraft flight at high Re are reviewed, and the cryogenic tunnel is shown to be the most practical method to achieve high Re The design proposed for the European Transonic Wind-tunnel (ETW) is presented: parameters include cross-section = 4 sq m, operating pressure = 5 bar, temperature = 110-120 K, maximum Re = 40 x 10 to the 6th, liquid N2 consumption = 40,000 metric tons/year, and power = 39 5 MW The smaller Cologne subsonic tunnel being adapted to cryogenic use by DFVLR for preliminary studies is described Problems of configuration, materials, and liquid-N2 evaporation and handling, and the research underway to solve them are outlined The benefits to be gained by the construction of these costly installations are seen more in applied aerodynamics than in basic research in fluid physics The need for parallel development of both high-Re tunnels and computers capable of performing high-Re numerical analysis is stressed T K.

A83-46492#
THE SIMULATION OF TEMPERATURE-STRATIFIED ATMOSPHERIC BOUNDARY LAYERS IN A WIND TUNNEL [SIMULATION VON TEMPERATURGESCHICHTETEN ATMOSPHAERISCHEN GRENZSCHICHTEN IM WINDKANAL]
L. ROEMER and M. WIER (Muenchen, Hochschule der Bundeswehr, Neubiberg, West Germany) IN: Publication on the occasion of the 65th birthday of Prof. Dr -Ing. Erich Truckenbrodt, Scientific Colloquium, Technische Universitaet Muenchen, Munich, West Germany, February 1, 1982, Reports Munich, Technische Universitaet Muenchen, 1982, p. 379-393. In German. refs

The fundamental design requirements, construction, and preliminary operation of an atmospheric wind tunnel are discussed. The basic requirements include similarity coefficients (Reynolds, Richardson, Rossby, Prandtl, and Eckert numbers), initial conditions (vertical distribution of average velocity, turbulent fluctuations, temperature, and temperature fluctuations) and edge conditions (geometry, roughness, and temperature distribution on the floor, pressure gradient in the direction of flow) The extent to which these requirements can be met by a wind tunnel is considered, and the present installation is described. The generation of different atmosphere-like profiles with and without temperature layering is demonstrated. T.K.

N83-32729# Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div
EXPERIMENTAL INVESTIGATION OF INTERFERENCES OF TOP AND BOTTOM SLOTTED WALLS AND THE EFFECTS OF SIDEWALLS IN A TRANSONIC AIRFOIL WIND TUNNEL
In its Acta Aeron. et Astronautica Sinica (FTD-ID(RS)T-0664-82) p 17-37 4 Mar. 1983 refs Transl. into ENGLISH from Hang Kong Xuebao (China), v. 2, no. 1, 1981 21 p
Avail: NTIS HC A10/MF A01 CSCL 14B

Pressure distribution on three RAE 104 airfoil models were measured in transonic airfoil wind tunnel. It is shown that when the open area ratio is 2%, the blockage interference of the wind tunnel practically vanishes. It is shown that under the three sidewall conditions of solid sidewalls, multilayered mesh plates without air exhaust and multilayered mesh plates with air exhaust: multilayered mesh plates without air exhaust cause the lift coefficients to be much lower than the values when there is no interference; when M 0.7, use of a solid sidewall causes the lift coefficients to reach the values when there is not interference; installment of a multilayered mesh plate with air exhaust can also cause the lift coefficients to reach the values when there is no interference. Test results in this wind tunnel and those in the British NPL's 20 inch x 8 inch transonic tunnel are compared. E.A.K.

N83-32739# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div
SEVERAL PROBLEMS IN THE DESIGN OF ENVIRONMENTAL WIND TUNNELS
F ZHIFU *In its* Mech. and Practice (Selected Articles) p 1-14 28 Mar 1983 Transl into ENGLISH from Lixue yu Shijian (China), v. 4, no. 3, 1982 p 19-23
Avail. NTIS HC A03/MF A01 CSCL 14B

Characteristics of an environmental wind tunnel are discussed Design problems are also discussed. Author

N83-32741# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div.
THE OPTICAL OIL FLOW TECHNIQUE IN A SHOCK WAVE WIND TUNNEL
Y. ZUQING and W. XIRONG *In its* Mech. and Practice (Selected Articles) p 26-27 28 Mar. 1983 Transl. into ENGLISH from Lixue yu Shijian (China), v. 4, no. 3, 1982 p 78-81
Avail: NTIS HC A03/MF A01 CSCL 14B

The experimental model is a plate-cylinder composite body. The body was installed on the symmetry plane in the test section in an attitude approximately perpendicular to the horizontal plane. The M number of the flow at the outlet of the nozzle is close to 8 It could also ensure the presence of a turbulent surface layer on the plate in front of the cylinder. The experimental time period is approximately 7 milliseconds. Clear flow pattern photographs related to the supersonic turbulent surface layer separation in front and behind the cylinder were obtained. Author

N83-32813# Federal Aviation Administration, Washington, D.C. Program Engineering and Maintenance Service
STATE OF THE ART SURVEY ON CONFINED BASE COURSES FOR UTILITY AIRPORT PAVEMENTS Final Report
A. L. MCLAUGHLIN Apr. 1983 30 p refs
(FAA-PM-83-24) Avail: NTIS HC A03/MF A01

The state of the art in the use of confining methods for loose on-site materials as a stabilizing medium for utility airport pavements are reviewed. Much field experimentation on expedient types of pavements is in progress but a theoretical base was not yet developed for predicting performance. It is shown that well developed specifications exist for membrane encapsulated soil layer systems, but none exists for sand-filled cellular systems. Experimentation points to certain problems that must be corrected before sandfilled systems can be used for civil aircraft pavements. Recommendations are offered that could provide a predictive methodology. S.L.

N83-32815# Arbeitsgemeinschaft Deutscher Verkehrsflughaefen, Stuttgart (West Germany)
GUIDELINES FOR THE PLANNING AND DIMENSIONING OF GENERAL AVIATION INSTALLATIONS ON TRAFFIC AIRPORTS [LEITSAETZ FUER DIE PLANUNG UND BEMESSUNG VON ANLAGEN DER ALLGEMEIN LUFTFAHRT AUF VERTKHRSFLUGHAEFEN]
G. D. SCHMIDT Jan. 1982 66 p refs In GERMAN
(ISBN-3-87977-049-2) Avail. NTIS HC A04/MF A01

Planning and infrastructure of airport installations were reviewed in order to provide general guidelines. General aviation contains the complete civil aviation except line and charter aviation. The increasing importance of business trips and working traffic requires more and more from airport installation. Common dispatching in line and charter aviation installations can lead to complicated traffic handling. Separate general aviation terminals and parking places, and partly separate runways are useful. Additional security measures have to be considered. Statistics of existing installations are presented. Author (ESA)

N83-33906*# Fluidyne Engineering Corp., Minneapolis, Minn
PRELIMINARY ENGINEERING STUDY QUICK OPENING VALVE MSFC HIGH REYNOLDS NUMBER WIND TUNNEL (STUDY REPORT APPENDICES) Final Report
Jul. 1983 101 p
(Contract NAS8-35056, FLUIDYNE PROJ. 1380)
(NASA-CR-170849; NAS 1.26.170849) Avail: NTIS HC A06/MF A01 CSCL 14B

Release mechanism concept, seal concepts, vendor contacts, and calculations are discussed N.W.

N83-33908*# National Aeronautics and Space Administration, Washington, D C.
WALL INTERFERENCE CORRECTION IMPROVEMENTS FOR THE ONERA MAIN WIND TUNNELS
X. VAUCHERET Aug 1982 24 p refs Transl. into ENGLISH of conf. paper presented at the 50th Fluid Dyn. Panel Spec Meeting on Wall Interference in Wind Tunnels, 1982 p 1-12 Meeting held in London, 19-20 May 1982 Transl by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASW-3541)
(NASA-TM-76971; NAS 1.15:76971) Avail: NTIS HC A02/MF A01 CSCL 14B

This paper describes improved methods of calculating wall interference corrections for the ONERA large windtunnels. The mathematical description of the model and its sting support have become more sophisticated. An increasing number of singularities is used until an agreement between theoretical and experimental signatures of the model and sting on the walls of the closed test section is obtained. The singularity decentering effects are calculated when the model reaches large angles of attack. The porosity factor cartography on the perforated walls deduced from the measured signatures now replaces the reference tests previously carried out in larger tunnels. The porosity factors obtained from the blockage terms (signatures at zero lift) and from the lift terms are in good agreement. In each case (model + sting + test section), wall corrections are now determined, before the tests, as a function of the fundamental parameters M, CS, CZ. During the windtunnel tests, the corrections are quickly computed from these functions. Author

N83-33909*# National Aeronautics and Space Administration, Washington, D. C.
THE EFFECTS OF SUPPORTS ON THE FLOW BEHIND A BODY
P. REBUFFET May 1983 47 p refs Transl into ENGLISH of conf. paper presented at the La Reunion sur les Effets des Interactions en Soufflerie du Groupe de Trail, 1959 p 1-31 Conf held in Rhode St. Genese, Belgium, 2-5 Mar 1959 Original document was announced as N80-71569 Transl. by Kanner (Leo) Associates, Redwood City, Calif.
(Contract NASW-3541)
(NASA-TM-77073; NAS 1.15 77073) Avail: NTIS HC A03/MF A01 CSCL 14B

Two cases in a supersonic flow with a turbulent boundary layer are studied in order to determine the effects of supports on models with a flat base The first concerns the effect of various obstacles situated upstream of the two dimensional base, at Mach 2. The second relates to a body of revolution passing through the throat of the jet from upstream to downstream. The interference of obstacles simulating supporting masts is examined for the base, both bare and with a sting, at Mach 1 94 Without any support, the drag of a conical-cylindrical body of revolution was measured by means of the ONERA magnetic suspension The interference of various stings was studied at Mach 2.4 with a laminary boundary layer and with a separated turbulent boundary layer The mechanism of the interference of a sting, progressively approached axially to the base, was determined Author

N83-33911*# National Academy of Sciences - National Research Council, Washington, D. C.
INFLUENCE OF COMPUTATIONAL FLUID DYNAMICS ON EXPERIMENTAL AEROSPACE FACILITIES: A FIFTEEN YEAR PROJECTION Final Report
Mar. 1983 128 p refs Sponsored in part by AEDC
(Contract NASW-3455)
(NASA-CR-172859; NAS 1.26:172859, PB83-191312) Avail: NTIS HC A07/MF A01 CSCL 14B

An assessment was made of the impact of developments in computational fluid dynamics (CFD) on the traditional role of aerospace ground test facilities over the next fifteen years. With improvements in CFD and more powerful scientific computers projected over this period it is expected to have the capability to compute the flow over a complete aircraft at a unit cost three orders of magnitude lower than presently possible Over the same period improvements in ground test facilities will progress by application of computational techniques including CFD to data acquisition, facility operational efficiency, and simulation of the light envelope; however, no dramatic change in unit cost is expected as greater efficiency will be countered by higher energy and labor costs GRA

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ASTRONAUTICS

Includes astronautics (general); astrodynamics; ground support systems and facilities (space); launch vehicles and space vehicles; space transportation; spacecraft communications, command and tracking; spacecraft design, testing and performance; spacecraft instrumentation; and spacecraft propulsion and power.

A83-44168
AUTONOMY IN MILITARY AIRCRAFT
D. W. HENDERSON (USAF, Space Div., Los Angeles, CA) IN: *Guidance and control 1983, Proceedings of the Annual Rocky* Mountain Conference, Keystone, CO, February 5-9, 1983 San Diego, CA, Univelt, Inc, 1983, p 167-170
(AAS PAPER 83-041)

Military users are becoming increasingly dependent on satellites for vital services related to communication, surveillance information, navigation, and meteorological data. The current military spacecraft, however, need the services of a ground support network which is vulnerable in connection with a variety of threats. It has, therefore, been proposed to decrease the dependence of the satellites on the ground segment by improving satellite autonomy, and the Satellite Autonomy Program at the recently created Air Force Space Technology Center is developing the Autonomous Redundancy and Maintenance Management Subsystem (ARMMS) for a near term generic autonomy solution. Attention is given to the implementation of autonomy and technological requirements for ensuring autonomy. G.R.

11

CHEMISTRY AND MATERIALS

Includes chemistry and materials (general), composite materials; inorganic and physical chemistry; metallic materials; nonmetallic materials; and propellants and fuels

A83-44061
NI-BASE MC-CARBIDE REINFORCED EUTECTIC ALLOYS FOR JET ENGINE APPLICATION
S. W YANG (General Electric Co., Schenectady, NY) IN: Engineering science and mechanics; Proceedings of the International Symposium, Tainan, Republic of China, December 29-31, 1981. Part 2 San Diego, American Astronautical Society, 1983, p 1525-1537. refs

It has been found that a eutectic point exists between a nickel-based (or cobalt-based) matrix and the refractory monocarbide Further, a superalloy/MC composite structure can be grown, in situ, from the molten state by directional solidification. This fabrication process is reviewed Two alloy systems - CoTaC and NiTaC - have been under extensive evaluation as candidates for turbine application. Properties pertinent to turbine application are discussed. Latest advancements in both systems are examined Author

A83-44685
FINAL EVALUATION OF MULTI-VISCOSITY OILS DESIGNED FOR AIRCRAFT RECIPROCATING ENGINES
W. E. GARRELTS (Illinois, University, Urbana, IL) Society of Automotive Engineers, Business Aircraft Meeting and Exposition, Wichita, KS, Apr 12-15, 1983. 15 p
(SAE PAPER 830707)

Six, one hundred eighty horsepower aircraft piston engines have been operated through their normal overhaul life using three different ashless dispersant multi-viscosity aircraft oils Two of these oils achieved their multi-viscosity characteristics by utilizing some synthetic base stock while the third utilized additional viscosity-index (V-I) improver The performance of these three oils was compared with that of a conventional, single-grade AD oil in six identical control aircraft engines. The results of this test indicates that multi-viscosity oils provide improved cold-weather starting, less consumption, and comparable wear rates to the six control engines. Author

A83-44856* Jet Propulsion Lab., California Inst. of Tech., Pasadena.
RHEOLOGICAL BEHAVIOR OF FM-9 SOLUTIONS AND CORRELATION WITH FLAMMABILITY TEST RESULTS AND INTERPRETATIONS
S. T J PENG and R F LANDEL (California Institute of Technology, Jet Propulsion Laboratory, Pasadena, CA) Journal of *Non-Newtonian Fluid Mechanics* (ISSN 0377-0257), *vol. 12*, 1983, p 95-111. NASA-FAA-sponsored research. refs

The rheological behavior of progressively shear thickening FM-9 solutions, a time-dependent shear thickening material with characteristics of threshold behavior, is investigated as part of a study of the rheological properties of antimisting jet fuel

Flammability test results and test configurations from various sources are evaluated. A correlation is obtained between the rheological behavior and the flammability tests such that, for a given system, such as a fixed solvent system and the FM-9 polymer system, the flammability criterion can be applied to a wide range of concentrations and temperatures. N.B.

A83-44879
THE DURABILITY OF AIRCRAFT TYRES
G. SCOTT (Aston, University, Birmingham, England) International Journal of Aviation Safety (ISSN 0264-6803), vol. 1, June 1983, p. 31-41. refs

It is pointed out that a pneumatic tire is essentially a device for absorbing energy. In the case of ground vehicles, it has been found that as much as 30 percent of the energy content of the fuel is dissipated as heat caused by internal friction within the tire, and, consequently, there are considerable pressures on tire manufacturers to improve design to provide better fuel economy The primary function of an aircraft tire is to absorb very large amounts of energy during very short periods of landing and takeoff. In considering the service life of a tire, it has to be taken into account that all polymeric materials change with time, and that the service environment has a profound effect on all rubbers currently used in tire construction Attention is given to structural modifications occurring in tires during service, the mechanism of fatigue in rubber, the effects of retreading, and the loss of antidegradants from tires It is recommended that the design of polymers for durability must increasingly become part of the engineer's thinking. G R.

