

AD-744 000

VERTICAL TAKE-OFF PLANES

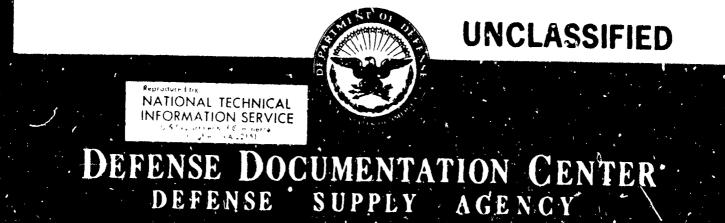
A DDC BIBLIOGRAPHY

DDC-TAS-72-46

JUNE 1972

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shrouded propellers, rotary	wings, aerodynamic characteristics,
	ance engineering, capabilities and
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	al Take-Off Planes. Computer generate
indexes are included.	

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*Bibliographies Jet Engines							
Performance(Engineering)							
Transport Planes							
Military Requirements							
Flight Testing							
Design							
Aerodynamic Characteristics							
Ducted Fans Wind Tunnel Models							
Lift							
Handling							
Hovering							
Downwash							
Ground Effect							
Take-Off							
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Tilt Wings Airframes							
Flight Control Systems							
XV-5A Aircraft							
V-5 Aircraft							
Transition Flight							
C-142 Aircraft							
XC-142A Aircraft		Í					
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VERTIGAL TAKE-OFF PLANES

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January 1962 - January 1972

JUNE 1972

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DEFENSE DOCUMENTATION CENTER

DEFENSE SUPPLY AGENCY CAMERON STATION ALEXANDRIA, VIRGINIA 22314

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FOREWORD

C

This bibliography contains 199 unclassified references relating to Vertical Take-Off Planes. These references were selected from entries processed into the Defense Documentation Center's data bank during the period of January 1962 through January 1972.

This bibliography is a revision of AD-683 500.

Individual entries are arranged in AD number sequence under the heading AD Bibliographic References. Corporate Author-Monitoring Agency, Subject, Title, and Personal Author Indexes are included.

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DUC REPORT BIBLINGRAPHY SEARCH CONTROL NO. /ZDM07

AD-426 234

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DAVID TAYLOR MODEL BASIN WASHINGTON D C

RESULTS OF A VTUL PROPELLER TYPE AIRCHAFT TESTED IN THE SUBSONIC WIND TUNNEL IN A HIGHSPEED CONFIGURATION, (U)

NGV 13 15P BAMBER,MILLARD J. ; REPT. NU. DTMB-AERO-1062

UNCLASSIFIED REPORT

DESCRIPTORS: (•VERTICAL TAKE-OFF FLANES: DESIGN), ROTARY BLADES (ROTARY WINGS), WIND TUNNEL MODELS, FEASIBILITY STUDIES, MODEL TESTS, ROTARY WINGS, HOVERING, LIFT, DRAG, PITCH (MOTION), AERODYNAMIC CHARACTERISTICS, PERFORMANCE (ENGINEERING), SUBSONIC CHARACTERISTICS, PROPELLERS (AERIAL) (U) IDENTIFIERS: 1963

THE ABILITY OF A PROPELLER TO DEVELOP A FURCE PERPENDICULAR TO THE AXIS OF ROTATION IS THE BASIS FOR A VTOL AIRCRAFT THAT APPEARS TO BE CAPABLE OF HOVERING, AND AT THE SAME TIME TO BE SUPERIOR TO EXISTING TYPES OF VTOL AIRCRAFT IN HIGH-SPEED PERFORMANCE. LOW-SPEED WIND-TUNNEL TEST RESULTS FOR A MODEL INDICATED A LIFT-DRAG RATIO OF 8 WITH PROPELLERS WINDMILLING IN THE HIGH-SPEED CONFIGURATION. FOR EXISTING VTOL AIRCRAFT, THE MAXIMUM LIFT-DRAG ATTAINED IN A HIGH-SPEED CONFIGURATION IS ABOUT 5. (AUTHOR)

DOL REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07

AD-426 498 CENTRE NATIONAL DIETUDES ET DE RECHERCHES AERONAUTIQUES BRUSSELS (BELGIUM)

PUWERED LIFT MOUEL TESTING FOR GROUND PROXIMITY EFFECTS, (U)

UCT 63 IV COLIN.P. E. I REPT. NU. TCEA TH14 CONTRACT: DA91 591EUC2771

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (+V_RTICAL TAKE=OFF PLANES, GROUND EFFECT); MODEL TESTS, PERFORMANCE (ENGINEERING), JETS, LIFT, PITCH (MUTION), AERODYNAMIC CHARACTERISTICS, PRESSURE; NOMENTUM, GROUND EFFECT MACHINES, WIND TUNNEL MODELS (U) IDENTIFIERS: 1983 (U)

THE EFFECT OF GROUND PROXIMITY ON THE PERFORMANCE OF POWERED LIFT VEHICLES WAS INVESTIGATED ON SIMPLE MODELS USING TWO DIFFERENT TESTING METHODS. SINGLE AND DOUBLE-JET MODELS REPRESENTING VTOL CONFIGURATIONS AND AN AIR-CUSHION MODEL WITH PERIPHERAL JET WERE TESTED BOTH IN THE WIND TUNNEL WHERE A STATIONARY PLATE IMMERSED IN THE FLOW WAS USED TO REPRESENT THE GROUND AND ON A SPECIAL RIG ALLOWING THE MODELS TO BE MOVED OVER A FIXED-GROUND PLATE. THE LIFT AND CENTRE OF PRESSURE LOCATION HAVE BEEN DETERMINED WITH BOTH IECHNIQUES FOR VARIOUS MODEL HEIGHTS ABOVE THE GROUND-PLATE OVER A RANGE OF MOMENTUM COEFFICIENTS. RESULTS OBTAINED WITH BOTH METHODS ARE COMPARED. (AUTHOR)

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ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07

AD-426 785 GENERAL ELECTRIC CO CINCINNATI OHIO

RESULTS OF WIND TUNNEL TESTS OF A FULL-SCALE, WING-MOUNTED, TIP-TURBINE-DRIVEN LIFT FAN.

 SEP
 63
 379P

 CUNTRACT:
 DA-44-177-1C-584

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 1-D-121401-D-144

 TASK:
 1-D-121401-D-14402

 MONITUR:
 TRECOM
 TR-63-21

UNCLASSIFIED REPORT

DESCRIPTORS: (*VERTICAL TAKE-OFF PLANES, SHROUDED PROPELLERS), (*SHROUDED PROPELLERS, DESIGN), LIFT, FANS, AERODYNAMIC CHARACTER ISTICS, GAS TURBINES, INSTRUMENTATION, MODEL TESTS, WIND TUNNEL MODELS, DRAG, GROUND EFFECT, PERFORMANCE (ENGINEERING), EQUATIONS, MOTION, EXPERIMENTAL DATA, DESIGN, PRESSURE, GAS FLOW, TEMPERATURE, VELOCITY, MUMENTS, PITCH (MOTION), THRUST, ACCELERATION, STRESSES, TEST METHODS, THERMODYNAMICS. (U) IDENTIFIERS: X-353 ENGINES, LIFT FANS.

THE FULL-SCALE WING-TIP TURBINE-DRIVEN LIFT FAN WAS MODEL TESTED IN THE NASA AMES RESEARCH CENTER 40-FOOT BY 80-FOOT WIND TUNNEL. THIS SERIES OF TESTS HAS PROVIDED THE FIRST LARGE SCALE TEST DATA WITH FANS INSTALLED IN WINGS. DETAILED DISCUSSIONS AND TABULAR DATA ARE PRE SENTED ON THE FOLLOWING: WIND TUNNEL MODEL: TEST INSTRUMENTATION, AND TEST PROCEDURES AND RESULTS. ANALYSIS OF RESULTS CONSIDERS THE BASIC AIRCRAFT PERFORMANCE (POWER OFF), FAN AERODYNAMIC PERFORMANCE, FAN THERMODYNAMIC PER FURMANCE, FAN POWERED AIRCRAFT PERFORMANCE, FAN MECHANICAL PERFORMANCE AND HARDWARE INSPECTION. (AUTHOR)

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DDC REPORT BIBLIUGRAFHY SEARCH CUNIROL NU. /20M07

AD-431 566 PRINCETUN UNIV N J

SOME DYNAMIC ASPECTS OF STABILITY IN LOW-SPEED FLYING MACHINES, (U)

NOV 63 59P DUKES, THEODOR A. (CARBALLAL, JOSË M. (LION, PAUL M.) CUNTRACT: DA=44-177-TC-835 PROJ: DA=1-D=121401-a-142 TASK: 1-D=121401-a-14203 MONITOR: TRECOM TR=63-56

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, ADAPTIVE CONTROL SYSTEMS), (+FLIGHT CONTROL SYSTEMS, VERTICAL TAKE-OFF PLANES), STABILITY, PITCH (MOTION), FEEDBACK; DAMPING, DIFFERENTIAL EQUATIONS, MATHEMATICAL ANALYSIS, ANALOG COMPUTERS, TIME, PROGRAMMING (COMPUTERS), LINEAR SYSTEMS, SUBSONIC CHARACTERISTICS (U) IDENTIFIERS: 1963

THIS REPORT IS CONCERNED WITH A LINEAR TIME VARYING APPROXIMATION TO THE DYNAMICS OF LOWSPEED FLYING MACHINES. SIMPLIFICATIONS AND APPROXIMATIONS ARE APPLIED WIDELY IN ORDER TO EMPHASIZE ESSENTIAL ASPECTS. THE RANGE OF TIME VARIATION IS DESCRIBED IN TERMS OF FROZEN SYSTEM LOCI OF THE ROOTS CORRESPONDING TO THE PREDOMINANT MODE OF A SYSTEM. THE RATE OF THE TIME VARIATION IS DESCRIBED IN TERMS OF THE DEVIATION FROM THE FROZEN SYSTEM APPROXIMATION. AN ANALOG COMPUTER STUDY WAS MADE TO SPECIFY QUANTITATIVELY THOSE RATES OF TIME VARIATION WHICH CANNOT BE CUNSIDERED AS SLOW, THE LONGITUDINAL DYNAMICS OF VTOL AIRCRAFT IS STUDIED AS AN EXAMPLE IN RATHER GENERAL TERMS. APPROXIMATIONS AND THE APPLICATION OF ROOT LOCUS METHODS IN TERMS OF THE MOST SIGNIFICANT STABILITY DERIVATIVES LEAD TO A CONSTRUCTION DESCRIBING THE BEHAVIOR OF THE OSCILLATORY ROOTS DURING TRANSITION. THE RESULTS ARE USED IN A DISCUSSION OF THE FOLLOWING VARIABLE FEEDBACK CONFIGURATIONS: DIRECT FEEDBACK ADJUSTMENTS, ADAPTIVE FEEDBACK, AND PROGRAMMED FEEDBACK ADJUSTMENTS. (AUTHOR) (U)

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DDE REPORT BIBLIOGRAPHY - SEARCH CONTROL NO. /ZD407

AD-447 839

GENERAL ELECTRIC CO CINCINNATI UNIO

XV-SA LIFT FAN FLIGHT RESEARCH AIRCRAFT.