A83-46281
COMPOSITES IN COMMERCIAL AIRCRAFT
D. T. LOVELL (Boeing Co., Seattle, WA) IN: The role of the polymeric matrix in the processing and structural properties of composite materials; Proceedings of the Joint U.S.-Italy Symposium on Composite Materials, Capri, Italy, June 15-19, 1981 . New York, Plenum Press, 1983, p. 19-31.

The current and future uses of advanced composites in commercial aircraft are reviewed, with particular reference made to the use of composite structures on the Boeing 767 The advanced composites used on the Boeing 767 include Kevlar, graphite, and hybrid (Kevlar and graphite) structures. Of key significance is the use of graphite composites for primary flight-control structures. These applications have resulted in 20-25 percent weight savings. The major engineering requirements include consistency of properties, environmental durability, interfacial bond integrity, inspectability, and repairability. It is emphasized that the development of an improved resin matrix is the most critical requirement for the successful application of advanced composites to the aircraft primary structure. V.L.

A83-46810* California Inst. of Tech , Pasadena.
OBSERVATION OF DAMAGE GROWTH IN COMPRESSIVELY LOADED LAMINATES
W. G. KNAUSS, C. D BABCOCK (California Institute of Technology, Pasadena, CA), and H. CHAI Experimental Mechanics (ISSN 0014-4851), vol 23, Sept. 1983, p. 329-337. refs
(Contract NSG-1483)

Graphite/epoxy laminates have a definite advantage with respect to the strength-to-weight relation over many standard engineering materials used in aerospace applications. However, this advantage is somewhat reduced by the sensitivity of these laminates to operational hazards, which include a low-velocity impact by foreign objects. Investigations conducted by Chai (1982) and Knauss et al. (1980) have been concerned with the growth of impact damage in compressively loaded laminates, and the visualization of such an impact damage. The present study represents a condensation of parts of these investigations, taking into account a determination of the damage-growth mechanism via real-time recording of the impact event. The material considered, a T300/5208 graphite/epoxy laminate, is typical of the configuration proposed for future heavily loaded primary structures. It has stiffness properties similar to those of the wing skins in existing transport aircraft. G R.

N83-32712# Vereinigte Flugtechnische Werke G m b H., Bremen (West Germany) Metallische Werkstoffe.
STATISTICAL AND VIBRATORY FATIGUE LIMIT CHARACTERISTICS OF ALUMINUM CAST ALLOYS [STATISCHE UND SCHWINGFESTIGKEITSKENNWERTE FUER AL-GUSSLEGIERUNGEN]
H FROMMEYER *In its* Develop. and Demonstration of Econ. Production Systems in Airframe Construct p 32-63 Sep. 1982 In GERMAN
Avail NTIS HC A10/MF A01

Statistical, fracture mechanics, dynamic, and crack propagation characteristics were determined for the high strength aluminum alloy A357 T6 airframe components manufactured with the Precial-cast and sand-cast procedures Statistical tests show that the required values are obtained Tensile test samples were statically loaded till fracture The A357 cast alloys show similar tendencies to the aluminum alloy plate material, but lower fracture toughness Crack propagation tests show that Precial-cast has slightly better characteristics than sand-cast. Author (ESA)

N83-32713# Vereinigte Flugtechnische Werke G m.b.H., Bremen (West Germany). Metallische Werkstoffe.
ADDITIONALLY COMPRESSED TITANIUM FINE CAST COMPONENTS [NACHVERDICHTETE TITAN-FEINGUSSTEILE]
K BLOMEIER *In its* Develop. and Demonstration of Econ Production Systems in Airframe Construct p 64-83 Sep 1982 In GERMAN
Avail. NTIS HC A10/MF A01

The effect of hot isostatic compression (HIP-process) on the vibratory fatigue limit behavior of titanium fine cast components was investigated Ten upper belt fittings (HIP and non-HIP) were fatigue tested and their mechanical-technological properties investigated. Metallographic and X-ray tests show that inner defects are removed by the HIP-process. Static fatigue limit values of hipped components are slightly better than these of HIP-components The vibratory fatigue limit behavior of HIP and non-HIP-components is improved by additional surface treatment The use of titanium casts in aircraft construction is required for fatigue limit and cost reduction reasons. Author (ESA)

N83-32716# Vereinigte Flugtechnische Werke G.m b.H., Bremen (West Germany). Metallische Werkstoffe.
SUPERPLASTIC TRANSFORMATION AND DIFFUSION WELDING OF TITANIUM ALLOYS [SUPERPLASTISCHES UNFORMEN/DIFFUSIONSSCHWEISSEN VON TI-LEGIERUNGEN]
W BECK, K F SAHM, and P. J. WINKLER *In its* Develop. and Demonstration of Econ. Production Systems in Airframe Construct. p 159-188 Sep. 1982 In GERMAN
Avail NTIS HC A10/MF A01

A propeller rib was manufactured as airframe component specimen in order to study construction details, manufacturing parameters and cost data of the Superplastic Forming/Diffusion Ion Bonding (SPFIDB) technology. The inner structure was investigated with X-rays. The use of titanium is justified by the presence of high thermal and mechanical loads. The manufacturing parameters transformation temperature, transformation velocity and pressure-time evolution are optimized. Special tools are developed for the manufacturing. Expansion of electron beam welded from sheets and argon pressure transformation of sheet titanium were applied. Computer aided evaluation optimizes hot-drawing tests for the qualification of the starting material with a view to superelastic transformation characteristics. Author (ESA)

N83-32734# Air Force Systems Command, Wright-Patterson AFB, Ohio. Foreign Technology Div
FUNDAMENTAL INVESTIGATION OF JET ENGINE IGNITION OF FUEL SPRAYS AND ITS APPLICATION
C. NINGKUN (Peking Inst. of Aeronautics and Astronautics) *In its* Acta Aeron et Astronautica Sinica (FTD-ID(RS)T-0664-82) p 134-148 4 Mar 1983 refs Transl. into ENGLISH from Hang Kong Xuebao (China), v. 2, no. 1, 1981 15 p
Avail: NTIS HC A10/MF A01 CSCL 21D

Jet engine ignition of fuel sprays, was investigated It is found that the present store energy in high energy ignition equipment should not be further increased. It is suggested that effective approaches to improve ignition performance are improvement of the quality of fuel sprays, to sustain optimal spark time, to keep the electric pole distance a little more than the quenching distance and to heat the starting fuel E A K

N83-33955*# Sikorsky Aircraft, Stratford, Conn
DESIGN, FABRICATION, INSTALLATION AND FLIGHT SERVICE EVALUATION OF A COMPOSITE CARGO RAMP SKIN ON A MODEL CH-53 HELICOPTER Report, Jun. 1976 - Dec. 1982
D W. LOWRY and M J RICH Apr 1983 34 p refs
(Contract NAS1-14447)
(NASA-CR-172126, NAS 1 26:172126, SER-510111) Avail: NTIS HC A03/MF A01 CSCL 11D

The installation of a composite skin panel on the cargo ramp of a CH-530 marine helicopter is discussed. The composite material is of Kevlar/Epoxy (K/E) which replaces aluminum outer skins on the aft two bays of the ramp. The cargo ramp aft region was selected as being a helicopter airframe surface subjected to possible significant field damage and would permit an evaluation of the long term durability of the composite skin panel. A structural analysis was performed and the skin shears determined Single lap joints of K/E riveted to aluminum were statically tested. The joint tests were used to determine bearing allowables and the required K/E skin gage. The K/E skin panels riveted to aluminum edge members were tested in a shear fixture to confirm the allowable shear and bearing strengths. Impact tests were conducted on aluminum skin panels to determine energy level and damage relationship. The K/E skin panels of various ply orientations and laminate thicknesses were then impacted at similar energy levels. The results of the analysis and tests were used to determine the required K/E skin gages in each of the end two bays of the ramp S.L

N83-33957*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va.
FAILURE ANALYSIS AND MECHANISMS OF FAILURE OF FIBROUS COMPOSITE STRUCTURES
A. K NOOR, comp (George Washington Univ), M. J. SHUART, comp., J. H. STARNES, JR , comp , and J G. WILLIAMS, comp Aug. 1983 382 p refs Workshop held in Hampton, Va., 23-25 Mar. 1982
(NASA-CP-2278; L-15641; NAS 1.55 2278) Avail NTIS HC A17/MF A01 CSCL 11D

The state of the art of failure analysis and current design practices, especially as applied to the use of fibrous composite materials in aircraft structures is discussed. Deficiencies in these technologies are identified, as are directions for future research.

N83-33958*# Boeing Commercial Airplane Co., Seattle, Wash.
COMMERCIAL TRANSPORT AIRCRAFT COMPOSITE STRUCTURES
J. E MCCARTY *In* NASA Langley Research Center Failure Anal. and Mech of Failure of Fibrous Composite Struct. p 7-66 Aug. 1983 refs
Avail: NTIS HC A17/MF A01 CSCL 11D

The role that analysis plays in the development, production, and substantiation of aircraft structures is discussed The types, elements, and applications of failure that are used and needed; the current application of analysis methods to commercial aircraft advanced composite structures, along with a projection of future needs; and some personal thoughts on analysis development goals and the elements of an approach to analysis development are discussed. R.J F.

N83-33959*# General Dynamics Corp., Fort Worth, Tex
A PRELIMINARY DAMAGE TOLERANCE METHODOLOGY FOR COMPOSITE STRUCTURES
D. J WILKINS *In* NASA Langley Research Center Failure Anal. and Mech of Failure of Fibrous Composite Struct p 67-94 Aug. 1983 refs
Avail NTIS HC A17/MF A01 CSCL 11D

The certification experience for the primary, safety-of-flight composite structure applications on the F-16 is discussed. The rationale for the selection of delamination as the major issue for damage tolerance is discussed, as well as the modeling approach selected. The development of the necessary coupon-level data base is briefly summarized. The major emphasis is on the description of a full-scale fatigue test where delamination growth was obtained to demonstrate the validity of the selected approach. A summary is used to review the generic features of the methodology. R.J.F.

N83-33960*# McDonnell Aircraft Co., St. Louis, Mo.
DESIGN AND ANALYSIS OF COMPOSITE STRUCTURES WITH STRESS CONCENTRATIONS
S. P GARBO *In* NASA Langley Research Center Failure Anal and Mech of Failure of Fibrous Composite Struct. p 95-128 Aug. 1983 refs
Avail: NTIS HC A17/MF A01 CSCL 11D

An overview of an analytic procedure which can be used to provide comprehensive stress and strength analysis of composite structures with stress concentrations is given The methodology provides designer/analysts with a user-oriented procedure which, within acceptable engineering accuracy, accounts for the effects of a wide range of application design variables. The procedure permits the strength of arbitrary laminate constructions under general bearing/bypass load conditions to be predicted with only unnotched unidirectional strength and stiffness input data required. Included is a brief discussion of the relevancy of this analysis to the design of primary aircraft structure; an overview of the analytic procedure with theory/test correlations; and an example of the use and interaction of this strength analysis relative to the design of high-load transfer bolted composite joints R.J.F.

N83-33961*# Army Research and Technology Labs., Fort Eustis, Va Applied Technology Lab
SAFE-LIFE AND DAMAGE-TOLERANT DESIGN APPROACHES FOR HELICOPTER STRUCTURES
H K. REDDICK, JR. *In* NASA. Langley Research Center Failure Anal. and Mech. of Failure of Fibrous Composite Struct. p 129-152 Aug. 1983 refs
Avail. NTIS HC A17/MF A01 CSCL 11D

The safe-life and damage-tolerant design approaches discussed apply to both metallic and fibrous composite helicopter structures. The application of these design approaches to fibrous composite structures is emphasized Safe-life and damage-tolerant criteria are applied to all helicopter flight critical components, which are generally categorized as: dynamic components with a main and tail rotor system, which includes blades, hub and rotating controls, and drive train which includes transmission, and main and interconnecting rotor shafts, and the airframe, composed of the fuselage, aerodynamic surfaces, and landing gear. R J F

N83-33962*# Washington Univ , St. Louis, Mo.
FAILURE MECHANISMS
H. T. HAHN *In* NASA Langley Research Center Failure Anal and Mech of Failure of Fibrous Composite Struct. p 153-172 Aug 1983
Avail. NTIS HC A17/MF A01 CSCL 11D

Data, charts, and graphs relating to longitudinal tension, crack growth modes in unidirectional composites, strength predictions, and compression are given R J F

N83-34067# United Technologies Corp., South Windsor, Conn. Power Systems Div.
EVALUATION OF SYNTHETIC-FUEL CHARACTER EFFECTS ON RICH-LEAN STATIONARY GAS-TURBINE COMBUSTION SYSTEMS. VOLUME 2: FULL-SCALE TEST PROGRAM Final Report, May 1983
P. RUSSEL, G. BEAL, J. B. KENNEDY, J. B. MCVEY, and T J. ROSFJORD May 1983 105 p refs Prepared in cooperation with Pratt and Whitney Aircraft Group, West Palm Beach, Fla.
(Contract EPRI PROJ 1898-1)
(DE83-902337; EPRI-AP-2822-VOL-2) Avail. NTIS HC A06/MF A01

The results of the full-scale test effort are described Full-scale hardware evaluations were conducted to investigate the effect of burner geometric scale on emissions and performance produced by rich-lean combustion systems. Evaluations were conducted using a 10-inch diameter burner, and the results were compared with the results obtained in the subscale effort, which used a similar but smaller (5-inch diameter) burner. Scale effects are of concern in staged, rich-lean combustors because of the suspected critical importance of certain design parameters in translating laboratory performance into commercial hardware performance. Author

N83-34068# Falcon Research and Development Co., Englewood, Colo.
CORRELATION OF FLAMMABILITY TEST DATA ON ANTIMISTING FUELS Final Report, Aug. 1980 - 1981
L. MAHOOD and R. L. TALLEY Atlantic City FAA Dec 1982 147 p refs
(Contract DTFA03-80-C-0061)
(AD-A127142; DOT/FAA-CT-81/14; FALCON-TR-364010) Avail: NTIS HC A07/MF A01 CSCL 21D

As a part of a comprehensive FAA program to minimize post-crash fire hazards of jet transport aircraft, a correlation study was conducted on flammability test data of neat Jet A fuel, and the same fuel with various antimisting additives. The data were from full-scale aircraft crash tests, large-scale fuel spillage/ignition tests, and several small-scale flammability tests. Various rheometric tests were also considered. The ability of certain antimisting fuels of eliminate large fireballs during occupant-survivable aircraft crashes was amply supported Large-scale crash simulations were found to be highly developed, and provide essential credibility on a given antimisting fuel near the end of its development. Small-scale flammability test rigs used for screening antimisting fuels were found generally effective, but with some conflicting data between rigs, and with some deviations from large-scale results. GRA

N83-34071# Westinghouse Electric Corp , Golden, Colo Advanced Systems Technology Div
REFORMED ALCOHOL FUELS FOR COMBUSTION TURBINES: TECHNICAL AND ECONOMIC FEASIBILITY ASSESSMENT Final Report
N. H. WOODLEY, D. A. NORDMAN, J. R LEGRO, and D. G. DAVIES Apr. 1982 57 p refs
(Contract DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE82-013921; SERI/TR-11290-1) Avail: NTIS HC A04/MF A01

Likely problems and advantages of burning reformed alcohol fuels in combustion turbines are identified. An analysis of the costs of converting new and existing combustion turbines for alcohol fuels is given as well as an economic comparison of various fuel options. DOE

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ENGINEERING

Includes engineering (general); communications; electronics and electrical engineering; fluid mechanics and heat transfer; instrumentation and photography; lasers and masers; mechanical engineering; quality assurance and reliability; and structural mechanics

A83-43829
A CRITICAL COMMENTARY ON MAGNETIC PARTICLE INSPECTION
D. J. HAGEMAIER (Douglas Aircraft Co , Long Beach, CA) Materials Evaluation (ISSN 0025-5327), vol. 41, Aug 1983, p. 1063-1068.

Inspection procedures that failed to detect cracks in steel parts are assessed. Failure analysis showed that all the cracks were thermally induced by welding, quenching, or the residual stresses arising during a delay between quenching and tempering. It is therefore recommended that parts undergoing these operations be carefully inspected. The magnetic particle inspection requirements were revised in such a way as to dictate that all false indications be explored, that inspection techniques be recorded, and that parts with fusion welds, splines, threads, and/or sharp radii be inspected using the residual magnetic method and low concentration oxide solutions. C R.

A83-43924
OPTIMAL DESIGN OF THE BLADING OF AXIAL TURBINES [OPTIMAL'NOE PROEKTIROVANIE PROTOCHNOI CHASTI OSEVYKH TURBIN]
A. V BOIKO Kharkov, Izdatel'skoe Vishsha Shkola, 1982, 152 p. In Russian. refs

The study seeks to apply the principles of nonlinear programming to the design of turbines. The problem of optimizing the parameters of an axial turbine stage along the radius in such a way as to allow for the three-dimensional flow of the working medium is considered. A method is given for solving the direct axisymmetric problem in the stages of gas and steam turbines. A problem that involves the determination of the optimal geometric and gasdynamic parameters of a stage with the aid of numerical methods of optimization is presented. Attention is then given to the machine design of aerodynamically perfect turbine profiles using various quality criteria. C.R.

A83-43974#
DESIGN OPTIMIZATION CODES FOR STRUCTURES - DOCS COMPUTER PROGRAM
D. T. NGUYEN (Northeastern University, Boston, MA), J. S. ARORA, and A. D. BELEGUNDU (Iowa, University, Iowa City, IA) Journal of Aircraft (ISSN 0021-8669), vol. 20, Sept. 1983, p. 817-824. refs

A finite-element-based computer program called Design Optimization Codes for Structures (DOCS) has been developed. The program can be used to optimize elastic structural systems for a variety of design environments. The main features of level 2.0 of the code are: (1) two- and three-dimensional structural systems can be modeled using rod, beam, constant strain triangular, shear panel, and fiber-reinforced composite finite elements; (2) large structural systems are handled by the use of substructural formulation, (3) damage-tolerant design capability is provided by including in the design process the probable future damage to the structure, (4) specifications of the American Institute of Steel Construction and Aluminum Association of America can be used in the design process, (5) acceleration loads can be specified for the structure; (6) free format input and several other flexibilities have been incorporated into the code. These include design-variable linking, fixed design status for parts of the structure, direct input of substructural stiffness and mass properties, and specification of various constraint combinations such as stress,

deflection, member buckling, natural frequency, and member sizes. This paper describes these features of the DOCS program and presents some structural design applications Author

A83-44046
DESIGN, FABRICATION AND TEST OF A COMPOSITE ELEVATOR
S.-S. WANG, H. CHIN, and Y.-C. WU (Aeronautical Research Laboratory, Taichung, Republic of China) IN Engineering science and mechanics; Proceedings of the International Symposium, Tainan, Republic of China, December 29-31, 1981. Part 2 . San Diego, American Astronautical Society, 1983, p. 1215-1227. refs

The methods and procedures employed in the design, analysis, manufacture, and test of an aircraft wing elevator with honeycomb sandwich construction and graphite-fiberglass/epoxy hybrid laminated composite panels as facing sheets are presented. Attention is focused on a two-layer 120 fiberglass cloth between two layers of graphite laminate. The strength of the laminated composites and the instability of honeycomb sandwich panels were quantified with the generalized Hook's law and the Kirchhoff hypothesis of plates Also, the critical buckling loads and a safety margin were computed for sandwich panels Structural and static load tests were performed with the elevator, along with 327 hours of in-flight service in g-forces up to +6, temperature ranges from -18 C to 40 C, and under 25,000 ft altitude No cracks or delamination failures have been discovered. M.S.K.

A83-44677* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A NONINTRUSIVE LASER INTERFEROMETER METHOD FOR MEASUREMENT OF SKIN FRICTION
D. J. MONSON (NASA, Ames Research Center, Moffett Field, CA) Experiments in Fluids (ISSN 0723-4864), vol. 1, no. 1, 1983, p. 15-22. refs

A method is described for monitoring the changing thickness of a thin oil film subject to an aerodynamic shear stress using two focused laser beams. The measurement is then simply analyzed in terms of the surface skin friction of the flow. The analysis includes the effects of arbitrarily large pressure and skin friction gradients, gravity, and time varying oil temperature. It may also be applied to three dimensional flows with unknown direction Applications are presented for a variety of flows, including two dimensional flows, three dimensional swirling flows, separated flow, supersonic high Reynolds number flows, and delta wing vortical flows. Previously announced in STAR as N83-12393 Author

A83-44828
PULSED HOLOGRAPHIC NONDESTRUCTIVE TESTING ON AIRCRAFT
H FAGOT, P. SMIGIELSKI, F. ALBE (Saint-Louis, Institut Franco-Allemand de Recherches, Saint-Louis, Haut-Rhin, France), and J.-L ARNAUD (SocieteNationale Industrielle Aerospatiale, Laboratoire Central, Suresnes, Hauts-de-Seine, France) IN The Max Born Centenary Conference, Edinburgh, Scotland, September 7-10, 1982, Proceedings . Bellingham, WA, SPIE - The International Society for Optical Engineering, 1983, p 493-496. Research supported by the Direction des Recherches, Etudes et Techniques refs

Techniques for the application of pulsed-laser holography to *the in situ nondestructive testing of aircraft structures are presented.* Double-exposure holographic interferometry is demonstrated using 20-nsec, 100-mJ pulses from two ruby lasers; the test objects are made to vibrate by means of an electromagnetic hammer (which triggers the first laser) to reduce the time interval between exposures to about 10-50 microsec. The arrangement of the equipment and the interpretation of the holograms are discussed and illustrated for a honeycomb panel investigated under laboratory conditions and for wing, landing-gear-trapdoor, and air-brake structures of a Vautour military aircraft examined in a maintenance hangar. It is suggested that the system can be improved by using YAG lasers with a thermoplastic-film camera for instantaneous hologram development. T.K

A83-44872
PROCESS PLANNING AT SIKORSKY
H WALDMAN CAD/CAM Technology, vol. 2, Summer 1983, p 13-17.

The software program is called Computer Managed Process Planning, (CMPP). This system employs computer technology to speed and simplify process planning of cylindrical parts It is aimed at the machining of expensive materials requiring tight tolerances and complex manufacturing processes. Thus far, the program has resulted in a 75 percent reduction in manpower and a 70 percent increase in productivity. The software performs four tasks: (1) it manipulates the manufacturing database, accepting input information from a central CAD system or from an interactive display; (2) it finds the dimensioning reference surfaces, clamping surfaces, and locating surfaces for each machining operation, (3) it analyzes dimensions, tolerances, and stock removals in all cuts for each operation to ensure that blueprint specifications can be achieved; and (4) it prints a summary of operations or a routing sheet C.R.

A83-45322
A STUDY OF THE DAMPING CAPACITY OF RODS IN A CENTRIFUGAL FORCE FIELD [K ISSLEDOVANIIU DEMPFIRUIUSHCHEI SPOSOBNOSTI STERZHNEI V POLE TSENTROBEZHNYKH SIL]
A. IA. ADAMENKO, I. G. TOKAR, A. P ZINKOVSKII, and V. V. MATVEEV (Akademiia Nauk Ukrainskoi SSR, Institut Problem Prochnosti, Kiev, Ukrainian SSR) Problemy Prochnosti (ISSN 0056-171X), Aug 1983, p. 89-93 In Russian. refs

The possibility of using kinematically excited tuning-fork specimens for determining the damping capacity of turbocompressor blade materials under centrifugal force loading is investigated theoretically and experimentally. It is shown analytically that in the case of weak frequency detuning of the subsystems modeling specimen rods, there exist antiphase vibration regimes where the amplitude of one of the subsystems is sufficiently close to that of an isolated subsystem. Experimental results are presented for D16 alloy and 1Kh13 steel. V.L

A83-45591*# Virginia Polytechnic Inst. and State Univ., Blacksburg.
DAMAGE TOLERANT DESIGN USING COLLAPSE TECHNIQUES
R. T HAFTKA (Virginia Polytechnic Institute and State University, Blacksburg, VA) (Structures, Structural Dynamics and Materials Conference, 23rd, New Orleans, LA, May 10-12, 1982, Collection of Technical Papers. Part 2, p. 383-386) AIAA Journal (ISSN 0001-1452), vol. 21, Oct. 1983, p 1462-1466. refs
(Contract NAG1-168)

Previously cited in issue 13, p. 2110, Accession no. A82-30168

A83-45863
ANNUAL AIRLINE PLATING AND METAL FINISHING FORUM, 18TH, ORLANDO, FL, MARCH 16-18, 1982, PROCEEDINGS
Forum sponsored by the Society of Automotive Engineers Warrendale, PA, Society of Automotive Engineers, Inc. (SAE Proceedings P-108), 1982, 65 p.

The papers presented in this volume provide an overview of current developments in aerospace plating and metal finishing. The topics discussed include hydrogen embrittlement measurement using a new palladium probe, nichrome clad chromium carbide powder plasma sprayed coatings, automation of the thermal spray process, and plating on glass for hermetic seal. Papers are also presented on the improved chromium acid anodize seal for optimum paint adhesion, electroless nickel applications in aircraft maintenance, and automatic equipment for spraying aircraft engine parts. V.L.

A83-45864
IMPROVED CHROMATIC ACID ANODIZE SEAL FOR OPTIMUM PAINT ADHESION
Y MOJI (Boeing Commercial Airplane Co., Seattle, WA) IN: Annual Airline Plating and Metal Finishing Forum, 18th, Orlando, FL, March 16-18, 1982, Proceedings . Warrendale, PA, Society of Automotive Engineers, Inc , 1982, p. 1-9. refs
(SAE PAPER 820603)

A new anodize sealing process using a dilute solution of chromic acid and metal chromates in deionized water has been developed. Use of this process to seal chromic acid anodize layers gives films that have excellent paint adhesion while maintaining specification requirements for salt-spray corrosion resistance The extent of hydration is easier to control than with conventional sealing methods and does not require monitoring. Extensive laboratory testing has defined optimum operating parameters Examination of sealed films using scanning/transmission electron microscopy has elucidated the anodize film structures controlling paint adhesion and corrosion resistance. Author

A83-45867
ELECTROLESS NICKEL APPLICATIONS IN AIRCRAFT MAINTENANCE
G REINHARDT (Eastern Air Lines Engineering Laboratories, Miami, FL) IN: Annual Airline Plating and Metal Finishing Forum, 18th, Orlando, FL, March 16-18, 1982, Proceedings . Warrendale, PA, Society of Automotive Engineers, Inc., 1982, p 27-29 refs
(SAE PAPER 820609)

Electroless nickel coatings are characterized by high throwing power resulting in uniform coverage of partially blind areas, close dimensional tolerance control, high hardness controllable by heat treatment, good wear resistance, and good corrosion protection It has been recently reported that maximum strength, hardness, adhesion, and fatigue strength are obtained when the phosphorus content of the coating is in the 12-14 percent range, approaching the optimum stoichiometric Ni3P value of 14.9 percent. Some of the current applications of electroless nickel plating, including electroless nickel-cadmium stators for aircraft engines, other engine parts, and airframe parts, are reviewed, as are some potential new uses V.L.

A83-45868
AUTOMATION OF THE THERMAL SPRAY PROCESS
F. J. HERMANEK (Alloy Metals, Inc , Troy, MI) IN Annual Airline Plating and Metal Finishing Forum, 18th, Orlando, FL, March 16-18, 1982, Proceedings Warrendale, PA, Society of Automotive Engineers, Inc., 1982, p 31-41
(SAE PAPER 820610)

A programmable, automated, computer-based plasma process controller and an attendant robotic manipulation system have been developed for the thermal spray coating operation. The system guarantees consistently repeatable operating parameters combined with monitoring and regulation in a real-time mode In addition to providing coatings of reproducible quality, the system has other benefits, such as remotely controlled operation and the adaptability to apply many material types to any configuration. The system design criteria, the system operation, and the functions of the principal system components are discussed V.L.

A83-45869
GATOR-GARD APPLIED COATINGS EXTEND SERVICE LIVES OF CRITICAL AEROSPACE COMPONENTS
T. F. LEWIS, III (United Technologies Metal Products, Inc , Boynton Beach, FL) IN: Annual Airline Plating and Metal Finishing Forum, 18th, Orlando, FL, March 16-18, 1982, Proceedings . Warrendale, PA, Society of Automotive Engineers, Inc., 1982, p. 43-45
(SAE PAPER 820611)

A new coating process, GATOR-GARD uses a high temperature, high velocity ionized gas to deposit metal or ceramic particles on substrate materials. These uniformly heated particles are deposited at velocities in excess of 4,000 feet per second ensuring a high density, well bonded coating tailored for resistance to wear, erosion, oxidation and sulfidation The unique structure of GATOR-GARD applied coatings provides the exceptional wear resistance necessary to increase aircraft engine component service lives in particularly harsh environments. Author

A83-45871
PLATING ON GLASS FOR HERMETIC SEAL
J E JONES (USAF, Tinker AFB, OK), R. DANIELS, and J KING (Oklahoma, University, Norman, OK) IN: Annual Airline Plating and Metal Finishing Forum, 18th, Orlando, FL, March 16-18, 1982, Proceedings . Warrendale, PA, Society of Automotive Engineers, Inc , 1982, p. 53-55.
(SAE PAPER 820613)

A multicomponent, solderable layer, which can be applied to instrument glass, has been developed. The layer consists of an initial coat of SermeTel followed by an electrodeposited zincate, then electroless nickel and finally tin plated When tested in tension, the interface was found to be more superior in strength than the base material While this procedure produces an optimal coating, great care must be used in all aspects of production to insure quality and integrity of the interfacial bond. Author

A83-45872
SHOT PEENING FOR ADVANCED AEROSPACE DESIGN; PROCEEDINGS OF THE AEROSPACE CONGRESS AND EXPOSITION, ANAHEIM, CA, OCTOBER 25-28, 1982
Congress and Exposition sponsored by the Society of Automotive Engineers. Warrendale, PA, Society of Automotive Engineers, Inc. (SAE Proceedings SP-528), 1982, 35 p. Sponsorship $12.50.

Topics discussed include the mechanics and structures of the shot peening of metals, the control and measurement of shot peening, advanced concepts of the process, and the application of shot peen forming technology to commercial aircraft wing skins. It is noted that with the advent of the more sophisticated metal alloys in the aerospace, aircraft, and machine-tool industries, shot peening has taken on a new dimension as a primary means of mitigating stress and intergranular corrosion Shot peening is the most widely used insurance against these types of erosion Peen forming, in which peening is used (as in the Almen strip) to bend large sections of metal into complex shapes, has removed rivets from modern airfoils, thereby increasing reliability and overall efficiency C.R.

A83-46111
MARINE GRAVITY MEASUREMENT FROM FIXED WING AIRCRAFT
J. M BROZENA and J. D. CLAMONS (U S. Navy, Naval Research Laboratory, Washington, DC) IN: 1982 International Geoscience and Remote Sensing Symposium, Munich, West Germany, June 1-4, 1982, Digest Volume 1 . New York, Institute of Electrical and Electronics Engineers, 1982, 5 p. Research supported by the U.S. Defense Mapping Agency and U S. Navy refs

The Naval Research Laboratory has developed an airborne gravimetry system for marine use. The system utilzes global positioning system navigation and fine resolution radar altimetry to overcome the major problems of Eotvos correction and vertical acceleration correction. Precise measurements of aircraft motions permit system operation in the noisier environment of low altitudes and allow averaging data over fairly short periods resulting in good system response to short wavelength gravity anomalies. Preliminary analysis indicates average errors of four mgals or less on three aircaft profiles over a gravity equipment evaluation range Author

A83-46307
CONSIDERATION ON THE FATIGUE DAMAGE OF SPECIMENS USED FOR COMPOSITE CRITICAL COMPONENTS QUALIFICATION
A BRIVIO, G. PARENTI, G SAMANNI, V. WAGNER, and C. ZANOTTI (Costruzioni Aeronautiche Giovanni Agusta S.p A , Gallarate, Italy) IN: The role of the polymeric matrix in the processing and structural properties of composite materials, Proceedings of the Joint U S.-Italy Symposium on Composite Materials, Capri, Italy, June 15-19, 1981 . New York, Plenum Press, 1983, p. 607-624. Research supported by the Costruzioni Aeronautiche Giovanni Agusta S p.A refs

A series of fatigue tests on full-scale rotor-blade prototype components made from glass fiber/epoxy laminates have been carried out as part of a qualification program The testing procedure is described, and the results are presented in the form of S-N curves The problems encountered in fatigue damage interpretation on the basis of test results are examined. In particular, it is noted that in 0-deg laminates, fatigue damage is completely masked by various degradation processes taking place below the end tabs. It is shown that the on-line monitoring of the specimen deformation in the central region should be useful in identifying the degradation processes occurring outside the end tabs. V.L.