DESCRIPTIVE NUTE: QUARTERLY TECHNICAL PROGRESS REPT. NO. 9, 16 NOV 63-15 FEB 64.

> Reproduced from best available copy.

APR 64 15P CONTRACT: DA44 1777C715

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTH:

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DESCRIPTORS: (*VERTICAL TAKE-OFF PLANES, RESEARCH PROGRAM ADMINISTRATION), RESEARCH PLANES, DUCTED FANS; DESIGN, EJECTION SEATS, TURBOJET ENGINES, GROUND SUPPORT EQUIPMENT, MUDEL TESTS (U) IDENTIFIERS: V-5 AIRCRAFT, LIFT FAN, J-85 ENGINES (U)

DURING THE NINTH AUARTEER (NOVENBER 10. 1963 TO FEBRUARY 15, 1963) PRUGRESS UNDER THE PROPULSION SYSTEM PROGRAM INCLUDED: (1) SEVEN TECHNICAL . PROGRAM REPORTS COMPLETED AND TRANSMITTED TO TRECOM WITH THE REMAINING JATA NECESSARY FUR LOW SPEED FLIGHT CLEARANCE JEARING COMPLETION; (2) REVISION TO MAINTENANCE MANUAL COMPLETED: (3) PROPULSION SYSTEN SPARE PARTS, QUANTITIES, PRICE CONTROL, AND AUTHORITY FUR USE ESTABLISHED WITH TRECOM: (4) SPARE JOS ENGINES, UNE LIFT FAN, UNE PITCH FAN, PLUS ENGINE AND FAN SPARE COMPONENTS PACKAGED FOR SHIPMENT TO EDWARDS: (5) PROVIDED PROPULSION SYSTEM SUPPORT DURING AIRCRAFT GROUND TESTS; AND (6) PREPARATION FUR FULL SCALE WIND TUNNEL TEST WAS COMPLETED IN TERMS OF DETAIL TEST PLAN, INSTRUMENTATION, TEST FIXTURES, AND DATA REDUCTION PROGRAM. (AUTHOR)

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07

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AD-452 792 KELLETT AIR RAFT CORP PHILADELPHIA PA

EFFECTS OF AIRFRAME GEOMETRY ON DOWNWASH PRUBLEMS OF TANDEM DUCTED-PROPELLER VTOL AIRCRAFT. (U)

DESCRIPTIVE NUTE: REPT. FOR JUL 61-NAY 63, JAN 64 115P PRUYN,RICHARD R.

REPT. NO. 179780 6 CONTRACT: NOW-61-0926

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: +VENTICAL TAKE-OFF PLANES, DUCTED FANS), (+DUCTED FANS, DUWNWASH), MUDEL TESTS, GROUND EFFECT, PERFORMANCE (ENGINEERING), AERODYNAMIC CHARACTERISTICS, INTERFERENCE, DUCTS, DEFLECTION, FLUID DYNAMIC PROPERTIES, AERODYNAMIC CONFIGURATIONS, DUCT INLETS (U) IDENTIFIERS: TANDEM PRUPELLERS (U)

A FULL SCALE HAUF-MUDEL SIMULATION OF A DUAL TANDEM DUCTED PROPELLER VTOL AIRCRAFT HAS BEEN TESTED AT HEIGHTS OF LESS THAN TWO DUCT DIAMETERS ADDVE SAND AND NATER TERRARN. DATA ON TERRAIN TRANSPORT. TERRAIN CAUSED AIRCHAFT DAMAGE, FLON FIELD MEASUREMENTS AND DUCTED PROPELLER PERFORMANCE WERE OBTAINED. THESE TESTS WERE CONDUCTED AT PROPELLER DISC LOADINGS UP 10 60 POUNDS PER SQUARE FOOT WITH VARIOUS AIRCRAFT CONFIGURATIONS AND DUCTED PROPELLER ORIENTATIONS. THE DUAL TANDEM CUNFIGURATION WAS FOUND TO CAUSE A SIGNIFICANT INCREASE IN DOWNWASH PROBLEMS COMPARED TO ISOLATED PROPELLER CONFIGURATIONS PREVIOUSLY TESTED. REDUCED PERFORMANCE, SEVERE ENGINE AND PROPELLER DAMAGE AND AN USCILLATING AERODYNAMIC INTERFERENCE WERE EXPERIENCED. SEVERAL PROMISING DEVICES TO ALLEVIATE DOWNWASH PROBLEMS WERE EVALUATED. (AUTHOR)

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ODC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20407

AD-453 315 ROYAL AIRCRAFT ESTABLISHMENT FARNBOROUGH (ENGLAND)

THE STATIC PRESSURE DISTRIBUTION AROUND A CIRCULAR JET EXHAUSTING NORMALLY FROM A PLANE WALL INTO AN AIRSTREAH. (U)

AUG 64 37P BRADBURY,L. J. S. WOOD, M. N. I REPT. NO. TN AERU2978

UNCLASSIFIED REPORT

SUP /LEMENTARY NOTE:

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES: LIFT), (+JET⁵, AXIALLY SYMMETRIC FLUW), PRESSURE, DISTRIBUTION, BOUNDARY LAYER, THICKNESS, REYNOLDS NUMBER, AERODYNAM¹C CHARACTERISTICS, WINGS, WIND TUNNEL MODELS, VELOCITY, MEASUREMENT, INTERFERENCE (U)

MEASUREMENTS HAVE BEEN MADE OF THE STATIC PRESSURE DISTRIBUTION ON THE WALL AROUND A CIRCULAR JET EXHAUSTING NORMALLY FROM ONE WALL OF A WIND TUNNEL INTO THE MAINSTREAM FLOW THROUGH THE TUNNEL. THE MEASUREMENTS SHOW THE WAY IN WHICH THE PRESSURE DISTRIBUTIONS VARY WITH THE RATIO OF JET TO FREE-STREAM VELOCITY AND ALSO SHOW THE REGIONS ON THE WALL WHICH CONTRIBUTE MOST TO THE OVERALL SUCTION FORCE ON THE WALL. THESE OVERALL SUCTION FORCES ARE SHOWN TO BE OF THE RIGHT ORDER OF MAGNITUDE TO ACCOUNT FOR THE LIFT LOSS OBSERVED ON MODELS OF DIRECT JET LIFT VTOL AIRCRAFT. THEORETICAL WORK ON THE PROBLEM IS BRIEFLY DISCUSSED AND IT IS SHOWN THAT A PARTICULARLY SIMPLE MODEL OF THE FLOW WHICH HAS PREVIOUSLY BEEN SUGGESTED ON A NUMBER OF OCCASIONS IS NOT REALLY ADEQUATE. SOME DETAILS OF AN ALTERNATIVE MODEL WHICH IS PROVING MORE SUCCESSFUL ARE GIVEN. (U) (AUTHOR)

7

DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NU. /ZOMO7 AD-455 562 AIR FORCE AERO PROPULSION LAB WRIGHT-PATTERSON AFO OHIU TEST RESULTS OF RESEARCH FOR RAPID SITE PREPARATION FOR VTOL AIRCRAFT. DESCRIPTIVE NOTE: REPT. FOR AUG 62-AUG 64, NOV 64 41P VASILOFF,A. ; REPT. NO. IDR64 104 PROJ: 8174 TASK: 917401

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIFTORS: (+LANDING FIELDS, PREPARATION), (+VERTICAL TAKE-OFF PLANES, LANDING FIELDS), SITE SELECTION, SOIL MECHANICS, BLAST, AFTERBURNERS, TURBOJET ENGINES, DUST, SPRAYS, AREA COVERAGE, AIR DROP OPERATIONS, POLYESTER BLASTICS, BORIC ACIDS, FEASIBILITY STUDIES, EPOXY PLASTICS, RESORCINUL, FORMALDEHYDE, GLASS TEXTILES, ISOCYANATE PLASTICS, CONCRETE, SODIUM COMPOUNDS, SILICATES, ZIRCONUM, CEMENTS, CERAMIC MATERIALS, CONSTRUCTION (U) IDENTIFIERS: X-14 AIRCRAFT, J-85 ENGINES (U)

TO OPERATE VTOL AIRCRAFT IN REMOTE FRONT-LINE AREAS, SITES MUST BE PREPARED TO PREVENT FLYING FURLIGN OBJECTS FROM DAMAGING THE AIRCRFT. RESEARCH WAS CONDUCTED TO DETERMINE WHETHER ANY QUICK-SETTING SOIL HARDENERS COULD WITHSTAND THE BLAST ENVIRONMENT OF THE VTOL AFTERBURNER. SAMPLES OF NUMEROUS MATERIALS WERE TESTED IN A SPECIAL VTOL TEST FACILITY CONSISTING OF A J-85-5 JET ENGINE WITH AFTERBURNER THAT COULD BE ROTATED TO A VERTICAL POSITION TO DUPLICATE GROUND CONDITIONS IMPOSED BY THE VTOL JET BLAST. A FASTCURING, SPRAYABLE. RESIN FORMULATION WAS DEVELOPED AND TESTED, AND FULL-SCALE TESTS WERE MADE WITH AN X-14 VTUL AIRCRAFT. (AUTHOR)

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AD-461 017

GENERAL ELECTRIC CO CINCINNATI OHIO

XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT. (U)

DESCRIPTIVE NOTE: QUARTERLY TECHNICAL PROGRESS REPT. NO. 10, 17 FEB-15 MAY 64.