A83-46346#
SELECTING SHOCK AND VIBRATION ISOLATORS
H. LEKUCH and G SILVERMAN (Aeroflex Laboratories, Inc., Plainview, NY) Astronautics and Aeronautics (ISSN 0004-6213), vol 21, Sept. 1983, p. 30-32.

Techniques for selecting a helical cable isolator to prevent vibration and shock in avionics components are outlined. Account must be taken of the forcing frequency and the natural frequency of the isolating system, which should be chosen to avoid resonance interaction with the forcing frequency. The seven selection steps include determination of the static load for each isolator, identification of the lowest forcing frequency, choice of the isolation level, measurement of the static deflection from a frequency/static deflection equation, characterization of the type of loading, and identification of an isolator that exceeds the defined characteristics by a significant margin. A shock isolator operates nonlinearly and is selected on the bases of the load, the equipment resistance to g-forces, and safety margins Methods for estimating the expected shock and mounting the absorbers are discussed. D.H.K

A83-46482
PUBLICATION ON THE OCCASION OF THE 65TH BIRTHDAY OF PROF. DR.-ING. ERICH TRUCKENBRODT; SCIENTIFIC COLLOQUIUM, TECHNISCHE UNIVERSITAET MUENCHEN, MUNICH, WEST GERMANY, FEBRUARY 1, 1982, REPORTS [FESTSCHRIFT ZUM 65. GEBURTSTAG VON PROF. DR.-ING. ERICH TRUCKENBRODT; WISSENSCHAFTLICHES KOLLOQUIUM, TECHNISCHE UNIVERSITAET MUENCHEN, MUNICH, WEST GERMANY, FEBRUARY 1, 1982, VORTRAEGE]
R FRIEDRICH, ED. (Muenchen, Technische Universitaet, Munich, West Germany) and S. WAGNER, ED (Muenchen, Hochschule der Bundeswehr, Neubiberg, West Germany) Colloquium sponsored by the Bayerische Motorenwerke and Messerschmitt Boelkow-Blohm GmbH Munich, Technische Universitaet Muenchen, 1982, 449 p.

Collected contributions on fluid mechanics are presented, with an emphasis on both theoretical-numerical and experimental methods in aerodynamic design evaluation. Such topics as supercritical wings, cryogenic-wind-tunnel design, laser-optical measurements of density and temperature in gas flows, and the calculation of polar curves from aircraft test-flight data are discussed. Papers are included on the air system of modern jet engines, the simulation of atmospheric boundary layers in wind tunnels, the determination of suction-force distribution on supersonic wings, failure analysis of high-energy pressure vessels, a plane free jet in a porous medium, and the numerical computation of three-dimensional time-dependent flows. T.K.

A83-46769
DETECTION OF CRACKS UNDER INSTALLED FASTENERS IN AIRCRAFT STRUCTURES
T. D COOPER and D. M. FORNEY (USAF, Materials Laboratory, Wright-Patterson AFB, OH) Materials Evaluation (ISSN 0025-5327), vol. 41, Sept 1983, p 1178-1185, 1200. refs

The principal reasons for requiring improved capability to inspect for fatigue cracks propagating from fastener holes are reviewed along with the progress that has been made using various NDE methods The reasons why fatigue cracks initiate at fastener holes in aircraft structures in spite of best efforts to design and build long-life structures are addressed, and a number of methods currently in use to detect cracks in assembled and operating aircraft when the fastener is removed and when it is installed are discussed and evaluated The development of various outer layer methods is covered, citing the advantages derived from the new Autoscan Ultrasonic Method The recent development of methods to detect inner layer cracks is reviewed, and the status of progress in this area is noted C.D

A83-47020
EXPERIMENTS ON A FLOW WITH SWEPT SEPARATION AND REATTACHMENT OF A BOUNDARY LAYER
E. P. SUTTON (Cambridge University, Cambridge, England) IN: Three-dimensional turbulent boundary layers; Proceedings of the Symposium, Berlin, West Germany, March 29-April 1, 1982 . Berlin, Springer-Verlag, 1982, p. 138-148.

An experimental study is made of flows with boundary-layer separation from swept salient edges and with subsequent turbulent reattachment. Observations of the types of flow that occur are discussed qualitatively The surface oil-flow on the plate without separation-edge disturbances indicates a gradual spanwise change from a highly three-dimensional separated flow, near the upstream corner of the plate, to a two-dimensional type of separated flow, further out along the span The pressure measurements show that even where the pattern of limiting streamlines had ceased to change appreciably in the spanwise direction, the chordwise pressure distribution had not, even though its shape is generally similar to that for a two-dimensional flow with a separation bubble The question whether the spanwise variations can be explained by the finite aspect ratio of the plate remains to be investigated C.R

A83-47021
THREE-DIMENSIONAL BOUNDARY LAYERS IN TURBOMACHINES
Y. SENOO (Kyushu University, Fukuoka, Japan) IN: Three-dimensional turbulent boundary layers; Proceedings of the Symposium, Berlin, West Germany, March 29-April 1, 1982 . Berlin, Springer-Verlag, 1982, p 149-164. refs

Various kinds of three-dimensional boundary layer are observed in turbomachines. They are induced by relative motion of a rotor and a stator, by lateral pressure gradient based on curvature of streamlines and by revolution of a rotor In many cases, secondary flow in boundary layer increases the friction-loss and induces flow separation, as a result the performance of turbomachine is reduced. In some cases separation of boundary layer is delayed by secondary flow and the performance of turbomachine is improved including widening the range of stable operation Author

N83-32714# Vereinigte Flugtechnische Werke G m.b.H , Bremen (West Germany) Metallisches Werkstoffe
ECONOMIC RIVETING [WIRTSCHAFTLICHES NIETEN]
K. HOFFER and R. MEIER *In its* Develop and Demonstration of Econ. Production Systems in Airframe Construct p 84-126 Sep 1982 In GERMAN
Avail: NTIS HC A10/MF A01

Riveted test rods made of the aluminum cast alloy A357 T6 were tested under single flight load FALSTAFF simulation in order to investigate the influence of the connecting element in the rod, and of the drilling procedure. As compared to riveted AGARD test rods made of the aluminum wrought alloy 3 4364 T7351, the vibratory fatigue limit of the aluminum cast alloy is lower in the

domain between 2 times 10 to the 4th power and 5 times 10 to the 4th power simulated flights From 6 times 10 to the 4th power flights on it is equal or better. The results of different evaluations of fatigue resistant fasteners are found to be similar. Small differences are probably due to differences in geometry and material. Author (ESA)

N83-32715# Vereinigte Flugtechnische Werke G.m.b.H , Bremen (West Germany). Metallische Werkstoffe.
WELDING OF COMPONENTS MADE OF THE ALUMINUM CAST ALLOY A357 [SCHWEISSEN VON BAUTEILEN AUS DER AL-GUSSLEGIERUNG A357]
G. NEYE and A. KOLLEY *In its* Develop and Demonstration of Econ Production Systems in Airframe Construct. p 127-159 Sep. 1982 In GERMAN
Avail: NTIS HC A10/MF A01

The fatigue resistance of welded aluminum cast alloy samples was tested and the welding of airframe components was investigated. Electron beam and tungsten-inert gas welding were used. Static and dynamic fatigue resistance values are presented for samples made of aluminum Precial-cast alloys A357 and Avior A. Optimization tests on welded components show that they can be economically utilized in airframe construction. Author (ESA)

N83-32730# Air Force Systems Command, Wright-Patterson AFB, Ohio Foreign Technology Div.
THE BIPARAMETRIC CYCLE COUNT METHOD AND THE PRINCIPLE OF SIMPLIFICATION
J. ZUGUO *In its* Acta Aeron. et Astronautica Sinica (FTD-ID(RS)T-0664-82) p 38-69 4 Mar. 1983 refs Transl. into ENGLISH from Hang Kong Xuebao (China), v. 2, no. 1, 1981 22 p
Avail: NTIS HC A10/MF A01 CSCL 20K

Working out the load spectrum which plays an important part in determining the fatigue life of the aircraft structure is discussed Selection of the counting method and determination of the principle of simplification are two outstanding problems in drawing up the operational load spectrum of a fighter. This method corresponds to the stress strain delaying loop and gives real expression to fatigue loads sustained on the aircraft; it is a simplification principle of invariable mean value The simplification principle of the variable mean value and a two wave method is proposed. A typical random load mechanism of a fighter for 50 flight hours is presented Two counting methods and four simplification principles for load spectra calculations, and corresponding life estimations were completed. The contrast tests in groups for the six different load spectra were carried out. It is confirmed that the theoretical analysis is useful for working out the load spectrum of the fighter with the counting method and the principle of simplification E.A.K.

N83-33001# Israel Aircraft Industries Ltd , Tel-Aviv Engineering Div.
TWO AND THREE DIMENSIONAL SYSTEMS FOR COMPUTER AIDED GEOMETRIC DESIGN OF AIRCRAFT SURFACE AND COMPONENTS
F. ARYEH Jan. 1982 28 p refs
(PB83-187344; IAITIC-82-1010) Avail: NTIS HC A03/MF A01 CSCL 13C

Three interactive software systems dealing with the computerized definition, storage and handling of aircraft geometric shapes and entities in a multidisciplinary design environment are presented The systems are operated in an interactive fashion via use of low cost graphic display terminals driven by a remote computer in a time sharing mode. GEODEF is a system for interactive definition of complex aircraft surfaces, GEOBASE is a system for interrogation and manipulation of a computerized aircraft geometry data base, and DOG is a 3-D detailed structural and mechanical part definition system. GRA

N83-33014*# San Jose State Univ., Calif Dept of Chemistry.
CHARACTERIZATION AND DEGRADATION STUDIES ON SYNTHETIC POLYMERS FOR AEROSPACE APPLICATION Final Report, 1 Oct. 1981 - 10 Dec. 1982
M. T HSU 10 Dec. 1982 51 p refs
(Contract NCC2-28)
(NASA-CR-172996; NAS 1.26 172996) Avail: NTIS HC A04/MF A01 CSCL 20N

Characterization of FM9, polyisobutylene and their modified fuels is provided. Synthesis alternative AMA candidates was attempted. Some data for alternative AMA is shown. Author

N83-33016# Lincoln Lab., Mass. Inst. of Tech , Lexington.
MODE S BEACON SYSTEM: FUNCTIONAL DESCRIPTION
V. A ORLANDO and P. R. DROUILHET 15 Jul 1983 157 p refs
(Contract F19628-80-C-0002, DOT-FA72WAI-261, FAA PROJ. 052-241-04)
(ATC-42-REV-C; FAA-PM-83-8-REV-C) Avail: NTIS HC A08/MF A01

The Mode S Beacon System, a combined secondary surveillance radar (beacon) and ground-air-ground data link system capable of providing the aircraft surveillance and communications necessary to support ATC automation in traffic environments is described Mode S is capable of common channel interoperation with the ATC beacon system, and may be implemented over an extended transition period Mode S will provide the surveillance and communication performance required by ATC automation, the reliable communications needed to support data link services, and the capability of operating with a terminal or enroute, radar digitizer-equipped, ATC surveillance radar. S.L.

N83-33035# Institute for Perception RVO-TNO, Soesterberg (Netherlands) Afd. Technische Menskunde.
OPERATIONAL LIGHTING AT THE AIR TRAFFIC CONTROL CENTER (MILATCC) AT NEW-MILLIGEN
E ELLENS and H. J. LEEBEEK Oct 1982 22 p In DUTCH; ENGLISH summary
(Contract A73/KLU/096)
(IZF-1982-28; TDCK-77222) Avail: NTIS HC A02/MF A01

An operational lighting system for radar consoles is outlined. It is based on low voltage slit luminaires and is suitable for cases where certain parts of the console have to be specifically lighted without disturbing the radar information. A modified design was investigated, but it is found that the improvements do not justify the costs and that the existing system is adequate, given a few modifications. Author (ESA)

N83-33160 ESDU International Ltd., London (England).
DESIGNING WITH ROLLING BEARINGS. PART 3: SPECIAL TYPES
Jun. 1982 23 p refs Sponsored in part by the Institution of Mechanical Engineers
(ESDU-82014; ISBN-0-85679-389-2; ISSN-0141-2590) Avail ESDU

This Data Item is an addition to the Tribology Subseries. The third of a group of three reports dealing with design considerations in rolling bearing selection is intended to make the designer aware of some of the bearing types not fully covered in Parts 1 and 2. These bearings may allow the designer to meet more exacting requirements or may offer production and assembly advantages. Double row angular contact ball bearings, cylindrical roller bearings with ribs on both rings, multirow cylindrical roller bearings, split roller bearings, needle roller bearings high precision bearings, plummer blocks, bearings with housings take up units, airframe control bearings and rod end bearings are considered. The general characteristics of the bearings and their typical applications are described. Guidance is given where appropriate, on the calculation of equivalent loads and an appendix is included on the axial load carrying ability of cylindrical roller bearing with ribs on both rings. Charts are provided for selecting suitable dimensions of double row angular contact ball, caged needle roller and double row cylindrical roller bearings ESDU

N83-33169# Westinghouse Electric Corp., Golden, Colo. Advanced Systems Technology.
IMPROVED COMBUSTION-TURBINE EFFICIENCY WITH REFORMED-ALCOHOL FUELS
D. G. DAVIES, N H. WOODLEY, R. W. FOSTER-PEGG, and M. E. KARPUK Jan. 1983 7 p refs Presented at the ASME 28th Intern. Gas Turbine Conf., Phoenix, Ariz., 27-31 Mar. 1983 Prepared in cooperation with Midwest Research Inst.
(Contract DE-AC02-77CH-00178; EG-77-C-01-4042)
(DE83-005713; SERI/TP-235-1710; CONF-830309-2) Avail: NTIS HC A02/MF A01

A high efficiency, alcohol-burning combustion turbine system is described. The system's high efficiency is the result of an endothermic catalytic reforming of the alcohol fuel using exhaust gas waste heat. A performance analysis of a catalytic reformer for methanol, methanol/water, and ethanol/water mixtures is presented. System performance predictions for a 501D (100 MW/sub e/) combustion turbine show significant improvements in efficiency and power over distillate fuel and potential reductions in NO/sub x/ emissions. An economic comparison with distillate fuel indicates the time when a reformed alcohol combustion turbine could be feasible. DOE

N83-33173# Curtiss-Wright Corp., Wood-Ridge, N.J Power Systems Div.
HIGH TEMPERATURE TURBINE TECHNOLOGY PROGRAM. PHASE 2: TECHNOLOGY TEST AND SUPPORT STUDIES Technical Progress Report, 1 Oct. - 31 Dec. 1982
Feb. 1983 14 p
(Contract DE-AC01-76ET-10348)
(DE83-008933, CW-WR-76-020 115, FE-2291-115) Avail: NTIS HC A02/MF A01

This report presents the status of work performed on the High Temperature Turbine Technology Program, Phase II Technology Test and Support Studies during the fourth quarter of 1982, October 1 through December 31, 1982. The objective of this effort is to evaluate the level of aerodynamic losses associated with a transpiration air-cooled airfoil and with a solid uncooled airfoil of identical profile. All work was completed in this period This report discusses the calibration of the traversing probe, the completion of the Topical Report and the completion of the extended oxidation testing on mesh alloys. DOE

N83-33182*# Pratt and Whitney Aircraft Group, East Hartford, Conn.
SENSOR FAILURE DETECTION FOR JET ENGINES Final Report
E. C. BEATTIE, R. F. LAPRAD, M. M AKHTER (Systems Control Technology), and S. M. ROCK (Systems Control Technology) May 1983 152 p refs
(Contract NAS3-23282)
(NASA-CR-168190, NAS 1 26:168190; PWA-5891-18) Avail: NTIS HC A08/MF A01 CSCL 14D

Revisions to the advanced sensor failure detection, isolation, and accommodation (DIA) algorithm, developed under the sensor failure detection system program were studied to eliminate the steady state errors due to estimation filter biases. Three algorithm revisions were formulated and one revision for detailed evaluation was chosen. The selected version modifies the DIA algorithm to feedback the actual sensor outputs to the integral portion of the control for the nofailure case. In case of a failure, the estimates of the failed sensor output is fed back to the integral portion. The estimator outputs are fed back to the linear regulator portion of the control all the time. The revised algorithm is evaluated and compared to the baseline algorithm developed previously. E.A.K.

N83-33189 Stanford Univ., Calif
TECHNIQUES IN OPTIMUM STRUCTURAL SYNTHESIS WITH STATIC AND DYNAMIC CONSTRAINTS Ph.D. Thesis
P HAJELA 1982 143 p
Avail: Univ. Microfilms Order No. DA8301220

A general class of nonlinear programming, gradient based numerical procedures for optimal structural design is emphasized A design variable linking strategy is presented that adaptively reduces a large dimension optimal synthesis problem to a sequence of one dimensional searches. This controlled growth approach is based on a constraint proposition that allows the user to represent a very large number of inequality constraints by a single cumulative measure The cumulative constraint formulation is also extended to a multilevel design approach for sizing redundant truss structures for strength and buckling constraints. This approach incorporates a hybrid search involving a nonlinear programming algorithm at the system level and a state space type optimal solution at the component level. The methodology developed is applied to a class of flutter constrained design problems The cumulative constraint formulation affords a single constraint on the design to exclude flutter from the flight regime In this approach, analytical gradients of the generalized flutter constraint can be computed in an elegant manner. Dissert Abstr

N83-33190 ESDU International Ltd , London (England).
ELASTIC STRESSES IN THE ADHESIVE IN SINGLE STEP DOUBLE LAP BONDED JOINTS
Aug. 1980 10 p refs Sponsored by the Royal Aeronautical Society
(ESDU-80011, ISBN-0-85679-294-2, ISSN-0141-4097) Avail: ESDU

This Data Item is an addition to the Structure Subseries. Curves are presented which enable the peak elastic stresses to be determined in the adhesives in single step, double lap bonded joints loaded in tension or compression The data cover a wide, practical range of joint sizes and adhesive and adherend materials properties in non-dimensional form. Typically they may be applied to thin bonded joints in aircraft wing, fuselage and furnishing components. B.W

N83-33194 ESDU International Ltd., London (England).
BUCKLING OF OUTSTANDING FLANGES DIRECT STRESSES VARYING LINEARLY OR PARABOLICALLY
Nov. 1980 7 p Sponsored in part by the Royal Aeronautical Society and the Institution of Structural Engineers
(ESDU-80035; ISBN-0-85679-318-3, ISSN-0144-2805; ISSN-0141-4097) Avail: ESDU

This Data Item is an addition to the Engineering Structures and to the Structures Subseries Data on the buckling of outstanding flanges subjected to stresses which vary linearly or parabolically across their width are given. The buckling stresses are given for long thin rectangular plates in which one of the long edges is elastically restrained against rotation and the other is free and in which both ends perpendicular to the loading are simple supported The data presented are strictly only applicable to cases where the stress and its distribution across the section remain constant along the length of the outstanding flange and are therefore not applicable to external loading distributions which diffuse rapidly into the outstanding flanges. ESDU

N83-33201 ESDU International Ltd., London (England).
LATTICE STRUCTURES. PART 1: MEAN FLUID FORCES ON SINGLE AND MULTIPLE PLANE FRAMES
Oct. 1981 45 p refs Supersedes ESDU-75011
(ESDU-81027-PT-1-AMEND-A; ESDU-75011, ISBN-0-85679-361-2, ISSN-0141-4003) Avail: ESDU

This data item is an addition to the Wind Engineering Subseries. Data giving the mean force coefficients for plane lattice frames of conventional geometry are provided. The data are applicable to the calculation of wind loading (or other fluid loading) on lattice support structures for cable and pipe runs and sign gantries and on multiple frame structures in unclad building frames, roof structures and simple bridges. The data apply for frames of flat faced or tubular members (smooth or rough surfaces) and allow for the effect of ancillaries such as gusset plates, ladders, cables, and meshes The effects of yaw and incidence of the flow can be accounted for as can the effects of shielding in multiple lattice frames. Data for solidity ratios from 0 to 1 are given and for tubular members the effect of Reynolds number is quantified Guidance is also provided for tapered frames and frames of mixed

number sections in both uniform and shear flow. Data for tower like lattice structures are provided in ESDU 81028. ESDU

N83-33202 ESDU International Ltd., London (England)
LATTICE STRUCTURES. PART 2: MEAN FLUID FORCES ON TOWER-LIKE SPACE FRAMES
Nov. 1981 49 p refs Supersedes ESDU-75011
(ESDU-81028-PT-2-AMEND-A; ESDU-75011; ISBN-0-85679-379-5; ISSN-0141-4003) Avail: ESDU

This Data Item is an addition to the Wind Engineering Sub-series. Data for estimating the mean wind (or other fluid) forces and moments on spatial lattice structures such as towers are provided for application in the design of tower-like lattice structures such as communication towers, pylons, and masts. The data are also applicable to other types of spatial frames such as crane jibs, gantries and lattice booms but only when normal to the flow Comprehensive data are provided for space frames of triangular, square or rectangular arrangements of the mean chord (leg) members for flow incidence from 0 deg to 360 deg For tubular members, means of accounting for Reynolds numbers and surface roughness affects are included The effect of adding ancillaries to the space frame are accounted for separately.
ESDU

N83-33209 ESDU International Ltd., London (England).
STRONG WINDS IN THE ATMOSPHERE BOUNDARY LAYER. PART 1: MEAN HOURLY WIND SPEEDS
Sep 1982 51 p refs Supersedes ESDU-72026
(ESDU-82026-AMEND-A, ESDU-72026; ISBN-0-85679-407-4, ISSN-0141-4003) Avail ESDU

This Data Item is an addition to the Wind Engineering Subseries. Methods for estmating the variation of strong mean hourly wind speeds in the atmospheric boundary layer are presented. The data are particularly applicable in calculations of wind loads on buildings and structures. The range includes heights between gound level and the edge of the Earth's boundary layer (500-3000 m) over various types of terrain including those where step changes in surface roughness occur upwind of the site The methods described, start with a known reference wind speed applicable for a specified terrain and height such as taken from a map of extreme wind speeds. Factors are then given by which this value must be multiplied to account for the terrain roughness for changes in terrain upwind of the site and for different heights above the ground Statistical factors are given to account for return periods and risks of exceedance other than applicable to the reference wind speed. Topographical effects, such as those produced by embankments, escarpments and nearby hills are noted for the U.K a new map of the once in 50 year mean hourly wind speed is provided together with factors giving the equivalent directional extremes in 30 deg sectors based on new work from the building research establishment. Sources are provided of extreme wind speed data in other countries. ESDU

N83-33214 Royal Aircraft Establishment, Farnborough (England) Materials/Structures Dept.
THE ROLE OF A FATIGUE DAMAGE ACCUMULATION PLOT IN STRUCTURAL LOADS DATA ANALYSIS
D. M HOLFORD 23 Dec. 1982 23 p refs
(RAE-TR-82125; RAE-MAT/STRUCT-24; BR87777) Avail: Issuing Activity

The concept of displaying the accumulation of fatigue damage against time into flight is described. Ground mode presentation is suitable for use in ground analysis of load time histories, the snapshot mode can be used in real time. Examples from operational aircraft loads data demonstrate the usefulness of the display. The damage accumulation plot permits a ready identification of flight conditions/flight activities which provoke substantial fatigue damage. It can be used to identify the structurally relevant flight data and so reduce the quantity of data that needs to be analyzed in an operational loads measurement program. It is particularly important in advanced fatigue load monitoring systems, fleet management from a fatigue standpoint, and in the specification of fatigue test loading sequences. Author (ESA)

N83-33233# National Aerospace Lab , Amsterdam (Netherlands) Structures and Materials Div.
LIFETIME PREDICTION METHODS FOR CORNER CRACKS AT HOLES
C. J. LOF 11 Jan. 1983 11 p refs Presented at AGARD Conf. on Behavior of Short Cracks in Airframe Components, Toronto, 20-21 Sep. 1982
(NLR-MP-82042-U) Avail NTIS HC A02/MF A01

An application of linear elastic fracture mechanics to three dimensional crack growth prediction was developed. Corner flaw growth during constant amplitude fatigue testing was studied. A lifetime prediction algorithm based on investigated crack behavior as a function of calculated instantaneous stress intensity distribution along the crack boundary was developed. Comparison of results with data from experiments and from the literature shows very acceptable agreement. Author (ESA)

N83-33234# Technische Hogeschool, Delft (Netherlands) Dept. of Aerospace Engineering
FATIGUE CRACK GROWTH OF CORNER CRACKS IN LUG SPECIMENS
S. FRIEDRICH and J. SCHIJVE Jan. 1983 29 p refs
(VTH-LR-375) Avail: NTIS HC A03/MF A01

Constant amplitude tests and simplified flight simulation tests with one peak load per flight were carried out on 7075-T6 lug specimens. Corner cracks at the pin loaded hole were initiated by a small starter notch Applications of marker loads indicated successive locations of the crack front on the fracture surfaces. These indications gave information about crack shape development and crack growth rates along the crack front. The latter data were used to determine empirical stress intensity factors, which were compared to calculated data. Damage calculations gave indications on crack growth retardation of corner cracks
Author (ESA)

N83-34095# Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine (France)
BEHAVIOUR OF SHORT CRACKS IN AIRFRAME COMPONENTS
Loughton, England Apr. 1983 203 p refs Meeting held in Toronto, 19-24 Sep. 1982
(AGARD-CP-328, ISBN-92-835-1444-0) Avail NTIS HC A10/MF A01

The accuracy and applicability of methods based on linear elastic fracture mechanics currently available for predicting short crack behavior are discussed Emphasis is on the behavior of short cracks in airframe components. R.J.F.

N83-34096# California Univ , Berkeley Lawrence Berkeley Lab Materials and Molecular Research Div
MECHANICS AND PHYSICS OF THE GROWTH OF SMALL CRACKS
R. O RITCHIE and S. SURESH *In* AGARD Behaviour of Short Cracks in Airframe Components 14 p Apr 1983 refs
(Contract AF-AFOSR-0181-82)
Avail NTIS HC A10/MF A01

The mechanics and physics of the subcritical propagation of small fatigue cracks are reviewed in terms of reported differences in behavior between long and short flaws based on fracture mechanics, microstructural and environmental viewpoints. Cracks are considered short when their length is small compared to relevant microstructural dimensions (a continuum mechanics limitation), when their length is small compared to the scale of local plasticity (a linear elastic fracture mechanics limitation), and when they are merely physically small (e.g , 0 5-1 mm). For all three cases, it is shown that, at the same nominal driving force, the growth rates of the short flaws are likely to be greater than (or at least equal to) the corresponding growth rates of long flaws; a situation which can lead to nonconservative defect tolerant lifetime predictions where existing (long crack) data are utilized. Reasons for this problem of similitude between long and short flaw behavior are discussed in terms of the roles of crack driving force, local plasticity, microstructure, crack shape, crack extension

mechanism, premature closure of the crack, and local crack tip environment. Author

N83-34101# Vereinigte Flugtechnische Werke-Fokker G.m b.H., Bremen (West Germany).
DAMAGE TOLERANCE EVALUATION OF STRUCTURES WITH SMALL CRACKS
L. SCHWARMANN *In* AGARD Behaviour of Short Cracks in Airframe Components 6 p Apr 1983 refs
Avail: NTIS HC A10/MF A01

Two different methods for damage tolerance evaluation of airframe structures with small cracks are investigated. These methods are: by through the thickness cracks emanating from a circular hole and by semielliptical surface cracks. Both methods give sufficient results as far as the comparison with corresponding test results is concerned. Therefore both methods are recommended for practical applications in aircraft design concerning damage tolerance evaluation. A cracked pin loaded hole is the most critical crack configuration, especially for small cracks, as compared with other cases Therefore the degree of pin load, i.e., the load transfer by a bolt or by a rivet, has to be determined very thoroughly in order to avoid overestimations of the damage tolerance performance of the airframe structure. Analyses based on through cracked configurations are pessimistic as compared with surface cracked configurations and should therefore be the first (safe) step of damage tolerance evaluation procedure R J F

N83-34104# Air Force Wright Aeronautical Labs., Wright-Patterson AFB, Ohio.
PROBABILISTIC FRACTURE MECHANICS ANALYSIS METHODS FOR STRUCTURAL DURABILITY
J. L. RUDD, J. N YANG (George Washington Univ., Washington, D.C.), S K. MANNING (General Dynamics Corp., Forth Worth, Tex.), and B. G W YEE (General Dynamics Corp., Forth Worth, Tex.) *In* AGARD Behaviour of Short Cracks in Airframe Components 23 p Apr 1983 refs
(Contract F33615-77-C-3123)
Avail: NTIS HC A10/MF A01

The United States Air Force requires that Air Force aircraft be designed to be durable This requirement necessitates an analytical demonstration that excessive cracking within the airframe will not occur during the aircraft's design service life. In order to predict the time at which excessive cracking occurs, an analysis is needed which is capable of predicting the distribution of crack sizes within the airframe at any point in time. Such an analysis was recently developed and is presented in this paper. The durability analysis is based on a fracture mechanics philosophy, combining a probabilistic format with a deterministic crack growth rate relationship. Essential elements of the methodology are presented, with emphasis on the statistical representation of the initial fatigue quality of the structure. The accuracy of the durability analysis is demonstrated by correlation analytical predictions with experimental results of a fighter full-scale test article as well as complex-splice specimens subjected to a bomber load spectrum. Author

N83-34108# Douglas Aircraft Co., Inc., Long Beach, Calif.
A STUDY OF SMALL CRACK GROWTH UNDER TRANSPORT SPECTRUM LOADING
D. Y. WANG *In* AGARD Behaviour of Short Cracks in Airframe Components 15 p Apr. 1983 refs
Avail NTIS HC A10/MF A01

This paper describes a study of microcrack growth and statistical fatigue in terms of the initial quality of fastener holes in aluminum alloy. A special test procedure was used to obtain a statisticaly large sample of data under spectrum loading by testing a specimen containing 24 holes with maximum of 48 fatigue data sets. A total of seven specimens was tested Small crack measurements were taken by fractography and surface observation. Marker cycles, which were designed to be part of the spectrum, served the intended purpose of identifying crack origin and microcrack growth rates using a scanning electron microscope. The phenomena of small crack growth have been analyzed from the extensive data. The essential physical defects in 2024-T3 and 7075-T6 aluminum alloys as origins of microfatigue cracking are the inclusions and tool marks. Author

N83-34109# Industrieanlagen-Betriebsgesellschaft m b.H., Ottobrunn (West Germany).
SMALL CRACKS IN LARGE FORGINGS
W. SCHUETZ *In* AGARD Behaviour of Short Cracks in Airframe Components 17 p Apr 1983 refs
Avail NTIS HC A10/MF A01

The feasibility of producing large steel forgings for steam turbine rotors without flaws is discussed The behavior of flaws under typical service stress was analyzed. The propagation of flaws was studied. The accuracy of the size of flaws in the interior of large forgings indicated by ultrasonics was also studied. B.W

N83-34148# Rome Air Development Center, Griffiss AFB, N.Y
THE ROLE AND NATURE OF ADAPTIVE ANTENNAS IN ECCM
J. A. GRANIERO *In its* Proc. of the RADC Microwave Magnetics Technol. Workshop p 56-72 Jan. 1983 refs
(AD-P000923) Avail NTIS HC A16/MF A01 CSCL 20N