JUL 64 1V CUNTRACT: DA44 177TC715

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANED; RESEARCH PROGRAM ADMINISTRATION); (+RESEARCH PLANES; VERTICAL TAKE-OFF PLANES); TURBOJET ENGINES; DUCTED FANS; SPARE PARTS; MUDIFICATION KITS; CAPTIVE TESTS; WIND TUNNEL MODELS; DESIGN; LOADING (MECHANICS); ACTUATORS; FLIGHT TESTING; NOSE WHEELS; TAXIING; LANDING GEAR; MALFUNCTIONS; LIFT; CORRECTIONS; EJECTION SEATS; RESONANCE; INSTRUMENTATION; MAINTENANCE; STABILITY; FLIGHT CONTRUL SYSTEMS; STRUCTURAL PROPERTIES; TEMPERATURE; RELIABILITY; HOVERING; SIMULATION; WEIGHT; FLUTTER IDENTIFIERS: V-5 AIRCRAFT; J-85 ENGINES; LOUVERS; LIFT ENGINES

PROPULSION SYSTEM DELIVERIES WERE COMPLETED WITH ACCÉPTANCE UF THE LAST SPARE LIFT FAN. FAN SPEED VTOL AND CTUL FLIGHT CLEARANCE WAS REQUESTED AND GRANTED FOR A/C NUMBER TWO. LIFT FAN AND J85 SPARE PARTS WERE SHIPPED TO EDWARDS AIR FORCE BASE. NUMBER ONE A/C COMPLETED MODIFICATION AND GROUND TESTS AT NASA-AMES PRIOR TO FULL SCALE WIND TUNNEL TESTS. ENGINEERING DESIGN AND ANALYSIS WAS COMPLETED FOR THE HIGHER LOADING IN THE EXIT LOUVER ACTUATION SYSTEM. BOTH AIRCRAFT COMPLETED SYSTEMS FUNCTIONAL TESTS AT SAN DIEGO. A/C NUMBER TWO WAS SHIPPED TO EDWARDS AFB TO BEGIN FLIGHT TESTS AND A/C NUMBER ONE WAS SHIPPED TO NASA-AMES FOR WIND TUNNEL TESTING. NOSE WHEEL SHIMMY ENCOUNTERED DURING TAXI TESTS CAUSING AIRCRAFT DAMAGE. NOSE GEAR REDESIGN AND SUCCESSFUL DYNAMIC AND STATIC TESTS WERE COMPLETED. A SYSTEMS FAILURE EVALUATION WAS CONDUCTED ON THE FLIGHT SINULATOR TO ESTABLISH EMERGENCY PROCEDURES. A/C DAMAGE AS A RESULT OF NOSE GEAR FAILURE WAS CURRECTED. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07

AD-461 447 LING-TEMCO-VOUGHT INC DALLAS TEX LTV VOUGHT AERONAUTICS DIV

XC-142A VTOL TRANSPORT PROGRAM.

(U)

DESCRIPTIVE NUTE: MONTHLY PROGRESS REPT. SEP 64 29P CUNTRACT: AFJ3 657 7868

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

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DESCRIPTORS: (+TRANSPORT PLANES, VERTICAL TAKE-OFF PLANES), (+VERTICAL TAKE-OFF PLANES, TRANSPORT PLANES)+ FLIGHT TESTING, PERFORMANCE (ENGINEERING), TAXIING, AIRCHAFT EQUIPMENT, SPARE PARTS, MANUFACTURING METHODS IDENTIFIERS: C-142 AIRCRAFT, VTOL (U)

A MAJOR MILESTONE WAS ACCOMPLISHED WITH ACHIEVEMENT OF THE FIRST FLIGHT OF THE XC-142A. THE FLIGHT, MADE ON THE 2 AIRCRAFT, WAS 38 MINUTES IN LENGTH DURING WHICH TIME THE AIRCRAFT HANDLING CHARACTERISTICS WERE CHECKED AT AN ALTITUDE OF 10.000 FEET AND A SPEED OF APPROXIMATELY ISC KNOTS, WITH LANDING GEAR DOWN THROUGHOUT THE ENTIRE FLIGHT: TAKEOFF AND LANCING WERE MADE WITH WING AND FLAPS AT 10 DEGREES. THROUGHOUT THE FLIGHT, THE AIRCHAFT DEMONSTRATED SMOOTH RESPONSE AND STABLE AERODYNAMIC CHARACTERISTICS. SEVERAL OTHER ITEMS OF SIGNIFICANCE WERE ACCOMPLISHED IN THE OVERALL TEST PROGRAM. HIGH SNEED TAXI TESTS ON THE 2 AIRCRAFT NERE ACHIEVED: THE SU-HOUR TIE-DOWN TEST ON THE I AIRCRAFT WAS COMPLETED, AS WELL AS THE TEARDOWN INSPECTION OF TRANSMISSION AND PROPULSION (U) SYSTEM COMPONENTS. (AUTHOR)

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GENERAL ELECTRIC CO CINCINNATI OHIO

XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT. (U)

DESCRIPTIVE NOTE: QUARTERLY TECHNICAL PROGRESS REPT. NO. 11, 16 MAY-15 AUG 64. OCT 64 129P CONTRACT: DA44 177TC715

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES: RESEARCH PROGRAM ADMINISTRATION); (+RESEARCH PLANES; RESEARCH PROGRAM ADMINISTRATION); DUCTED FANS: DESIGN; ENGINEERING; TURBOJET ENGINES; STABILITY; FLIGHT CONTROL SYSTEMS; SIMULATION; AIRFRAMES; TEMPERATURE; WIND TUNNEL MODELS; MODEL TESTS; HEAT TRANSFER; COULING; RELIABILITY; MANUFACTURING METHODS; CAPTIVE TESTS; FLIGHT TESTING; PERFORMANCE (ENGINEERING); HANDLING; MANEUVERABILITY; HOVERING; COMPRESSORS; STALLING; LANDING GEAR; NOSE WHEELS; TAILS (AIRCRAFT); EXPERIMENTAL DATA; GRAPHICS (U)

THE LATERAL CONTROL INVESTIGATION WAS COMPLETED WITH THE STATIC LOAD TEST SUCCESSFULLY COMPLETED AT SAN DIEGO, THE NECESSARY HARDWARE MANUFACTURED AND MODIFICATION TO AIRCRAFT NUMBER 2 COMPLETED, WITH EDWARDS VERTICAL THRUST STAND PLUS FLIGHT TESTING VERIFICATION OF THE INCREASED LATERAL CONTROL PUWER. FULL SCALE WIND TUNNEL TESTING WAS COMPLETED WITH AIRCRAFT NUMBER 1, AND THE AIRCRAFT RETURNED TO EDWARUS FOR PREPARATION FOR FLIGHT TEST. LIFT FAN INLET VANE FAILURES WERE EXPERIENCED DURING THE WIND TUNNEL TESTS, MODIFICATIONS DESIGNED, MANUFACTURED, AND TESTED TO ESTABLISH A FLIGHT ENVELOPE. POTENTIAL LONGITUDINAL TRIM PROBLEMS WERE SEEN DURING THE WIND TUNNEL, A HURIZONTAL TAIL SLAT AND INSTRUMENTATION BOOM FOR MEASURING TAIL ANGLE OF ATTACK WERE DESIGNED AND INSTALLED ON AIRCRAFT NUMBER 2. THE NOSE WHEEL SHIMMY INVESTIGATION WAS COMPLETED AND MODIFICATIONS ACCOMPLISHED TO THE AIRCRAFT WHICH ALLOWED SUCCESSFUL CONVENTIONAL FLIGHTS TO COMMENCE MAY 25, 1964. INITIAL HOVER FLIGHTS BEGAN ON JULY 16, 1964. A J85 STALL INVESTIGATION WAS CONDUCTED AS A RESULT OF SEVERAL COMPRESSOR STALLS EXPERIENCED DURING FLIGHT.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07

AD-475 412 1/2 20/4 NAVAL POSTGRADUATE SCHOOL MONTEREY CALIF

AN ANALYSIS OF GROUND EROSION CAUSED BY JET DOWNWASH IMPINGEMENT. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS, 65 101P SHUTER,DAVID V. ;

UNCLASSIFIED REPORT

DESCRIPTORS: (+DOWNWASH; +VERTICAL TAKE-OFF PLANES), EROSION, "HURT TAKE-OFF PLANES; LANDING FIELDS; AERODYNAMIC LOADING; AERODYNAMIC CHARACTERISTICS, FLON FIELDS, JET PLANES; FLUID FLON; BOUNDARY LAYER; THEORY; EXHAUST NOZZLES; EXPERIMENTAL DATA; MATHEMATICAL MODELS; TERRAIN; LIFT; DRAG; PRESSURE; NOZZLES; HAZARUS; SAFETY IDENTIFIERS; FORTRAN; THESES (U)

RECENT INTEREST IN MILITARY VTOL/STOL AIRCRAFT EMPLOYING UNPREPARED LANDING SITES HAS LED TO INTEREST IN THE PROBLEM OF LANDING SURFACE EROSION. SURFACE EROSION IS LAUSED BY THE AERODYNAMIC FORCES ON GROUND PARTICLES EXISTING WITHIN THE FLOW FIELD OF AN IMPINGING JET. THE INVISCID FLOW FIELD IS DISCUSSED AND THE VISCOUS GROUND BOUNDARY LAYER IS ANALYZED UTILIZING BOTH THEORY AND AVAILABLE EXPERIMENTAL DATA. A MATHEMATICAL MODEL OF THE PROCESS OF ENTRAINMENT OF GROUND PARTICLES IS CONSTRUCTED. EROSION RATES IN THE FURM OF ENDSION PROFILES ARE PREDICTED FOR SELECTED JET CONFIGURATION AND TYPES OF TERRAIN. A CRITERIUN FOR ENTRAINMENT. DUE TO BOTH LIFT AND DRAG, WAS FOUND AND PRESENTED FOR SELECTED DISTANCES FROM THE JET CENTERLINE. (AUTHOR)

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DDC REPORT BIBLINGRAPHY SEARCH CUNIRUL NU+ /ZOMO7 AD-430 995 20/4 1/3 THERM ADVANCED RESEARCH INC ITHACA N Y A COMPARISON OF DUCTED PROPELLER THEORY WITH BELL X-(U) 22A EXPERIMENTAL DATA. DESCRIPTIVE NOTE: FINAL REPT., DEC 65 15P HOUGH , GARY R. IKASKEL. ALVIN L. ; TAR-TR-6510 REPT. NO. CONTRACT: NONR-4357(JO) PROJ: NR-212-103 UNCLASSIFIED REPORT DESCRIPTORS: (+SHROUDED PROPELLERS, PRESSURE), (+VENTICAL TAKE-OFF PLANES, SHROUDED PROPELLERS), LEVEL FLIGHT, THREE-DIMENSIONAL FLOW, THEORY, MATHEMATICAL PREDICTION, DUCTED BODIES, WIND TUNNEL MODELS, MODEL TESTS, PERFURMANCE(ENGINEERING), EXPERIMENTAL DATA, DISTRIBUTION, RESEARCH PLANES, MATHEMATICAL MODELS, DUCTED BUDIES, VORTICES, THICKNESS, CAMBER, RING WINGS, AERODYNAMIC LOADING, THRUST, PITCH(MOTION), HUMENTS, CYLINDRICAL BODIES, PROPELLERS(ALRIAL), SHROUD RINGS, AERODYNAMIC CONFIGURATIONS (U) IDENTIFIERS: X-22 AIRCRAFT **(U)** FOR THE FURWARD FLIGHT REGIME, A LIMITED COMPARISON IS MADE BETWEEN THEORETICAL PREDICTIONS OF DUCT PRESSURE DISTRIBUTIONS AND DATA OBTAINED FROM ONE-THIRD AND FULL SCALE MODEL TESTS OF THE X-22A DUCTED PROPELLER UNIT. THE THEORETICAL CALCULATIONS ARE BASED UPON PREVIOUS STUDIES OF DUCTED PROPELLERS WITH FINITE BLADE NUMBER. IT IS FUUND THAT THE THEORY IS IN REASONABLE AGREEMENT WITH EXPERIMENT AND GENERALLY TENDS TO UNDERESTIMATE THE

MEASURED PRESSURES. ALSO, THE CHARACTERISTIC SHAPE OF THE PREDICTED DISTRIBUTION AGREES WELL WITH THE

MEASURED DISTRIBUTION.