Background information on the need for adaptive antennas is given An introduction to the general theory of adaptive antennas is given. Their ability to reject interference through adaptive special filtering, i.e., automatically forming antenna pattern nulls in the direction of sources of interference, thereby reducing output noise and enhancing the detection of desired signals, is emphasized R.J.F

N83-34180# Rome Air Development Center, Griffiss AFB, N Y
GENERAL REVIEW OF MILITARY APPLICATIONS OF VOICE PROCESSING
B. BEEK and R S VONUSA *In* AGARD Speech Process. 20 p May 1983 refs
Avail: NTIS HC A06/MF A01

Voice Interactive Systems and their role in military applications are introduced. The history and evolution of automatic speech recognition and synthesis is briefly explored and the current state of the art is reviewed The term Voice Interactive Systems is defined and the advantages and disadvantages of Voice Interactive Systems are highlighted Previous applications of speech systems to military problems are summarized, the major application areas are described and current development projects in the U.S. and other NATO countries are presented Special attention is focused on the cockpit application. Several projects in this area are discussed along with a summary of important issues to consider when applying Voice Interactive Systems to the aircraft environment Author

N83-34185# Joint Speech Research Unit, Ruislip (England).
A SURVEY OF EQUIPMENT AND RESEARCH
J S. BRIDLE *In* AGARD Speech Process. 7 p May 1983 refs
Avail. NTIS HC A06/MF A01

Terms for description of speech recognition systems are defined A selection of real time, commercially available speech recognition equipment is described, concentrating on the high performance end of the market. Likely developments are indicated. A single approach to automatic speech recognition - that using whole-word templates was discussed. Current attempts to extend the capabilities of this approach, and also look at alternative approaches which are the subject of research in laboratories around the world are explained. Author

N83-34186# Crouzet Aerospace and Systems, Valence (France).
AUTOMATIC RECOGNITION OF SPEECH IN MILITARY AIRCRAFT [RECONNAISSANCE AUTOMATIQUE DE LA PAROLE DANS LES AVIONS D'ARMES]
J. R. COSTET *In* AGARD Speech Process. 11 p May 1983 *In* FRENCH
Avail: NTIS HC A06/MF A01

The application of word recognition techniques to vocal command control in military aircraft is discussed. The problems associated with cabin/oxygen mask noise and pilot respiration, and the effects of acceleration on word recognition are addressed. M G

N83-34192*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A MATHEMATICAL MODEL FOR THE DOUBLY FED WOUND ROTOR GENERATOR
F. J. BRADY 1983 8 p refs Presented at the Power Eng. Soc. Conf, Los Angeles, 17-22 Jul. 1983; sponsored by IEEE
(Contract DE-AI01-76ET-20320)
(NASA-TM-83454, E-1008-1; DOE/NASA/20320-48; NAS 1.15:83454) Avail: NTIS HC A02/MF A01 CSCL 09C

A mathematical analysis of a doubly-fed wound rotor machine used as a constant frequency generator is presented. The purpose of this analysis is to derive a consistent set of circuit equations which produce constant stator frequency and constant stator voltage. Starting with instantaneous circuit equations, the necessary rotor voltages and currents are derived The model, thus obtained, is assumed to be valid, since the resulting relationships between mechanical power and active volt-amperes agrees with the results of others. In addition, the model allows for a new interpretation of the power flow in the doubly-fed generator. M.G.

N83-34223 National Maritime Inst., Feltham (England).
AN INVESTIGATION OF FLOW IMPROVEMENT DEVICES FOR REDUCING PROPELLER EXCITED VIBRATION
G. E. GADD May 1983 29 p refs Sponsored by UK Mechanical and Electrical Engineering Requirements Board
(NMI-R-157) Avail: Issuing Activity

The effectiveness of triangular vortex generators and cambered rectangular planform flow deflectors for improving a poor wake flow to cure propeller excited vibration, and the relative power penalties involved were compared The wakes were investigated in a wind tunnel where a foreshortened double model was used so that the flow corrective devices were more correctly scaled relative to the local boundary layer thickness than on an undistorted model. Propulsion experiments on a similarly distorted floating model were made in a towing tank Results suggest that the different devices suffer comparable power penalties for comparable degrees of wake improvement, but reveal differences in their mode of operation. Author (ESA)

N83-34226*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RADIANT HEATING TESTS OF SEVERAL LIQUID METAL HEAT-PIPE SANDWICH PANELS
C. J. CAMARDA and A BASIULIS (Hughes Aircraft Co., Torrance, Calif.) Aug. 1983 9 p refs Presented at the AIAA 21st Aerospace Sci. Meeting, Reno, Nev., 10-13 Jan. 1983
(NASA-TM-85669; NAS 1.15:85669; AIAA-83-0319) Avail: NTIS HC A02/MF A01 CSCL 20D

Integral heat pipe sandwich panels, which synergistically combine the thermal efficiency of heat pipes and the structural efficiency of honeycomb sandwich construction, were conceived as a means of alleviating thermal stress problems in the Langley Scramjet Engine. Test panels which utilized two different wickable honeycomb cores, facesheets with screen mesh sintered to the internal surfaces, and a liquid metal working fluid (either sodium or potassium) were tested by radiant heating at various heat load levels. The heat pipe panels reduced maximum temperature differences by 31 percent with sodium working fluid and 45 percent with potassium working fluid. Results indicate that a heat pipe sandwich panel is a potential, simple solution to the engine thermal stress problem. Other interesting applications of the concept include· cold plates for electronic component and circuit card cooling, radiators for large space platforms, low distortion large area structures (e g., space antennas) and laser mirrors. Author

N83-34241# *Naval Postgraduate School, Monterey, Calif. Dept.* of Mechanical Engineering.
CHARACTERISTICS OF A FLUTED NOZZLE GAS EDUCTOR SYSTEM M.S. Thesis
J. W BOYKIN Mar 1983 227 p refs
(AD-A128065) Avail: NTIS HC A11/MF A01 CSCL 21B

Cold flow tests were conducted on a four nozzle and a one nozzle gas eductor system The nozzles employed were fluted with a constant cross sectional area The four nozzle tests used a mixing stack length-to-diameter ratio, (L/D), of 1.5, the single nozzle tests used L/D ratios of 2.0, 1.75 and 1.5. The total cross sectional area of the four fluted nozzles to the cross sectional area of the mixing stack was 2.5; for the single fluted nozzle, 2.42 Secondary pumping coefficients, mixing stack pressure distributions and exit velocity profiles were determined The pumping performance of the four fluted nozzle system was found to be comparable to a straight nozzle system, showing no specific advantages The single fluted nozzle system pumping performance showed a slight improvement with increased L/D. The system performance was comparable to the four straight nozzle system at the same L/D The peak exit velocities of the single fluted nozzle system were higher than those for the four straight and four fluted nozzle systems Author (GRA)

N83-34278*# National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A HOLOGRAPHIC INTERFEROMETRY TECHNIQUE FOR MEASURING TRANSONIC FLOW NEAR A ROTOR BLADE
J. K. KITTLESON Aug. 1983 24 p refs
(NASA-TM-84405; A-9432, NAS 1.15:84405; USAAVRADCOM-TR-83-A-10) Avail NTIS HC A02/MF A01 CSCL 14E

A technique that uses holographic interferometry to record the first interferograms of the flow near a hovering transonic rotor blade is presented. A pulsed ruby laser is used to record interferograms of a 2 ft diam field of view near a rotor tip operating at a tip Mach number of 0.90. Several interferograms, recorded along planes perpendicular to the rotor's tip path plane at various azimuth angles around the flow, are presented These interferograms yield quantitative information about shock structure and location, flow separation, and radiated noise that will help helicopter researchers understand the complexities of the flow around high speed rotor blades and thus improve performance and reduce noise E.A.K.

N83-34304* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
SIDELOOKING LASER ALTIMETER FOR A FLIGHT SIMULATOR Patent
L. D WEBSTER, inventor (to NASA) 5 Jul. 1983 17 p Filed 13 Feb. 1981 Supersedes N81-19439 (19 - 10, p 1351)
(NASA-CASE-ARC-11312-1; US-PATENT-4,391,514; US-PATENT-APPL-SN-234224; US-PATENT-CLASS-356-1; US-PATENT-CLASS-356-4; US-PATENT-CLASS-358-104, US-PATENT-CLASS-358-109, US-PATENT-CLASS-434-4; US-PATENT-CLASS-434-38) Avail: US Patent and Trademark Office CSCL 20E

An improved laser altimeter for a flight simulator which allows measurement of the height of the simulator probe above the terrain directly below the probe tip is described A laser beam is directed from the probe at an angle theta to the horizontal to produce a beam spot on the terrain. The angle theta that the laser beam makes with the horizontal is varied so as to bring the beam spot into coincidence with a plumb line coaxial with the longitudinal axis of the probe. A television altimeter camera observes the beam spot and has a raster line aligned with the plumb line. Spot detector circuit coupled to the output of the TV camera monitors the position

of the beam spot relative to the plumb line
Official Gazette of the U.S. Patent and Trademark Office

N83-34313# Armament Systems, Inc., Anaheim, Calif.
ASSESSMENT OF SURVIVABILITY AGAINST LASER THREATS: THE ASALT-I COMPUTER PROGRAM Final Report
F J. STEENROD and J. E. MUSCH Sep. 1981 175 p
(Contract N00123-80-D-0033)
(AD-A128472; JTCG/AS-81-S-004) Avail: NTIS HC A08/MF A01 CSCL 20E

ASALT-I is a FORTRAN computer program used to evaluate the effectiveness of a high-energy laser weapon against an aircraft flying a path previously evaluated for various encounter conditions. The laser weapon system is described by a flux emission function, aiming errors caused by jitter, and slewing limits of the tracking mechanism. The target aircraft is characterized by a set of components which are combined using a fault tree structure. The program output includes a summary for the whole mission which presents probabilities of kill for the total aircraft, its subgroups, and components. This manual contains descriptions for the mathematical concepts, the input requirements, and the output for the ASALT-I program. Author (GRA)

N83-34356*# General Electric Co., Cincinnati, Ohio
MULTIAXIAL CYCLIC THERMOPLASTICITY ANALYSIS WITH BESSELING'S SUBVOLUME METHOD
R. L MCKNIGHT *In* NASA. Lewis Research Center Nonlinear Constitutive Relations for High Temp. Appl p 69-88 Mar 1983 refs
Avail NTIS HC A16/MF A01

A modification was formulated to Besseling's Subvolume Method to allow it to use multilinear stress-strain curves which are temperature dependent to perform cyclic thermoplasticity analyses. This method automotically reproduces certain aspects of real material behavior important in the analysis of Aircraft Gas Turbine Engine (AGTE) components These include the Bauschinger effect, cross-hardening, and memory This constitutive equation was implemented in a finite element computer program called CYANIDE. Subsequently, classical time dependent plasticity (creep) was added to the program. Since its inception, this program was assessed against laboratory and component testing and engine experience. The ability of this program to simulate AGTE material response characteristics was verified by this experience and its utility in providing data for life analyses was demonstrated. In this area of life analysis, the multiaxial thermoplasticity capabilities of the method have proved a match for the actual AGTE life experience. Author

N83-34357*# National Aeronautics and Space Administration Lewis Research Center, Cleveland, Ohio.
EVALUATION OF INELASTIC CONSTITUTIVE MODELS FOR NONLINEAR STRUCTURAL ANALYSIS
A KAUFMAN *In its* Nonlinear Constitutive Relations for High Temp. Appl. p 89-106 Mar. 1983 refs
Avail: NTIS HC A16/MF A01 CSCL 20K

The influence of inelastic material models on computed stress-strain states, and therefore predicted lives, was studied for thermomechanically loaded structures Nonlinear structural analyses were performed on a fatigue specimen which was subjected to thermal cycling in fluidized beds and on a mechanically load cycled benchmark notch specimen. Four incremental plasticity creep models (isotropic, kinematic, combined isotropic-kinematic, combined plus transient creep) were exercised. Of the plasticity models, kinematic hardening gave results most consistent with experimental observations. Life predictions using the computed strain histories at the critical location with a Strainrange Partitioning approach considerably overpredicted the crack initiation life of the thermal fatigue specimen Author

N83-34372*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
SIMPLIFIED METHOD FOR NONLINEAR STRUCTURAL ANALYSIS
A KAUFMAN Sep. 1983 15 p refs
(NASA-TP-2208; E-1646; NAS 1.60 2208) Avail NTIS HC A02/MF A01 CSCL 20K

A simplified inelastic analysis computer program was developed for predicting the stress-strain history of a thermomechanically cycled structure from an elastic solution The program uses an iterative and incremental procedure to estimate the plastic strains from the material stress-strain properties and a simulated plasticity hardening model. The simplified method was exercised on a number of problems involving uniaxial and multiaxial loading, isothermal and nonisothermal conditions, and different materials and plasticity models Good agreement was found between these analytical results and nonlinear finite element solutions for these problems The simplified analysis program used less than 1 percent of the CPU time required for a nonlinear finite element analysis. Author

N83-34387# Fraunhofer-Inst. fuer Betriebsfestigkeit, Darmstadt (West Germany).
REVIEW OF INVESTIGATIONS OF AERONAUTICAL FATIGUE INTHE FEDERAL REPUBLIC OF GERMANY Review Period, May 1981 - April 1983
O BUXBAUM and D. SCHUETZ 1983 252 p refs Presented at 18th Intern. Comm on Aeron Fatigue (ICAF), Toulouse, 1983
(LBF-S-166; ISSN-0721-5320) Avail. NTIS HC A12/MF A01; Fachinformationszentrum, Karlsruhe, West Germany DM 150

Measurement and analysis of operational loads, mathematical modeling of dynamically loaded stuctures; fatigue behavior of joints and of notched and unnotched materials; fatigue life prediction and low cycle fatigue, and crack propagation, fracture mechanics and residual static strength are reviewed Fatigue of fiber reinforced plastics, strength degradation of composites due to environmental influences; and full scale tests, testing procedures, and test evaluation are discussed. Author (ESA)

N83-34836# Stuttgart Univ (West Germany). Sonderforschungsbereich 85
TRANSONIC AND SUBSONIC COMPRESSORS [TRANSCHALL- UND UEBERSCHALLVERDICHTER]
H. H FRUEHAUF *In its* Thermodyn. and Flow Mech Problems in Aircraft and Spacecraft Devices: Summary of Work and Results for 1980, 81, 82 p 394-483 1982 refs In GERMAN
Avail NTIS HC A99/MF A01

A three-dimensional numerical method was developed to compute the flow through turbomachine blade cascades in order to increase the efficiency of turbine components and to reduce the power comsumption. The turbulent transonic cascade flow is calculated in the case of strong interaction between main flow and boundary layer flow, resulting in an efficient and precise solution of the thin layer Navier-Stokes equations. Time-dependent Euler equations are obtained for subsonic and transonic flow through blade cascade subject to strong rotation. The frictionless aerodynamic quasi-two-dimensional interaction between two fixed cascades is accurately computed. A three dimensional computation of absolutely rotation-free subsonic and transonic flow through cascade is made. Author (ESA)

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GEOSCIENCES

Includes geosciences (general), earth resources; energy production and conversion; environment pollution, geophysics; meteorology and climatology; and oceanography.