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DDC REPORT BIBLIDGRAPHY SEARCH CUNTROL NO. /20M07 AD-482 075 1/3 13/8 LTV VOUGHT AERONAUTICS DIV LING-TEMCO-VOUGHT INC JALLAS TEX (U) XC-142A VTOL TRANSPORT PROGRAM. DESCHIPTIVE NOTE: MONTHLY PROGRESS REPT. NO. 29, MAY 64, MAY 64 33P CONTRACT: AF 33(657)-7868 UNCLASSIFIED REPORT DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, +TRANSPORT PLANES), TILT WINGS, PRODUCTION, CALIBRATION. CHECKOUT PROCEDURES, SCHEDULING, FLIGHT CONTROL SYSTEMS, HEAT TRANSFER, GEARS, FLIGHT TESTING, LANDINGS, FUEL SYSTEMS, STATICS, DROP TESTING,

PROPELLERS (AERIAL), WUALITY CONTROL, CAPTIVE (U) TESTS (U) IDENTIFIERS: C-142 AIRCRAFT

XC-142A VTOL TRANSPORT PROGRAM.

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DDC REPORT BIBLIDGRAPHY SEARCH CONTROL NO. /20007

AD-482 131 1/3 PITTSBURGH UNIV WASHINGTON D C RESEARCH STAFF

RESEARCH AIRCRAFT, XV-5A.

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DESCRIPTIVE NOTE: INTERIM REPT. APR 66 12P CONTRACT: UA-49-186-AMC-214(U) MONITUR: AMC TIR-18+1+3+1

UNCLASSIFIED REPORT

DESCRIPTORS: (*RESEARCH PLANES, VERTICAL TAKE-OFF PLANES), (*VERTICAL TAKE-OFF PLANES, DUCTED FANS), DESIGN, AIRFRAMES, SUBSONIC FLOW, TURBUJET ENGINES, LIFT, THRUST (U) IDENTIFIERS: J-85 ENGINES, V-5 AIRCRAFT (U)

THIS REPORT TRACES THE DEVELOPMENT OF THE XV-5A RESEARCH AIRCRAFT. THE AIRCRAFT, THOUGH PURELY EXPEPIMENTAL, DEMONSTRATES THE PRACTICABILITY OF VTOL LIFT-FAN PROPELLED FLIGHT, COMBINED WITH CONVERSION FROM THE VTOL MODE TO THE CTOL MODE AND FLIGHT IN THE PURELY CONVENTIONAL MODE. THE XV-DA IS AN ALL-METAL, TWIN ENGINE, GAS-PROPELLED, SUBSUNIC, TRI-FAN, TRICYCLE LANDING GEAR, VTOL/CTUL AIRCRAFT. IT IS 44.52 FT. LUNG. ITS WINGSPAN IS 29.83 FT., AND ITS HEIGHT TO THE TOP OF THE VERTICAL STABILIZER IS 14.75 FT. IT IS POWERED BY TWO J85-5B TURBOJET ENGINES. ITS TWO X353-5 WING FANS(LIFT) ARE 62.5 IN. IN DIAMETER. ITS X373-A NOSE FAN (PITCH CONTROL, AND LIFT) IS 36 IN. IN DIAMETER AND IS LOCATED IN THE NOSE AHEAD OF THE COCKPIT. ALL FANS ARE OPERATED BY DIVERTING ENGINE EXHAUST GASES THROUGH CROSSOVER DUCTS TO THE TIP TURBINES ON THE RIMS OF THE FANS. THRUST LOUYERS BELOW THE FANS CONTROL THE THRUST GENERATED BY THE REVOLVING FANS AND EXHAUST GASES. MODIFICATIONS SUGGESTED AS A RESULT OF TESTS ARE BEING MADE AND POSSIBLE MILITARY APPLICATIONS OF LIFT-FAN PRINCIPLES OF PROPULSION TO (U) HEAVY AIRCRAFT ARE BEING MADE. (AUTHOR)

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SEARCH CUNTROL NU. /20M07 DDC REPORT BIBLIOGRAPHY AD-482 425 1/3 LTV VOUGHT AERONAUTICS DIV LING-TEMCO-VOUGHT INC DALLAS TEX (U) XC-142A VTOL TRANSPORT PROGRAM. DESCRIPTIVE NOTE: MONTHLY PROGRESS REPT. NO. 25, FOR JAN 64. JAN 64 32P CONTRACT: AF 33(657)-7868 UNCLASSIFIED REPORT DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, +TRANSPORT PLANES), DESIGN, SCHEDULING, TEST METHODS, FLIGHT TESTING, AIRPLANE MODELS, TEST EQUIPMENT, FLIGHT CONTRUL SYSTEMS, AIRFRAMES, VIBRATION, EJECTION SEATS, SPARE PARTS, GROUND SUPPORT EQUIPMENT, AIR FORCE TRAINING, AIR FORCE PROCUREMENT, ASSEMBLING, AIRCRAFT EQUIPMENT, (U) GROUND EFFECT (U) IDENTIFIERS: C-142 AIRCRAFT

XC-142A VTOL TRANSPORT PROGRAM.

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NU+ /20M07 AD-486 371 1/3 LTV VOUGHT AERONAUTICS DIV LING-TEMCO-VOUGHT INC DALLAS TEX

XC-142A VTOL TRANSPURT PROGRAM.

DESCRIPTIVE NOTE: MONTHLY PROGRESS REPT. NO. 50 FOR FEB 66. FEB 66 16P CONTRACT: AF 33(657)-7868

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DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, +TRANSPORT PLANES), RESEARCH PRUGRAM ADMINISTRATION, SCHEDULING, TRANSMISSIONS, TILT WINGS, FLIGHT TESTING, TIME, TAXIING, TAKE-OFF, HOVEKING, WATER, RUNWAYS, RUBBER COATINGS, MEMBRANES, LANDING MATS, ACIUATURS, DE-ICING SYSTEMS, THRUST, PRUPELLERS(AERIAL) (U) IDENTIFIERS: C-142 AIRCRAFT (U)

A TOTAL OF 141 FLIGHTS AND 20.5 FLIGHT HOURS WERE ACHIEVED. THESE FLIGHTS INCLUDED TAXI RUNS AND STOL OPERATIONS WITH WATER ON THE RUNWAY, THE FIRST VERTICIRCUIT AT NIGHT, STOL PASSES AND HOVER OVER WATER, OFF-RUNWAY TESTS VERTICAL LANDINGS ON A RUBBERIZED MEMBRANE AND STOL AND HOVER WORK OVER FORWARD AREA LANDING MATS. THE CATEGORY 1 FLIGHT TOTAL REMAINED AT 191 FLIGHTS AND 136 HOURS AND 25 MINUTES OF FLIGHT TIME WHILE THE CATEGORY 2 FLIGHTS NUMBERED 46 FOR 54 HOURS AND 24 MINUTES OF FLIGHT TIME. TOTAL TIME UN THE FOUR AIRCRAFT AMOUNTED TO 237 FLIGHTS FOR 190 HOURS AND 49 MINUTES.

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SEARCH CONTROL NO. /ZOMO7 DDC REPORT BIBLIDGRAPHY 1/5 AD-486 932 1/3 LTV VOUGHT AERONAUTICS DIV LING-TEMCO-VOUGHT INC DALLAS TEX (1) XC-142A VTOL TRANSPORT PROGRAM. DESCRIPTIVE NUTE: MONTHLY PROGRESS REPT. NO. 48 FOR DEC 65, DEC HESSE, W. J. ; 65 16P CONTRACT: AF 33(657)-7868 UNCLASSIFIED REPORT . DESCRIPTONS: (+VERTICAL TAKE=OFF PLANES; +TRANSPORT

PLANES), PERFORMANCE(ENGINEERING), FLIGHTTESTING, TURBOPROP ENGINES, ACOUSTIC PROPERTIES,THRUST, STABILITY, STATICS, FLIGHT CONTROLSYSTEMS, AUTUMATIC, SYNCHROS, FLAPS, DUCTINLETS, LEADING EDGE, PROPELLERS(AERIAL),GROUND SUPPORT EQUIPMENTIDENTIFIERS:C=142 AIRCRAFT

DURING THE MONTH, NU. 1 AIRCRAFT MADE A TOTAL OF 14 FLIGHTS FOR 9 HOURS 33 MINUTES FLIGHT TIME, BRINGING THE TOTAL CUMULATIVE TIME FOR THE AIRCRAFT TO 50 HOURS 16 MINUTES IN 69 FLIGHTS. SIGNIFICANT FLIGHT TEST ACCOMPLISHMENTS DURING THE MONTH INCLUDED ACOUSTICAL MEASUREMENTS, ENGINE JET THRUST DETERMINATION, FLYING QUALITY EVALUATION, OFF-FLAP PROGRAMMING, AND LONGITUDINAL STATIC STABILITY INVESTIGATIONS. AT THE END OF THE REPORTING PERIOD, A TOTAL OF 18 PERSONS HAD FLOWN THE XC-142A AIRCRAFT INCLUDING TWO AIR FORCE GENERAL OFFICERS. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMO7

AD-486 998 1/3 LTV VUUGHT AERONAUTICS DIV LING-TEMCO-VOUGHT INC DALLAS TEX

XC-142A VTOL TRANSPORT PROGRAM.