A83-45326
THE DIAGNOSIS AND EVALUATION OF TURBULENCE WHICH INFLUENCES THE FLIGHT OF AIRCRAFT, ACCORDING TO RAWINSONDE NETWORK OBSERVATION DATA [DIAGNOZ I OTSENKA TURBULENTNOSTI, VLIIAIUSHCHEI NA POLET SAMOLETOV, PO DANNYM SETEVYKH RADIOVETROVYKH NABLIUDENII]
N. Z. PINUS (Tsentral'naia Aerologicheskaia Observatoriia, Leningrad, USSR) Meteorologiia i Gidrologiia (ISSN 0130-2906), Aug 1983, p. 5-9 In Russian. refs

Theoretical and experimental research on the diagnosis and evaluation of clear air turbulence which causes rough flights for passenger aircraft are examined. It is shown that the intensity of this turbulence can be diagnosed and evaluated by the magnitude of the vertical vector shifts of the wind and the horizontal pulsations of the wind speed in the atmospheric layer on the basis of rawinsonde network data. N.B

A83-45420#
LIDAR REMOTE-SENSING - FLUORESCENCE AND DIFFERENTIAL REFLECTANCE EXPERIMENTS
P. BURLAMACCHI, G. CECCHI, P MAZZINGHI (CNR, Istituto di Elettronica Quantistica, Florence, Italy), L. PANTANI, and I PIPPI (CNR, Istituto per la Ricerca sulle Onde Elettromagnetiche, Florence, Italy) Alta Frequenza (ISSN 0002-6557), vol. 52, May-June 1983, p. 233-235. refs

Experiments were carried out on lidar applications to the remote sensing of land and sea A laboratory experiment was done on lidar fluorosensing of oil films on sea water Four different wavelengths were tested, and films of thickness as low as 0.01 micron were detected. The ability of a two wavelength lidar in the signature of topographical targets by means of their reflectance spectra was also investigated. Author

N83-33840*# National Center for Atmospheric Research, Boulder, Colo.
JOINT AIRPORT WEATHER STUDIES (AWS) PROJECT
J. MCCARTHY *In* NASA. Marshall Space Flight Center Proc.: 6th Ann. Workshop on Meteorol. and Environ. Inputs to Aviation Systems p 85-95 Apr. 1983 Original contains color illustrations
Avail: NTIS HC A07/MF A01 CSCL 04B

The joint airport weather studies (JAWS) project is discussed The major objectives of the JAWS Project are a fundamental description of the phenomenon, a determination of the hazard potential and a definition of a protection and warning system, all of which are relative to low level wind shear. Aspects of the low level wind shear phenomenon The principal focus, however, is the microburst. The microburst is fundamentally a rather simple atmospheric flow. It is a downdraft that, upon approaching the surface, spreads out horizontally, poducing a diverging radial flow in all directions. For any direction that an aircraft flies through the microburst, it will first encounter increasing head winds; then the remnants of the downdraft; and then, increasing tail wind. E A.K.

N83-34514*# Universities Space Research Association, Boulder, Colo.
THE USRA WORKSHOP REPORT: ELECTROSTATIC FOG DISPERSAL Interim Report
M. H DAVIS, ed. 13 Jun. 1983 56 p refs Workshop held at Boulder, Colo., 1-2 Feb 1983
(Contract NAS8-33730)
(NASA-CR-170802, NAS 1.26 170802; USRA-AP-83-08) Avail NTIS HC A04/MF A01 CSCL 04B

The Workshop was held at the National Center for Atmospheric Research (NCAR) in Boulder, Colorado, on February 1-2, 1983. The Workshop was attended by seventeen experts in the scientific fields of fog and cloud physics, charged-particle electrodynamics, atmospheric turbulence, atmospheric electricity, and electro-gasdynamics The major objective of the Workshop was to assess the scientific merits and scientific basis of the proposed system and to assess its potential for operational application. Author

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MATHEMATICAL AND COMPUTER SCIENCES

Includes mathematical and computer sciences (general), computer operations and hardware; computer programming and software; computer systems, cybernetics; numerical analysis; statistics and probability, systems analysis; and theoretical mathematics

A83-44102
NEW COMPUTERS WILL AID ADVANCED DESIGNS
B. M. ELSON Aviation Week and Space Technology (ISSN 0005-2175), vol 119, Aug. 29, 1983, p 50, 51, 54-57.

The present and projected capabilities of computational fluid dynamics computers are discussed, together with features of succeeding, larger computers for increasingly more complex calculations The wind tunnel, although currently useful for basic data, is mainly used to verify and refine computational results Presently, steady, two-dimensional flows are calculated within minutes while steady, three-dimensional flows around objects require run times of up to 20 hr, an expensive item on a supercomputer The numerical aerodynamic simulator approaching development at NASA-Ames will perform 1 gigaflop operations with a data storage capacity of 250 millions 64-bit words The machine will be used to solve the Reynolds averaged approximation to the Navier-Stokes equations Additional speed is being achieved on the current generation of large computers through new algorithms and parallel processing architecture. M.S.K

A83-44948
OUTPUT FEEDBACK POLE ASSIGNMENT UNDER SYSTEM VARIATION
G. K. F. LEE (Colorado State University, Fort Collins, CO) and L F GODBOUT, JR. (Hartford, University, West Hartford, CT) Optimal Control Applications and Methods (ISSN 0143-2087), vol 4, July-Sept 1983, p. 253-264. refs

A design methodology is developed for output feedback pole assignment when there is system variation A performance measure is obtained which represents a squared-error between desired pole locations and the actual pole locations generated via compensation under probabilistic variations The optimization of this measure can be obtained by constructing gradient matrices necessary for obtaining the compensator parameters. Constant output feedback and dynamic compensation are examined for pole placement, and the design algorithms are illustrated using the example of the unstable Boeing-Vertol CH-46 helicopter system. N B

A83-45980#
PERFORMING LITERAL CALCULATION WITH A MICRO-COMPUTER
J -J COSTES (ONERA, Chatillon-sous-Bagneux, Hauts-de-Seine, France) La Recherche Aerospatiale (English Edition) (ISSN 0379-380X), no. 2, 1983, p. 61-64

The software necessary for handling problems of rational mechanics is discussed in terms of the aeroelastic analysis of rotary wings. It is assumed that all calculations will be performed on a microcomputer using an advanced version of BASIC. Deficiencies in current aeroelastic computer modelling (outside of finite difference procedures) are demonstrated. The ALGEBR (algebra), GESTAL (ALGEBR management), and INITIAL (ALGEBR initialization) codes for microcomputer calculations are described A sample program for speed calculation is provided. Algebraic management of chains of characters is shown to require only a small number of basic functions, thereby bridging the computational gap between engineering use of large computers and hand calculations. D.H K.

A83-46500
THE METHOD OF POLE DISPLACEMENT IN THE ARTIFICIAL STABILIZATION OF DYNAMIC SYSTEMS [METODA NA POSUNUTI POLU PRI UMELE STABILIZACI DYNAMICKYCH SOUSTAV]
J. DEDEK Zpravodaj VZLU (ISSN 0044-5355), no. 2, 1983, p. 57-64. In Czech

A method for the approximate displacement of the poles of the transfer function of a dynamic system (the eigenvalues of the system matrix) is developed which is based on the theory of modal control and on the notions of pole sensitivity to displacement (pole controllability) and the pole-displacement error In certain cases the method makes possible a significant simplification of the feedback loop from the state variables to the system inputs General expressions are derived for calculating the feedback gain in the case of precise pole-displacement and for calculating the displacement error in the case of simplified feedback. The proposed method is applied to the lateral-stability augmentation of an aircraft B J

N83-33591*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.
RADIATION OF SOUND FROM UNFLANGED CYLINDRICAL DUCTS
S L. HARTHARAN and A BAYLISS (Exxon Corp Research, Linden, N.J.) Jul. 1983 30 p refs
(Contract NAS1-17070, DE-AC02-76ER-03077, AF-AFOSR-0020-81)
(NASA-CR-172171, NAS 1.26:172171) Avail: NTIS HC A03/MF A01 CSCL 12A

Calculations of sound radiated from unflanged cylindrical ducts are presented. The numerical simulation models the problem of an aero-engine inlet. The time dependent linearized Euler equations are solved from a state of rest until a harmonic solution is attained A fourth order accurate finite difference scheme is used and solutions are obtained from a fully vectorized Cyber-203 computer program Cases of both plane waves and spin modes are treated Spin modes model the sound generated by a turbofan engine. Boundary conditions for both plane waves and spin modes are treated Solutions obtained are compared with experiments conducted at NASA Langley Research Center M.G.

N83-33641# Saab-Scania, Linkoping (Sweden)
ON PURSUIT-EVASION BETWEEN TWO REALISTIC AIRCRAFT
C. HILLBERG and B. JAERMARK 1983 41 p refs
(SAAB-TN-AE-75; ISSN-0080-5149) Avail: NTIS HC A03/MF A01

Differential game problems consisting of two aircraft with variable speed in coplanar motions are analyzed by the differential dynamic programming method. The formulation is made as a pursuit-evasion problem, with the final range, at the specified final time, as the measure of the game. Turning rate is constrained to structural as well as stall limits by a steep penalty method. Results show the importance of the ability to optimize a nonlinear problem. For example, a throttle off for a few seconds can have a considerable influence on the optimal cost value. For high performance aircraft, good acceleration performance should be combined with adequate deceleration means. Author (ESA)

N83-34591*# Boeing Computer Services, Inc., Seattle, Wash Energy Technology Applications Div
CORRECTION AND IMPROVEMENT OF CARE 3: VERSION 3 Interim Report
D. M. ROSE, J. W MANKE, R E ALTSCHUL, and D. L NELSON Apr. 1983 78 p refs
(Contract NAS1-16900)
(NASA-CR-166122; NAS 1 26 166122) Avail: NTIS HC A05/MF A01 CSCL 12A

Calculation of b sub x, y; system fault tree analysis, subroutine analysis, and transient faults are addressed. Author

N83-34598# Air Force Wright Aeronautical Labs, Wright-Patterson AFB, Ohio. Support Systems Branch
MULTIPROCESSOR SHARED MEMORY (MSM) DEVELOPMENT Final Report, May 1979 - Nov. 1982
J A LUKE Jan. 1983 13 p refs
(AD-A126527, AFWAL-TR-83-1024-VOL-1) Avail: NTIS HC A02/MF A01 CSCL 09B

The developmental aspects of the multiprocessor shared memory (MSM) are outlined The development of the MSM device was based on the requirement for a faster transfer of data between the DECsystem-10 mainframe computer and the satellite PDP-11 minicomputers during real-time simulations. The existing DMA10 (direct access memory device) was too slow in handling simultaneous simulations, or a real-time simulation and file transfer program running concurrently. A general description of the MSM prototype and its specifications is given Author

N83-34656*# Virginia Polytechnic Inst. and State Univ., Blacksburg. Dept. of Mechanical Engineering.
THEORETICAL INVESTIGATION OF THE FORCE AND DYNAMICALLY COUPLED TORSIONAL-AXIAL-LATERAL DYNAMIC RESPONSE OF EARED ROTORS Annual Status Report
J. W. DAVID and L. D MITCHELL 1982 33 p
(Contract NSG-3239)
(NASA-CR-173013; NAS 1.26·173013) Avail: NTIS HC A03/MF A01 CSCL 12A

Difficulties in solution methodology to be used to deal with the potentially higher nonlinear rotor equations when dynamic coupling is included. A solution methodology is selected to solve the nonlinear differential equations. The selected method was verified to give good results even at large nonlinearity levels. The transfer matrix methodology is extended to the solution of nonlinear problems Author

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PHYSICS

Includes physics (general), acoustics, atomic and molecular physics; nuclear and high-energy physics; optics; plasma physics; solid-state physics; and thermodynamics and statistical physics

A83-45517*# National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
LOW FLIGHT SPEED ACOUSTIC RESULTS FOR A SUPERSONIC INLET WITH AUXILIARY INLET DOORS
R. P WOODWARD, F W GLASER, and J. G. LUCAS (NASA, Lewis Research Center, Cleveland, OH) AIAA, SAE, and ASME, Joint Propulsion Conference, 19th, Seattle, WA, June 27-29, 1983 46 p. refs
(AIAA PAPER 83-1415)

A model supersonic inlet with auxiliary inlet doors and boundary layer bleeds was acoustically tested in simulated low speed flight up to Mach 0.2 in the NASA Lewis 9 x 15 Anechoic Wind Tunnel and statically in the NASA Lewis Anechoic Chamber. A JT8D refan model was used as the noise source. Data were also taken for a CTOL inlet and for an annular inlet with simulated centerbody support struts. Inlet operation with open auxiliary doors increased the blade passage tone by about 10 dB relative to the closed door configuration although noise radiation was primarily through the main inlet rather than the doors Numerous strong spikes in the noise spectra were associated with the bleed system, and were strongly affected by the centerbody location The supgrsonic inlet appeared to suppress multiple pure tone (MPT) generation at the fan source Inlet length and the presence of support struts were shown not to cause this MPT suppression Previously announced in STAR as N83-27794 Author

A83-46639
COHERENT, SINGLE-MODE FIBER OPTIC FOR MULTIFUNCTION 10.6 MICRON HELICOPTER AVIONICS SYSTEM
A KLEIDER (U S. Army, Aviation Research and Development Activity, Fort Monmouth, NJ) IN Advances in infrared fibers II, Proceedings of the Second Meeting, Los Angeles, CA, January 26-28, 1982 . Bellingham, WA, SPIE - The International Society for Optical Engineering, 1982, p. 122-127
(Contract DAAK80-81-C-0155)

A research and development effort is reported whose objective is to develop a fiber optic cable capable of transmitting 10.6 microns in a coherent single mode with acceptable transmission losses. Such a cable would minimize the physical space required in the nose of aircraft and thereby provide extended functional use of the clear field of view The discussion covers the general requirements for such a fiber optic system, candidate fiber materials, and cladding materials and techniques. A specific helicopter application involving a multifunction CO2 laser system is examined. V L.

N83-32980 Polish Academy of Sciences, Warsaw.
DEPARTMENT OF AEROACOUSTICS
In its Sci. Activities of the Polish Acad. of Sci. p 101-106 1983 Avail: Issuing Activity

Research conducted involved the following themes: the feedback in the process of generation of aerodynamic noise, sound propagation in bounded regions, nonlinear properties of mechano-acoustic resonance systems, and measurement and application of high power ultrasounds. Author

N83-33677 ESDU International Ltd , London (England)
AN INTRODUCTION TO AIRCRAFT NOISE LATERAL ATTENUATION
Nov 1981 9 p Sponsored in part by the Ministry of Defence and the Royal Astronautical Society
(ESDU-81035; ISBN-0-85679-368-X, ISSN-0307-0115) Avail: ESDU

This Data Item is an addition to the Noise Subseries. Guidance on the estimation of lateral attenuation of aircraft noise from noise measurements is given. Lateral attenuation is defined as the difference between the under the flightpath and sideline free field levels where the propagation range of the two sound levels is the same. A knowledge of aircraft noise lateral attenuation is required for the evaluation of ground noise levels ESDU

N83-33680 ESDU International Ltd , London (England)
ESTIMATION OF LATERAL ATTENUATION OF AIR-TO-GROUND JET OR TURBOFAN AIRCRAFT NOISE IN ONE-THIRD OCTAVE BANDS
Nov. 1982 78 p refs
(ESDU-82027, ISBN-0-85679-408-2, ISSN-0307-0115) Avail ESDU

This Data Item is an addition to the Noise Subseries The free-field values of one-third octave band lateral attenuation for air-to-ground airplane noise are estimated Lateral attenuation is defined as the difference between the under-the-flightpath and sideline free-field levels where the propagation distance of the two sound levels is the same Data are particularly applicable for the estimation of ground noise levels of turbo-fan powered aircraft The range of applicability includes sideline noise-levels for turbo-fan and jet powered aircraft when the aircraft's elevation angle, relative to an observer at the sideline location, is greater than five degrees, the wind speed is less than 6 meters/sec and there are no temperature inversions Guidance is given on the procedure that should be used to estimate sideline noise levels ESDU

N83-33682*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va
A LABORATORY STUDY OF THE PERCEIVED BENEFIT OF ADDITIONAL NOISE ATTENUATION BY HOUSES
I. H. FLINDELL Jun. 1983 58 p refs
(NASA-TM-85647; NAS 1 15:85647) Avail NTIS HC A04/MF A01 CSCL 20A

Two Experiments were conducted to investigate the perceived benefit of additional house attenuation against aircraft flyover noise. First, subjects made annoyance judgments in a simulated living room while an operative window with real and dummy storm windows was manipulated in full view of those subjects. Second, subjects made annoyance judgments in an anechoic audiometric test chamber of frequency shaped noise signals having spectra closely matched to those of the aircraft flyover noises reproduced in the first experiment. These stimuli represented the aircraft flyover noises in levels and spectra but without the situational and visual cues present in the simulated living room Perceptual constancy theory implies that annoyance tends to remain constant despite reductions in noise level caused by additional attenuation of which the subjects are fully aware. This theory was supported when account was taken for a reported annoyance overestimation for certain spectra and for a simulated condition cue overreaction. Author

N83-33684*# National Aeronautics and Space Administration Langley Research Center, Hampton, Va.
INVESTIGATION OF JET-INSTALLATION NOISE SOURCES UNDER STATIC CONDITIONS
J. G. SHEARIN Aug. 1983 33 p refs
(NASA-TP-2181; L-15599; NAS 1.61:2181) Avail: NTIS HC A03/MF A01 CSCL 20A

The acoustical effects of operating a 6-cm exit-diameter nozzle in the presence of a wing-flap model under static conditions are examined experimentally. The geometric parameters of the wing-flap model are chosen to represent a realistic jet-engine installation on a wide-body midrange transport airplane. The effects

of varying the installation parameters and the noise sources associated with the engine-installation effects are discussed. The major noise sources are the flow interaction of the jet and wing undersurface, the flow interaction of the jet with the side edges of the flap cutout and flap trailing edge, and the reflection of the jet noise off the undersurface of the wing and flap. Author

N83-33687# Southampton Univ (England). Inst. of Sound and Vibration Research

ACTIVITIES OF THE INSTITUTE OF SOUND AND VIBRATION RESEARCH Annual Report

1983 45 p refs

Avail: NTIS HC A03/MF A01

Research in fluid dynamics and acoustics, vehicle noise, audiology and human effects, industrial noise, and noise and vibration control is summarized. Aircraft noise, underwater acoustics, damping of fiber reinforced materials and finite element methods are discussed. Author (ESA)

N83-34713*# National Aeronautics and Space Administration. Langley Research Center, Hampton, Va.

RESIDENTS' ANNOYANCE RESPONSES TO AIRCRAFT NOISE EVENTS

T. K. DEMPSEY, D. G. STEPHENS, J M. FIELDS (Bionetics Corp), and K. P SHEPHERD (Bionetics Corp.) Sep 1983 42 p refs (NASA-TP-2121, L-15595, NAS 1.60:2121) Avail: NTIS HC A03/MF A01 CSCL 20A

In a study conducted in the vicinity of Salt Lake City International Airport, community residents reported their annoyance with individual aircraft flyovers during rating sessions conducted in their homes Annoyance ratings were obtained at different times of the day. Aircraft noise levels were measured, and other characteristics of the aircraft were noted by trained observers. Metrics commonly used for assessing aircraft noise were compared, but none performed significantly better than A-weighted sound pressure level. A significant difference was found between the ratings of commercial jet aircraft and general aviation propeller aircraft, with the latter being judged less annoying After the effects of noise level were accounted for, no significant differences were found between the ratings of landings and takeoffs. Aircraft noise annoyance reactions are stronger in lowered ambient noise conditions. This is consistent with the theory that reduced nighttime and evening ambient levels could create different reactions at different times of day. After controlling for ambient noise in a multiple regression analysis, no significant differences were found between the ratings of single events obtained during the three time periods morning, afternoon, and evenings. Author

N83-34822# Stuttgart Univ. (West Germany). Sonderforschungsbereich 85.

THERMODYNAMIC AND FLOW MECHANICAL PROBLEMS IN AIRCRAFT AND SPACECRAFT DRIVES: SUMMARY OF WORK AND RESULTS FOR 1980, 81, 82 [THERMODYNAMISCHE UND STROEMUNGSMECHANISCHE PROBLEME DER LUFT- UND RAUMFAHRTANTRIEBE: ARBEITS- UND ERGEBNISBERICHT 1980-81-82]

1982 606 p refs In GERMAN

Avail: NTIS HC A99/MF A01

Laser interferometry; reaction kinetics study in exhaust gases by mass spectrometry, Raman spectroscopy and electron beams; and concentration and relaxation times measurements are discussed. Flow and combustion processes, and numerical calculation methods are considered, including jet mixing flow, compressor blade profile and supercritical cascade design; flow computation in counter-rotating cascades, in chemically reacting flows, in three-dimensional cascade flow, and in multistage turbomachines The effect of Reynolds number on turbomachines is investigated. Combined chemical propulsion systems are analyzed.

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SOCIAL SCIENCES

Includes social sciences (general), administration and management, documentation and information science, economics and cost analysis; law and political science; and urban technology and transportation.

A83-45808#

AIRCRAFT CRASHWORTHINESS AND THE MANUFACTURER'S TORT LIABILITY IN THE UNITED STATES

J. E. SABA (Champlain College, Saint Lambert, Quebec, Canada) IN: Annals of air and space law. Volume 7 . Montreal/Paris, McGill University/Editions A. Pedone, 1982, p. 171-211. refs

A83-45829

FROM AEROSTATS TO DC-10S - RECOGNITION OF CERTIFICATES OF AIRWORTHINESS

E. DENZA (Foreign and Commonwealth Office, London, England) IN: Essays in air law The Hague, Martinus Nijhoff Publishers, 1982, p. 39-58. refs

The Paris Convention of 1910 established the requirement of an airworthiness certificate for flying machines, mandating that it be recognized by other nations. International standards of airworthiness were defined in the 1949 ICAO Council, based on recommendations of the Chicago Convention of 1944 The U.S developed specific airworthiness provisions for the Concorde in order to make it comply with domestic regulations. Similarly, the U.S has negotiated bilateral agreements with other countries in order to assure that their aircraft meet the standards of U S domestic carriers, a practice that was codified by the 1977 Bermuda 2 Agreement, which permitted nations to challenge the airworthiness standards of other countries. However, international pressures were brought to bear on the U S to recertify the DC-10 aircraft after vigorous inspection procedures were instituted to detect any pylon damage that had previously been the cause of serious air accidents M.S.K.

A83-45831

PASSENGER LIABILITY IN INTERNATIONAL CARRIAGE BY AIR - LINES OF DEVELOPMENT

F HJALSTED (Reumert and Partners, Copenhagen, Denmark) IN: Essays in air law . The Hague, Martinus Nijhoff Publishers, 1982, p 91-109. refs

The necessity of reevaluating the legal approach to passenger liability as defined by the 1929 Warsaw Convention is discussed The approximately $8300 limit on liability set by the Convention has been increased by various international protocols and conventions to a 1971 limit - not yet in force of $100,000, which is still regarded by the U S. negotiators as too small. States that are not members of the IMF are presently permitted to set their own limits. In practice, damages are currently divided among the air carrier, the insurers, and the manufacturers of the aircraft (in the U.S.). It is suggested that liability be linked to an assessment of the actual amount of damages, including a limit per kilogram for lost baggage. M S K.

A83-45832

INTERCHANGE OF AIRCRAFT

A. KEAN (International Civil Aviation Organization, Montreal, Canada) IN: Essays in air law The Hague, Martinus Nijhoff Publishers, 1982, p. 111-124

Problems posed by the requirement that an aircraft used by a carrier in one country be registered and certified in that country, as put forth by the Chicago Convention of 1944, are discussed. Numerous economic advantages are cited to show the profitability that is available when one airline or manufacturer can loan, even temporarily, an aircraft for trial or renumerative purposes to another airline, including one based in another country. A proposed amendment to the Chicago Convention mandates that the lease, charter, or interchange of an aircraft from one company in one

country to another in a different country will result in the transfer of registration and responsibility of the originating state to the state where the aircraft is based Failure to maintain adequate safety standards in transferring registration to another state is noted to lead quickly to a loss of revenue and/or revocation of the operator's license if an accident occurred. M S.K.

A83-45836
AIR SAFETY - ENFORCEMENT OF THE FEDERAL AVIATION REGULATIONS
D. R. ROARK, JR. (FAA, Office of the Chief Counsel, Washington, DC) and C. H. ONSTAD IN: Essays in air law . The Hague, Martinus Nijhoff Publishers, 1982, p. 195-222. refs

The establishment of the regulations, their enforcement, and the imposition of penalties, as well as the structure of the FAA and its programs for guaranteeing air safety are outlined Civil aviation was first regulated by the Air Commerce Act of 1926 and the FAA was formed in 1958, with the responsibility for air safety. In 1978, there were 190,000 general aviation aircraft in the U S., 432 air traffic control towers, 339 radars, 2700 navigational facilities, and 205 billion passenger miles flown yearly Public participation is part of the rulemaking process, and is preceded by public notices of a rule under consideration. FAA agency teams meet with carriers to discuss implementation of any new rules. Monetary and decertification, temporary or permanent, penalities have been codified for violations of rules, and formal and informal investigative procedures established, with provisions for violations by foreign carriers, airmen, and firms. M.S.K.

A83-45842
THE LEGAL STATUS OF THE AIRCRAFT COMMANDER - UPS AND DOWNS OF A CONTROVERSIAL PERSONALITY IN INTERNATIONAL LAW
A. A. VAN WIJK IN: Essays in air law The Hague, Martinus Nijhoff Publishers, 1982, p. 311-349 refs

By 1880, airship pilots had been legally defined by international agreement to be noncombatants. Negotiations in the 20th century, beginning in 1927 to establish the legal status of airmen, who by then included pilots of flying machines. Particular attention was given to the legal status of the commander of an aircraft. The discussions were carried out among national representatives through 1980 without any international agreement being reached The IATA, as of 1980, decided to establish a panel of experts to consider the question. M.S.K.

N83-33792*# *National Aeronautics and Space Administration, Washington, D. C.*
RECORDS OF ACHIEVEMENT: NASA SPECIAL PUBLICATIONS
1983 141 p Original contains color illustrations
(NASA-SP-470; NAS 1.21:470) Avail: NTIS and NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md. 21240 CSCL 05B

This annotated bibliography cites all NASA Special Publications issued since 1961. The Reference Publications and Conference Publications are included. Entries are arranged by SP number The entries are grouped in eight categories. general, handbooks and data compilations, histories and chronologies, technology utilization, management evaluation and analysis standards, bibliographies, space vehicle design criteria, and specifications. The Reference Publications and Conference Publications are listed separately according to RP and CP number. Approximately 1400 entries are listed Each entry includes the title, author, NASA accession number, NASA SP, RP, or CP number, original sales source, and publication date. An index of the SP, RP, and CP numbers according to NASA subject category is provided. Highlights of NASA's achievements since 1958 are included as a tribute to NASA's 25th anniversary. A.R.H.

N83-33800*# Garrett Turbine Engine Co , Phoenix, Ariz.
ADVANCED GAS TURBINE (AGT) POWERTRAIN SYSTEM DEVELOPMENT FOR AUTOMOTIVE APPLICATIONS Semiannual Progress Report, Jan. - Jun. 1981
Dec. 1981 87 p refs Prepared for DOE, Washington, D.C. (Contract DEN3-167)
(NASA-CR-167901; DOE/NASA/0167-81/3; NAS 1.26::167901; GARRETT-31-3725(3); SAPR-3) Avail. NTIS HC A05/MF A01 CSCL 13F

Compressor development, turbine, combustion, regenerator system, gearbox/transmission, ceramic material and component development, foil gas bearings, bearings and seals, rotor dynamics development, and controls and accessories are discussed Author

N83-34844# General Accounting Office, Washington, D. C Mission Analysis and Systems Acquisition Div
THE B-1 BOMBER PROGRAM: A NEW START
13 Apr. 1983 9 p
(AD-A127523, GAO/MASAD-83-21) Avail: NTIS HC A02/MF A01 CSCL 05A

We recently completed our review of the B-1B bomber program. This review was made because the B-1B is a key element of the strategic force modernization program, is costly, and has a compressed development and production schedule to meet the initial operational capability date of 1986. Our review was also directed at examining the B-1B cost estimates, management plans, and cost performance reports. We found that the B-1B program cost estimate still omits known program costs. We are concerned that the cost omissions obscure congressional visibility of the B-1B acquisition. In this regard, we recommend that you have your Office provide the Congress in a single package an estimate, including all the acquisition costs related to the B-1B program. GRA

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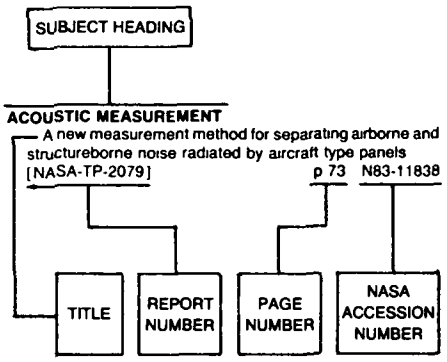
GENERAL

N83-34882* National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif
OUR FIRST QUARTER CENTURY OF ACHIEVEMENT: JUST THE BEGINNING
Oct 1983 198 p
(NASA-NEWS-RELEASE-83-132; P83-10167) Avail: NASA Scientific and Technical Information Facility, P.O. Box 8757, B.W.I. Airport, Md 21240 CSCL 22A

Space flight, space science, space applications, aeronautics, tracking and data acquisition, international programs, technology utilization, NASA installations, the NASA launch record, astronauts, and the fine arts program are reviewed in light of NASA's 25th anniversary. N.W.

Typical Subject Index Listing



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Publication on the occasion of the 65th birthday of Prof Dr-Ing Erich Truckenbrodt, Scientific Colloquium, Technische Universitaet Muenchen, Munich, West Germany, February 1, 1982, Reports p 697 A83-46482
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Certification of avionic systems, Proceedings of the Symposium, London, England, April 27, 1982 p 657 A83-45843
Annual Airline Plating and Metal Finishing Forum, 18th, Orlando, FL, March 16-18, 1982, Proceedings p 695 A83-45863
Shot peening for advanced aerospace design, Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, October 25-28, 1982 p 696 A83-45872
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Publication on the occasion of the 65th birthday of Prof Dr -Ing Erich Truckenbrodt, Scientific Colloquium, Technische Universitaet Muenchen, Munich, West Germany, February 1, 1982, Reports p 697 A83-46482
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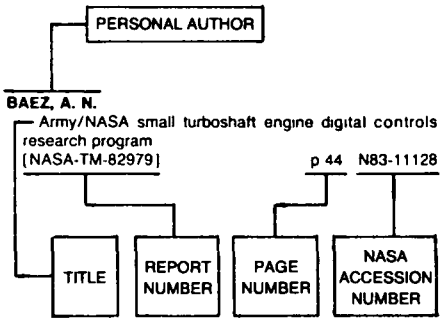

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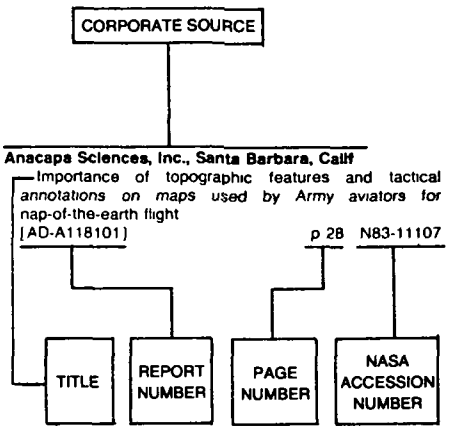

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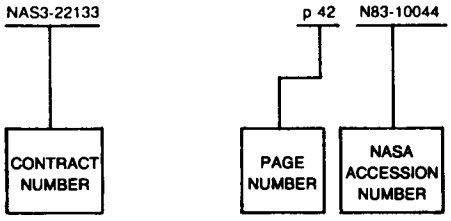

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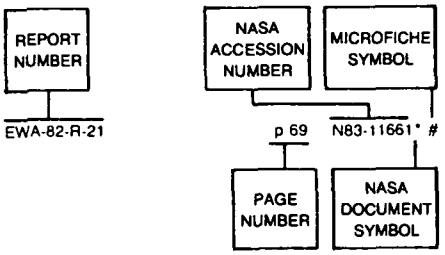

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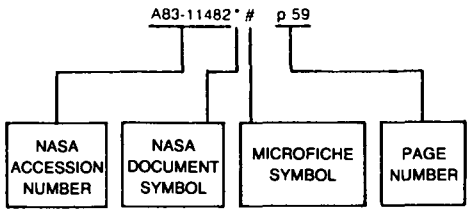

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