DESCRIPTIVE NUTE: MONTHLY PROGRESS REPT. NO. 52, APR 66. APR 66 19P Contract: AF 33(657)-7868

UNCLASSIFIED REPORT

DESCRIPTORS: (+VERTICAL TAKE-OFF PLAN-S, SYSTEMS ENGINEERING), (+TRANSFORT PLANES, VERTICAL TAKE-OFF PLANES), PROPELLERS(AERIAL), AERODYNAMIC CONFIGURATIONS, STRESSES, HOVERING, TAXIING, FLIGHT TESTING, PERFORMANCE(ENGINEERING), SPARE PARTS, GROUND SUPPORT EQUIPMENT, AIR FORCE TRAINING, TRAINING DEVICES, SCHEDULING (U) IDENTIFIERS: C-142 AIRCRAFT (U)

THE OVER-ALL XC-142A PROGRAM WAS UN SCHEDULE. EVALUATION OF THE NEW CONFIGURATION PROPELLERS (2FF) WAS ACCOMPLISHED ON THE NU. 1 AIRCRAFT WITH GOUD RESULTS. IN ADDITION TO PROP STRESS MEASUREMENTS IN THE HOVER AND CONVENTIONAL FLIGHT MODES, THE AIRCRAFT ACCOMPLISHED & NUMBER OF TAXI TESIS OVER SIMULATED BUMPS ON THE RUNWAY, THE REMAINDER OF THE PERIOD WAS DEVOTED TO READVING THE AIRCRAFT FOR DELIVERY. THE NO. 2 AIRCRAFT PROGRESSED SATISFACTORY THROUGH PORTIONS OF REPAIR WORK, LEADING TO DELIVERY. THE NO. 5 AIRCRAFT UNDERWENT CLEAN CONFIGURATION SHAKEDOWN EARLY IN PREPARATION FOR DELIVERY. THE NO. 3 AIRCRAFT REMAINED IN A DURMANT STATUS, PENDING A REPAIR DECISION. THE NO. 4 AIRCRAFT RETURNED TO FLIGHT STATUS. FLIGHTS WERE CONDUCTED PRIMARILY FOR EXTRACTION CHUTE TOW TESTS TO DETERMINE EXTRACTION (U) LOADS AT VARIOUS SPEEDS.

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AD=487 UO1 1/3 LTV VOUGHT AERONAUTICS DIV LING-TEMCO-VOUGHT INC DALLAS TEX

XC-142A VTOL TRANSPORT PROGRAM.

DESCRIPTIVE NOTE: MONTHLY PROGRESS REPI. NO. 53 FOR MAY 66. May 66 27P

CONTRACT: AF 33(657)-7868

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UNCLASSIFIED REPORT

DESCRIPTORS: (*VERTICAL TAKE-OFF PLANES, TRANSPORT PLANES), RESEARCH PROGRAM ADMINISTRATION, PROPELLERS(AERIAL), STRESSES, HOVERING, AIRCHAFT LANDINGS, TAKE-OFF, AIR DROP OPERATIONS, WEIGHT, PARACHUTE JUMPING, AIRCHAFT FIRES, ENGINE NACELLES, HYDRAULIC COUPLINGS, CARRIEN LANDINGS; WIND, UISCUNNECT FITTINGS, ACTUATORS, FLEXIBLE COUPLINGS, FLIGHT TESTING, PERFORMANCE(ENGINEERING), TAXIING, TRANSMISSIONS (U) IDENTIFIERS: C-142 AIRCRAFT

FLIGHTS ON THE NO. I AIRCRAFT WERE ACCOMPLISHED TO OBTAIN PROP STRESS DATA AND TO EVALUATE FLYING QUANTITIES WITH THE NEW CONFIGURATION PROPELLERS (2FF). IN AUDITION, THE AIRCRAFT HOVERED OVER. LANDED AND TOOK OFF VERTICALLY FROM A 120 FT DIAMETER HELICOPTER LANDING PAD OF POLYESTER RESIN AND FIBERGLASS. A COMPLETELY SUCCESSFUL AIR DROP PROGRAM WAS CONDUCTED AT UTILIZING THE NO. 4 AIRCRAFT. IN 8 HOURS AND 29 MINUTES OF FLIGHT TIME, THE AIRCRAFT ACCOMPLISHED APPROXIMATELY FORTY DROPS OF VARIOUS KINDS, INCLUDING LOADS RANGING FROM 500 TO 4000 POUNDS, 5 AND 95 PERCENTILE DUMMIES AND 1.0 PARATROOPERS. METHUDS EMPLOYED INCLUDED EXTRACTION, GRAVITY AND *DUMP TRUCK* AT VARIOUS ALTITUDES AND FORWARD SPEEDS FROM ZERU TO 125 KNOTS. THE NO. 5 AIRCRAFT FLEW FROM EAFB TO THE AIRCRAFT CARRIER USS BENNINGTON FOR FLIGHT EVALUATION UNDER VARIOUS CONDITIONS. TWO SERIES OF SUCCESSFUL OPERATIONS WERE CONDUCTED, INCLUDING VERTICAL AND SHORT TAKE-OFFS AND LAND.NGS. CONVERSIONS AND RECONVERSIONS AND HOVER WITH WIND OVER THE DECK FROM APPRUXIMATELY 12 TO 37 KNOTS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07

AD-601 022 MELPAR INC FALLS CHURCH VA

SIMULATION UF HELICOPTER AND V/STOL AIRCRAFT., VOLUME I: HELICOPTER ANALYSIS REPORT, (U)

SEP 63 325P TOLER, JAMES R. IMCINTYRE, WALTER (COFFEE, MERLIN P.) CONTRACT: N61339 1205 MONITUR: NAVTRADEVCEN 1205 1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON STUDY, EQUATIONS OF MOTION OF VERTICAL/SHORT TAKEOFF AND LANDING OPERATIONAL FLIGHT/WEAPON SYSTEM TRAINERS.

DESCRIPTORS: (+HELICOPTERS, SIMULATION), (+VERTICAL TAKE-OFF PLANES, SIMULATION), AERODYNAMIC CHARACTERISTICS, MATHEMATICAL MODELS, PROGRAMMING COMPUTERS, ANALOG COMPUTERS, DIGITAL COMPUTERS, M&, HEMATICAL ANALYSIS

THE OBJECTIVE OF THE REPORT IS TO PRESENT THE AERODYNAMIC AND DYNAMIC HELICOPTER EQUATIONS SUPPORTED BY DERIVATIONS AND A COMPREHENSIVE DISCUSSION. THE AERODYNAMIC EQUATIONS ARE DEVELOPED THROUGH A MODIFIED BLADE ELEMENT APPROACH ALTHOUGH OTHER ALTERNATIVE TECHNIQUES ARE CONSIDERED. THE EQUATIONS ARE NOT CONSTRAINED TO A GIVEN, OR A NUMBER OF GIVEN, FLIGHT CONDITIONS BUT ARE VALID FOR THE ENTIRE FLIGHT REGIME INCLUDING HOVER, TRANSITION. AUTOROTATION, THE EFFECTS OF VARYING ALTITUDE, GROUND EFFECTS, AND BLADE AEROELASTICITY IN TWIST. THE DYNAMIC DERIVATION DEVELOPS A SET OF UNABRIDGED AND SIMPLIFIED EQUATIONS OF TRANSLATIONAL AND ANGULAR RATES SPECIFICALLY FOR A TANDEMROTOR HELICOPTER. THE DYNAMIC AND AERODYNAMIC EFFECTS ON THE HELICOPTER ROTOR ARE COMBINED TO PRODUCE EQUATIONS TO DESCRIBE BLADE ACCELERATION, VELOCITY, AND POSITION, WHILE FLAPPING, AT CHUSEN POINTS DURING A ROTATION. A TECHNIQUE IS ALSO PRESENTED FOR GREATLY SIMPLIFYING THE SIMULATION OF A TANDEM-ROTOR HELICUPTER WHICH ELIMINATES THE NECESSITY OF CONSTRUCTION DETAILED, IDENTICAL MATHEMATICAL MODELS (U) FOR THE THO ROTURS.

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NU. /20407

AD-601 151 CURTISS-WRIGHT CORP CALDWELL N J

AN INVESTIGATION OF THE OVER WATER ASPECTS OF VTOL AIRPLANES AT HIGH DISC LOADING. (U)

DESCRIPTIVE NOTE: FINAL REPT. DEC 63 53P DYKE.RAYMOND W. : REPT. NO. 012 26 CONTRACT: NOM-62-0279

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (+VERTICAL TARE-OFF PLANES, DOWNWASH), (+CONVERTIBLE PLANES, MODEL TESTS), HOVERING, WATER, SURFACES, SPRAYS, WATER WAYES, DISKS, LOADING (MECHANICS), SEAPLANE FLOATS, AIR-SEA RESCUES, LIFE RAFTS (U) IDENTIFIERS: X-19 AIRCRAFT, X-100 AIRCRAFT (U)

TESTS, USING SMALL SCALE MODELS OF THE CURTISS-WRIGHT X-100 AND X-19 AIRCRAFT, HAVE BEEN CARRIED OUT TO INVESTIGATE THE DISTURBANCE AND SPRAY CAUSED BY VTOL AIRCRAFT HOVERING ABOVE WATER. FULL SCALE DISC LOADINGS IN THE RANGE 20 TO 70 LB./ SW.FT. WERE REPRESENTED. CORRELATION OF THE MODEL TEST RESULTS WITH FULL SCALE TESTING OF THE X-100 AIRPLANE OVER WATER AT A DISC LOADING OF 23 LB.SQ.FT. AND HEIGHT OF 21 FEET SHOW EX CELLENT AGREEMENT. DOWNWASH EFFECTS ON OBJECTS FLOATING BELOW THE X-19 MODEL WERE ALSO DEMONSTRATED. SPRAY IS SHOWN TO RISE TO CONSIDERABLE HEIGHTS AT THE HIGHER DISC LOAUINGS WITH THE MODELS CLOSE TO THE WATER SURFACE. AND FLOATING OBJECTS MAY BE SUBJECTED TO SEVERE BUFFETING UNDER THESE CONDITIONS. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20H07

AD-601 170 Kellett Aircraft Corp Philadelphia Pa

APPLICATION OF A MECHANICAL GYROSCOPIC STABILIZER TO VTOL AIRCRAFT. (U)

NOV 63 143P REPT. Nú. 220A90 2 Contract: Non-62-0819

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•GYRU STABILIZERS, VERTICAL TAKE-OFF PLANES), (+VERTICAL TAKE-OFF PLANES, GYRU STABILIZERS); DESIGN, AERODYNAMIC CHARACTERISTICS, PLRFORMANCE (ENGINEERING), RELIABILITY, EQUATIONS, DIFFERENTIAL EQUATIONS, MUTION, DAMPING STABILITY (U)

THE APPLICATION OF MECHANICAL GYROSCOPIC STABILIZERS TO VTOL AIRCRAFT HAS BEEN STUDIED FROM DESIGN AND FLYING QUALITIES CONSIDERATIONS. DESIGN OFSTUDIES OF A SINGLE DEGREE OF FREEDUM GYROSCOPIC STABILIZER AND A GYNOSCOPIC STABILIZER BAR HAVE BEEN MADE 10 DEVISE A RELIABLE, LIGHTWEIGHT, COMPACT AND INEAPENSIVE MECHANICAL STABILIZER. THE SELECTION OF PARAMETERS FOR THE DESIGN OF THE STABILIZERS WAS MADE UTILIZING EXISTING ANALYSIS AND STABILITY DERIVATIVES FOR THO TILT WING VTOL AIRCRAFT. THE STABILIZER PARAMETER EVALUATION PROCEDURE WAS ESTABLISHED BASED ON THE AVAILABLE FLYING QUALITIES CRITERIA. THE RESULTS OF THIS PROGRAM SHOW THE SINGLE DEGREE OF FREEDOM STABILIZER IS LESS EXPENSIVE, LIGHIER WEIGHT AND IS MORE COMPACT THAN THE STABILIZER BAR. THE SINGLE DEGREE OF FREEDOM STABILIZER WILL WEIGH 20 POUNDS AND WILL OCCUPY ONE HALF & CUBIC FOUT OF VOLUME TO PROVIDE ATTITUDE AND RATE STABILIZATION ABOUT THE PITCH AND ROLL AXES OF VIOL AIRCRAFT. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20107

AD-602 427

MELPAR INC FALLS CHURCH VA

SIMULATION OF HELICOPTER AND V/STOL AIRCRAFT. VOLUME II. V/STOL ANALYSIS REPURT. STUDY, EQUATIONS OF MOTION OF VERTICAL/SHORT TAKE-OFF AND LANDING OPERATIONAL FLIGHT/WEAPON SYSTEM TRAINERS, (U)

SEP 63 119P MCINTYRE,WALTER : CONTRACT: N61339 1205 MONITUR: NAVTRADEVCEN 1205-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*HELICOPTERS, FLIGHT SIMULATORS), (*VERTICAL TAKE-OFF PLANES, AERODYNAMIC CONFIGURATIONS), TRAINING DEVICES, SIMULATION, SHORT TAKE-OFF PLANES, AERODYNAMIC CHARACTERISTICS, MATHEMATICAL MODELS, TENSOR ANALYSIS, AIRPLANE LANDINGS, SPECIAL PURPOSE COMPUTERS, NAVAL TRAINING (U) IDENTIFIERS: V/STOL AIRCRAFT, EQUATIONS OF MOTION (U)

THE REPORT PROMUTES AN UNDERSTANDING OF V/STOL ANALYSIS FOR SIMULATION PURPOSES AND DEVELOPS EQUATIONS OF MOTION COMPATIBLE TO EITHER ANALOGUE OR REAL TIME DIGITAL SOLUTION. A GENERAL SET OF EQUATIONS OF MOTION ARE DEVELOPED IN WHICH AXIS SYSTEMS AND AERUDYNAMIC COEFFICIENTS ARE MINIMIZED. EQUATIONS OF MOTION ARE THEN DEVELOPED FOR FIVE DIFFERENT V/STOL AIRCRAFT WHEREIN THE NEED FOR ADDITIONAL AXIS SYSTEMS AND AERODYNAMIC COEFFICIENTS FOR A PARTICULAR V/STOL CONFIGURATION IS DEVELOPED. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NU. /20M0/

AU-607 737 Melpar inc falls church va

SIMULATION OF HELICOPTER AND V/STOL AIRCRAFT. VOLUME III: PART I. COMPUTATIONAL METHODS ANALOG. STUDY, EQUATIONS OF MOTION OF VERTICAL/SHORT TAKE-OFF AND LANDING OPERATIONAL FLIGHT/WEAPON SYSTEM TRAINERS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT., MAY 64 23UP CASTLE,R. A. ;GRAY,A. L. ; MCINTYRE,WALTER ; CONTRACT: N61339 1205 MUNITJR: NAVTRADEVCEN , 1205 3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (+HELICOPTERS, SIMULATION); (+VERTICAL TAKE-OFF PLANES, SIMULATION), (+EQUATIONS, MOTION), PROGRAMMING (COMPUTERS), MATHEMATICAL MODELS, ANALOG COMPUTERS, TILT WINGS, SHORT TAKE-OFF PLANES, AIRPLANE LANDINGS, WEAPON SYSTEMS, TRAINING DEVICES, NAVAL TRAINING, AEKODYNAMIC CHARACTERISTICS, FLIGHT SIMULATORS (U)

THIS REPORT DEMONSTRATES METHODS OF MECHANIZING THE EQUATIONS OF MOTION OF HELICOPTERS AND V/STOL AIRCRAFT BY THE USE OF ANALOG COMPUTING EQUIPMENT. THE EQUATIONS OF HOTION OF THESE AIRCRAFT ARE PRESENTED IN NAVTRADEVCEN TECHNICAL REPORTS 1205-1, -2 (AD-601 022, AD-602 427), AND THIS REPORT ASSUMES A KNOWLEDGE OF SUCH EQUATIONS BY THE READER. THE REPORT REVIEWS AND DISCUSSES CRITERIA FOR THE SELECTION OF ANALOG COMPUTER TYPE AS 60 CYCLE AND 400 CYCLE, AND CHOICE OF CARRIER, AS WELL AS SPECIFIC COMPUTER COMPONENTS. A HELICOPTER AND A TILT WING VISTOL ARE SELECTED FOR COMPUTER MECHANIZATION AND THE PRESENTATION OF COMPUTER FLOW DIAGRAMS WHICH MAY BE TYPICAL COMPUTER DIAGRAMS USED IN THE ANALOG SIMULATION OF SUCH AIRCRAFT ARE DISCUSSED. (AUTHOR) (U)

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DDC REPORT BIBLIDGRAPHY SEARCH CONTROL NO. /20M07

AD-607 730 MELPAR INC FALLS CHURCH VA

SIMULATION OF HELICOPTER AND V/STOL AIRCRAFT. VOLUME 111. PART 11. CUMPUTATIONAL METHODS DIGITAL. STUDY. EQUATIONS OF MOTION OF VERTICAL/SHORT TAKE-OFF AND LANDING OPERATIONAL FLIGHT/WEAPON SYSTEM TRAINERS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT., AUG 63 120P TREGUB,BURTON G. ;COFFEE, MERLIN P. ;RUSSELL,C. E.; CONTRACT: N61339 1205 MONITOR: NAVTRADEVCEN , 1205 3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-601 U22, AD-602 427.

DESCRIPTORS: (+HELICOPTERS, SIMULATION), (+VERTICAL TAKE-OFF PLANES, SIMULATION), (+EQUATIONS, MOTION), PROGRAMMING (COMPUTERS), MATHEMATICAL MODELS, DIGITAL COMPUTERS, TILT WINGS, SHORT TAKE-OFF PLANES, AIRPLANE LANDINGS, WEAPON SYSTEMS, TRAINING DEVICES, NAVAL TRAINING, AERODYNAMIC CHARACTERISTICS, FLIGHT SIMULATORS (U)

THIS REPORT WAS WRITTEN WITH THE PURPOSE OF DEMUNSTRATING THE METHODS OF MECHANIZING THE EQUATIONS OF MOTION OF HELICOPTERS AND VISTOL AIRCRAFT BY DIGITAL COMPUTING EQUIPMENT. THE REPORT IS BASED ON THE MECHANIZATION OF THE FINAL EQUATIONS DEVELOPED IN VOLUMES I AND II OF THIS REPORT AND ASSUMES A KNOWLEDGE OF THEM. A GENERAL TREATMENT OF MATHEMATICAL METHODS OF ANALYSIS AND OF DIGITAL CUMPUTER TECHNIQUES IS PRESENTED. THE MATHEMATICAL MODELS DEVELOPED IN VOLUMES I AND II FOR HELICOPTERS, BUTH SINGLE AND TANDEM ROTOR. AND FUR V/STOL AIRCHAFT ARE PRESENTED IN A DIGITALLY APPLICABLE FORM. RECOMMENDATIONS ARE GIVEN FOR COMPUTER MEMORY SIZE AND FOR COMPUTER SOPHISTICATION BASED ON THE FINDINGS OF THE STUDY REPURTED. (AUTHUR)

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AU-608 185 DYNASCIENCES CORP FORT WASHINGTON PA

DOWNWASH IMPINGEMENT DESIGN CRITERIA FOR VTUL AIRCRAFT.

DESCRIPTIVE NUTE: TECHNICAL REPT. FOR JUL 63-MAR 64, AUG 64 137P GEORGE,M. M. PERLMUTTER,A. A. P BUTWER,L. J. ; REPT. NO. DCR-139 CONTRACT: DA44 177AMC65T TASK: 1D121401A14129 MONITUR: TRECOM, TR64 48

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

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DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, DESIGN), (+DOWNWASH, VERTICAL TAKE-OFF PLANES), TERRAIN, PARTICLES, INHIBITION, VISION, FILUTS, DAMAGE, JETS, PERFORMANCE (ENGINEERING), AVIATION ACCIDENTS, PROPELLERS (AERIAL), PRESSURE (U)

THE OBJECTIVE OF THE PROGRAM WAS TO UTILIZE EXISTING DATA FUR THE PREPARATION OF DESIGN CHARTS FUR VIOL AIRCRAFT TO AID IN THE ESTABLISHMENT OF AIRCRAFT DESIGNS THAT WILL ALLEVIATE THE ADVERSE OPERATIONAL CONDITIONS RESULTING FROM DOWNWASH IMPINGEMENT ON TERRAIN. SHECIFIC AREAS OF INVESTIGATION INCLUDED PARTICLE ENTRAINMENT AND INGESTION AND THEIR EFFECT ON PILOT VISION, AIRCRAFT DAMAGE, PERSONNEL INJURY, AND AIRCRAFT SIGNATURE. METHODS TO QUANTITATIVELY PREDICT OPERATIONAL CONDITIONS RESULTING FROM DOWNWASH IMPINGEMENT OF A VIOL AIRCRAFT ARE PRESENTED. (AUTHOR)

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CORNELL AERONAUTICAL LAB INC BUFFALO N Y

THEORETICAL AND EXPERIMENTAL STUDIES OF IMPINGING UNIFORM AND NONUNIFORM JETS, (U)

AUG 64 102P BRADY,W. GORDON ILUDNIG:GARY R.; REPT. NU. CAL-TG-1818-5-1 CUNTRACT: DA44 127AMC18T TASK: 10121401A14129 MONITUR: TRECOM, TR64 42

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: CONTINUATION OF CONTRACT DA44 177TC782. SEE ALSO AD-408 669.

DESCRIPIONS: (+VERTICAL TAKE-OFF PLANES, DOWNWASH), (+JETS, FLUID FLOW), IMPELLERS, DUCTED FANS, BUUNDARY LAYEN, VELOCITY, EXHAUST NOZZLES, BOUNDARY LAYER TRANSITIONS, MATHEMATICAL ANALYSIS, EXPERIMENTAL DATA, MATHEMATICAL MODELS, THEORY, VORTICES, ITERATIVE METHODS, AERODYNAMIC CHARACTERISTICS (U) IDENTIFIERS: IBM 704

THE RESULTS OF AN EXPERIMENTAL INVESTIGATION OF THE FLOW UNDER A NORMALLY IMPINGING NONUNIFORM JET ARE PRESENTED. THE JET VELOCITY PROFILE WAS DESIGNED TO BE REPRESENTATIVE OF ROTORS AND DUCTED FANS. THE JET WAS TESTED AT DISTANCES FROM THE GROUND OF 4, 2, AND 1/2 NUZZLE DIAMETERS. AN APPROXIMATE ANALYSIS WHICH USES AN EMPIRICAL RELATION FOR RADIAL MASS FLOW NEAR THE GROUND IS USED TO CALCULATE THE PROPERTIES OF THE FLOW ALONG THE GROUND AT RADII LARGE ENOUGH 50 THAT THE PRESSURE GRADIENT IS APPROXIMATELY ZERU. A METHOD OF CALCULATING THE PROPERTIES OF THE FLOW IN AN INVISCID, NORMALLY IMPINGING, UNIFORM JET HAS BEEN FORMULATED. THE FORMULATION IS APPLICABLE FOR ALL DISTANCES BETWEEN THE JET NOZZLE AND THE GROUND. SOLUTIONS HAVE BEEN OBTAINED FOR JETS AT NOZZLE-TU-GROUND DISTANCES OF 1/4 AND 1 JET DIAMETERS. THE MATHEMATICAL MOUEL USED WAS BASED ON A VORTEX-SHEET REPRESENTATION, AND SOLUTIONS WERE OBTAINED BY MEANS OF AN ITERATIVE TECHNIQUE USING AN IBM 704 DIGITAL COMPUTER. GUOD AGREEMENT WAS OBTAINED WITH EXPERIMENTAL GROUND-PLANE AND JET-CENTERLINE PRESSURE DISTRIBUTIONS, AND WITH NOZZLE-EXIT VELOCITY PROFILES.

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ODC REPORT BIBLIUGRAPHY SEARCH CONTRUL NO. /20M07

AD-612 927 LING-TEMCO-VOUGHT INC DALLAS TEX LTV VOUGHT AERONAUTICS DIV

DATA REPORT FOR LTV LOW SPEED WIND TUNNEL TEST NUMBER 172, TEST OF HIGH MASS RATE VECTORED PROPULSION FLOW MODEL, (U)

FEB 65 198P MERTAUGH,L. J.,JR.; REPT. NO. 2-5331ú/5R-2172 CONTRACT: JAJ1 124ARU D262 PROJ: 526DE MONITUR: AROD, 5260:3

UNCLASSIFIED REPORT

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DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, WIND TUNNEL MODELS), (+WIND TUNNEL MODELS, VERTICAL TAKE-OFF PLANES), WIND TUNNELS, TESTS, DATA, LIFT, ROLL, PITCH MOTION, DRAG, ANGLE OF ATTACK, AERODYNAMIC CHARACTERISTICS, AERODYNAMIC CONFIGURATIONS, AERODYNAMIC LOADING, THRUST VECTOR CONTROL SYSTEMS, PROPULSION, GAS FLOW

THE WIND TUNNEL DATA RESULTING FROM A LOW SPEED WIND TUNNEL TEST OF A SEMI-SPAN MODEL OF A CLOSE SUPPORT, VTUL AIRCRAFT IS PRESENTED. THE MODEL FEATURES AN INTEGRATED PROPULSION/LIFTING SURFACE SYSTEM AS WELL AS VERTICAL AND HORIZONTAL TAILS LOCATED ON AN AFT, WING TIP EXTENSION. THE PROPULSION SYSTEM EXHAUST FLOW, WHICH IS SIMULATED WITH COLD AIR, CAHAUSTS OVER THE WING TRAILING EDGE FLAP (FLAP JET) AND OUT OF THE LOWER SURFACE OF THE WING (WING OUX JET). THE EXHAUST FLOWS CAN BE INDEPENDENTLY VECTORED THROUGH 90 DEGREES WITH RESPECT TO THE WING CHORD PLANE. THE TEST DATA ARE PRESENTED IN THE FORM OF LIFT AND RULLING MOMENT COEFFICIENTS AS FUNCTIONS OF ANGLE OF ATTACK, AND DRAG AND PITCH MOMENT COEFFICIENTS AS FUNCTIONS OF LIFT COEFFICIENT. THE CUEFFICIENT DATA ARE GIVEN WITH AND WITHOUT THE DIRECT THRUST CONTRIBUTION INCLUDED. THE STATIC THRUST DATA ARE GIVEN IN THE FORM OF LIFT, DRAG, PITCHING MOMENT AND ROLLING MOMENT AS FUNCTIONS OF ANGLE OF ATTACK . NO ANALYSIS OF THE DATA IS PRESENTED. (AUTHOR)

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BEC REPORT BIBLIOGRAPHY SEARCH CUNTRUL NO. /ZOMOT

AD-613 198

LING-TEMCO-VOUGHT INC DALLAS TEX LTV VOUGHT AERONAUTICS DIV

ANALYSIS OF A LOW SPEED WIND TUNNEL TEST OF A HIGH MASS RATE VECTORED PROPULSION FLOW MODEL. (U)

FEB 65 97P STANCIL R. T. MERTAUGH L. J. JR.; REPT. NU. 2=5331J/4R=2166 CONTRACT: DAJ1 124ARU D262 PROJ: 526DE MONITUR: AROD t 5260:2

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DESCRIPTORS: (*WIND TUNNEL MODELS, VERTICAL TAKE-OFF PLANES), (*VERTICAL TAKE-OFF PLANES, WIND TUNNEL MODELS), AERODYNAMIC CONFIGURATIONS, LIFT, DRAG, THRUST, FORCE (MECHANICS), FLOW VISUALIZATION, EXHAUST GASES, PROPULSION, WINGS, JET FLAFS, TAILS (AIRCRAFT), MODEL TESTS, GRAPHICS (U)

AN ANALYSIS OF SELECTED PORTIONS OF THE DATA RESULTING FROM A LOW SPEED WIND TUNNEL TEST OF A SEMI-SPAN MUDEL OF A VTOL AIRCRAFT IS PRESENTED. THE MODEL FEATURES AN INTEGRATED PROPULSION/LIFTING SURFACE SYSTEM AS WELL AS A HORIZONTAL TAIL LOCATED ON AN AFT, WING TIP EXTENSION. THE PROPULSION SYSTEM FLOW, SIMULATED WITH COLD AIR, EXHAUSTS OVER THE WING TRAILING EDGE FLAP (FLAP JET) AND OUT OF THE LOWER SURFACE OF THE WING (WING BOX JET). THE EXHAUST FLOWS CAN BE INDEPENDENTLY VECTORED THROUGH 90 DEGREES. FURCE AND MOMENT DATA ARE PRESENTED FUR BUTH STATIC AND FORWARD FLIGHT CONDITIONS. SOME COMPARISON WITH THEORETICAL PREDICTIONS ARE PRESENTED. PORTIONS OF THE DATA ARE SHOWN WITH THE DIRECT THRUST COMPONENTS REMOVED. THE RESULTS OF THIS ANALYSIS SHOW THAT: (1) THE OUTBOARD LOCATION OF THE HORIZONTAL TAIL PROVIDES A REDUCTION IN AIRPLANE INDUCED DRAG. (2) A SIGNIFICANT PURTION OF THE THEORETICAL JET FLAP EFFECT IS OBTAINED WITH THE WING BOX JET DIRECTED PARALLEL TO THE WING CHORD PLANE. (3) A REDUCED JET FLAP EFFECT IS AVAILABLE WITH DEFLECTIONS OF THE WING BOX JET AWAY FROM THE WING CHORD PLANE,

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NO. /20:407

AD-616 650 UNITED AIRCRAFT CORP NORWALK CONN NURDEN DIV

UNIVERSAL CUNTACT ANALOG DISPLAY (UCAD) RESEARCH. Phase 1. systems analysis.

DESCRIPTIVE NOTE: TECHNICAL PROGRESS REPT., APR 65 112P WILLIAMS,PLTER ; REPT. NO. 1161-R-0011 CONTRACT: NONR448900

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (+FLIGHT INSTRUMENTS, SPECIFICATIONS), (+VERTICAL TAKE-OFF PLANES, FLIGHT INSTRUMENTS), (+TELEVISION DISPLAY SYSTEMS, FLIGHT INSTRUMENTS), DESIGN, SYSTEMS ENGINEERING, ANALOG SYSTEMS, SONAR, CARRIER LANDINGS, HOVERING, ROTARY WINGS

THE RESULTS ARE PRESENTED OF THE SYSTEMS ANALYSIS PHASE OF THE UNIVERSAL CONTACT ANALOG DISPLAY (UCAD) RESEARCH PROGRAMS INITIATED IN JUNE 1964. THE GOAL OF THIS RESEARCH IS THE DEVELOPMENT OF DESIGN SPECIFICATIONS FOR A UNIVERSAL RASTER-SCAN TV FLIGHT INSTRUMENT SUITABLE FOR USE IN FIXED-WING, ROTARY-WING, AND VTUL AIRCRAFT. INFORMATION PARAMETERS WERE IDENTIFIED AND WUANTIFIED BY MEANS OF A SYSTEMATIC ANALYSIS OF AIRCRAFT PERFORMANCE AND FLIGHT INFURMATION REQUIREMENTS. MISSION SEGMENTS. CONSISTING OF COMMON FLIGHT MANEUVERS, WERE DEFINED AS A RESULT OF MISSION ANALYSES. LOOP DIAGRAMS ARE CONFIGURED FOR FIXED- AND ROTARY-WING AIRCRAFT INCORPORATING LINEAR TRANSFER FUNCTIONS. AIRCRAFT RESPONSE CRITERIA ARE DEVELOPED BASED ON A CUMBINATION OF MILITARY HANDLING QUALITY SPECIFICATIONS AND PILOT OPINION REPORTS. DISPLAY AUGMENTATION REQUIREMENTS WERE SPECIFIED. TOTAL DISPLAY INFURMATION REQUIREMENTS FOR FLIGHT CONTROL. PROPULSION SYSTEMS, AND SPECIAL MISSION PARAMETERS (1) WERE ESTABLISHED.

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /ZOMO7

AD-620 442

MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF AERONAUTICS AND ASTRONAUTICS

LOW SPEED AERODYNAMIC CHARACTERISTICS OF JET VTOL AIRCRAFT AT ANGLES OF ATTACK.

DESCRIPTIVE NOTE: MASTER'S THESIS, May 55 90P Kutyna,Donald Jüseph ; Contract: AF33 608 1041

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, AERODYNAMIC CHARACTERISTICS), SUBSONIC CHARACTERISTICS, ANGLE OF ATTACK, PIICH(MOTION), MOMENTS, WIND TUNNELS, MODEL TESTS, EXPERIMENTAL DATA (U)

A VIOL MODEL INCORPORATING A LIFTING FAN MOUNTED VERTICALLY IN THE FUSELAGE WAS TESTED IN THE M. I. T. WRIGHT BROTHERS WIND TUNNEL TO EXAMINE THE VARIATIONS OF THE PITCHING MOMENT AND LUNGITUDINAL FORCES WITH CHANGES IN THE ANGLE OF ATTACK AND FORWARD VELOCITY. THE MODEL WAS TESTED AT ANGLES OF ATTACK BETWEEN =90 DEGREES, BUT THE RESULTS WERE CONSIDERED RELIABLE ONLY UP TO +45 DEGREES DUE TO STALLING OF THE MODEL FAN BLADES. MOMENT WAS FOUND TO BE UNSTABLE BETWEEN THE MEASURED ANGLES OF ATTACK FROM -45 DEGREES TO +10 DEGREES, INCREASING MODERATELY AS ANGLE OF ATTACK INCREASED. AN INCREASE IN THE RATIO OF FORWARD VELOCITY TO FAN EFFLUX VELOCITY ALSO PRODUCED AN INCREASED MOMENT. A THEORY DEVELOPED BY A. R. KRIEBEL BASED UPON A FOURIER ANALYSIS OF THE VORTEX DISTRIBUTION ON A THIN CYLINDRICAL DUCTED FAN WAS EMPLOYED TO PREDICT THE RESULTS OF THE EXPERIMENT. CONSIDERING THE SIMPLIFYING ASSUMPTIONS USED IN THE THEORY, THE CORRELATION WAS FOUND TO BE REASONABLY GOUD EXCEPT AT HIGH RATIOS OF FREE STREAM TO FAN EFFLUX VELOCITY. AT THESE RATIOS, AN UNCOMPENSATED FOR LOW PRESSURE AREA AFT OF THE EXHAUST DUCT RESULTED IN CONSIDERABLY ERRUNEOUS PREDICTIONS. THRUST GENERALLY INCREASED WITH ANGLE OF ATTACK AND VARIED WITH THE VELOCITY RATIO, THE VARIATION BEING RELATED TO THE SIGN OF THE ANGLE OF ATTACK. (AUTHOR) (U)

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WITH AND WITHOUT GROUND BOARD EFFECTS ARE PRESENTED. (U)

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FORM OF LIFT, DRAG, PITCHING MOMENT AND ROLLING MOMENT AS FUNCTIONS OF ANGLE OF ATTACK. TEST DATA

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DDC REPORT BIBLIGGRAPHY SEARCH CUNTROL NG. /ZOMO/ AD-621 684 HUGHES TOOL CO CULVER CITY CALIF AIRCHAFT DIV AIRCRAFT DESIGN XV-9A HOT CYCLE RESEARCH (U) AIRCRAFT. DESCRIPTIVE NOTE: FINAL SUMMARY REPT. FOR 28 SEP 62-15 MAR 65. AUG 65 326P HIRSH, NORMAN B. REPT. NO. HTC-AD-64-11 (385-X-05) CONTRACT: DA44 177AMC877T TASK: _ 1M121401A14403 TR-65-29 MONITUR: USAAVLABS . - UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: SEE ALSO AD-613 339.

DESCRIPTORS: (•VERTICAL TAKE-OFF PLANES, RUTARY WINGS), DESIGN, GAS GENERATUR ENGINES, JET PROPULSION, ROTOR BLADES(ROTARY WINGS), AERODYNAMIC CONFIGURATION, WEIGHT, PAYLOAD, FLIGHT CUNTRUL SYSTEMS, HOVERING, LEVEL FLIGHT, STABILITY, AERODYNAMIC LOADING, AERODYNAMIC CHARACTERISTICS, PERFORMANCE(ENGINEERING) (U) IDENTIFIERS: XV-YA AIRCRAFT, YT-64 GAS GENERATOR (U)

A SUMMARY OF THE DESIGN OF THE XV-9A HOT CYCLE RESEARCH AIRCRAFT IS PRESENTED. A DISCUSSION OF THE CONCEPTS UTILIZED IN DESIGN AND ADDITIONAL INFORMATION RELATING TO CONFIGURATION. WEIGHT AND BALANCE, PERFORMANCE, STABILITY AND CONTROL. DYNAMICS, AND STRUCTURAL CHARACTERISTICS ARE PRESENTED. (AUTHOR)

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DDC REPORT BIBLIUGRAPHY SEARCH CUNTROL NO. /20M0/ AD-622 205 NAVAL PUSTGRADUATE SCHOOL MUNTEREY CALIF A QUALITATIVE DISCUSSION OF THE STABILITY AND CONTROL OF VIUL AIRLRAFT DURING HOVER (OUT OF GROUND EFFECT) AND TRANSITION. (U) DESCRIPTIVE NUTE: MASTER'S THESIS, 64 702 NEITZ PAUL J. ; UNCLASSIFIED REPORT DESCRIPTORS: (VERTICAL TAKE-OFF PLANES, HOVERING), STABILITY, CONTROL, DAMPING, AILERONS, YAN, DEFLECTION, DUCTED FANS, PROPELLERS(AERIAL), PITCH(HOTION), JET PLANES, TURBOJET ENGINES, THRUST, RESEARCH PLANES (U) IDENTIFIERS: THESES (M) A SURVEY OF THE LATEST AVAILABLE LITERATURE WAS MADE IN ORDER TO WUALITATIVELY DISCUSS STABILITY AND CUNTROL PROBLEMS OF VERTICAL TAKEOFF AND LANDING (VTOL) AIRCRAFT DURING HOVER (OUT OF GROUND EFFECT) AND THE TRANSITION TO LEVEL FLIGHT. MODES OF PROPULSION AND METHODS OF PERFORMING THE TRANSITION MANEUVER ARE DISCUSSED. CUMPARISONS ARE MADE OF THE VARIOUS METHODS UTILIZED FOR PROVIDING CONTROL FORCES AT ZERO AND VERY LOW SPEEDS. THE NEED FOR QUANTITATIVE CONTROL POWER REQUIREMENTS AND HANDLING QUALITIES CRITERIA IS PRESENTED. THE INSTABILITY OF VTUL AIRCRAFT WHILE HOVERING IS DISCUSSED, AS ARE THE BASIC REASONS FOR THE POOR DAMPING CHARACTERISTICS AT LOW SPEEDS. PROBLEMS WHICH HAVE BEEN ENCOUNTERED TO DATE WITH RESEARCH AIRCRAFT AND WHICH ARE PECULIAR TO A GIVEN VTOL MODE ARE DISCUSSED BY HUDE. THE NEED FOR AUTOMATIC STABILIZATION AND PRECISION INSTRUMENTATION (U) REQUIREMENTS ARE PRESENTED. (AUTHOR)

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DDC REPORT BIBLIDGRAPHY SEARCH CONTROL NO. /ZOMO7

AU-622 578 Lockheed-california (CU Burbank

STUDY OF SIZE EFFECTS ON VTOL HANDLING QUALITIES CRITERIA,

SEP 65 97P JOHNSTON, J. FORD (CULVER, IRVEN H. FRIENU, CARL F. REPT. NU. LR-18408 CONTRACT: DA44 177AMC236T TASK: 1P121401A14178 MONITUR: USAAVLABS, TR-65-24

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

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DESCRIPTORS: (+VERTICAL TAKE=OFF PLANES, CONTROL), DESIGN, DYNAMICS, FLIGHT, JET PLANES, HELICOPTERS, YAW, PITCH(MOTION), ROLL, STABILITY, HOVERING, HUMAN ENGINEERING, DAMPING (U)

A FUNDAMENTAL STUDY IS PRESENTED OF THE EFFECTS OF VEHICLE SIZE ON HANDLING QUALITIES OF JET AND HELICUPTER-TYPE VTOL AIRCRAFT AT HOVER AND LOW SPEEDS, SIZE BEING DEFINED BY THE CHARACTERISTIC LINEAR DIMENSION. THE EFFECTS OF SIZE ON VEHICLE HANDLING QUALITIES CAPABILITY AND PILOT-VEHICLE CUMPATIBILITY ARE DEVELOPED. CONSIDERATION IS GIVEN TO THE PILOT AS AN ADAPTIVE NONLINEAR SERVO. THE STUDY INDICATES: (1) CONTROL POWER/ INERTIA AND DAMPING/INERTIA TEND TO DECREASE WITH SIZE. (2) EXCEPT FOR TALL ROTOR HELICUPTERS IN YAW, FINAL ANGULAR RATES ARE RELATIVELY INVARIANT WITH SIZE. (3) CHARACTERISTIC TIME TO REACH FINAL ANGULAR RATE INCREASES WITH SIZE. (4) LINEAR ACCELERATIONS AND MOTIONS ARE NEARLY INVARIANT WITH SIZE. (5) EFFECTS OF EATERNAL DISTURBANCES AND TRIM CHANGES WITH SPLED ON JET VTOL VEHICLES DECREASE AT LEAST AS RAPIDLY AS CONTROL POWER/ INERTIA. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07 AD-623 100 AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING EFFECTS OF WEIGHT, INERTIA, AND VELOCITY ON CONTROL POWER REQUIREMENTS FOR VIOL AIRCRAFT. (U) DESCRIPTIVE NUTE: MASTER'S THESIS. AUG 65 71P ROMINE, BYRON HARL : REPT. NU. GE/EE/65-20 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: DESCRIPTORS: (VERTICAL TAKE-OFF PLANES, STABILIZATION SYSTEMS), (+STABILIZATION SYSTEMS,

POWER), STABILITY, CONTROL SYSTEMS, WEIGHT, VELOCITY, ROLL, AILENONS IDENTIFIERS: VZ-4 AIRCRAFT (U)

THE PILUT-VEHICLE SYSTEMS AWALYSIS IS APPLIED TO THE PROBLEM OF DETERMINING THE EFFECTS OF GROSS WEIGHT, INERTIA, AND VELOCITY ON THE STABILIZATION CONTROL POWER REQUIREMENTS FOR THE SINGLE-LOOP ROLL CUNTROL SYSTEM OF A DOAK VZ-4 VTOL AINCRAFT. THE AIRCRAFT IS SUBJECTED TO RANDOM ROLL INPUTS IN THE FURM OF ATMUSPHERIC DISTRUBANCES. ONLY THE CONTROL POWER REQUIRED TO STABILIZE THE AIRCRAFT ROLL ANGLE BY THE PILOTIS USE OF AILERONS ALONE IS CONSIDERED. THE OPEN-LOUP GAIN OF THE SYSTEM IS DETERMINED BY MAXIMIZING THE CLOSED-LUOP DAMPING RATIO. THERE ARE NO SIGNIFICANT DIFFERENCES IN THE STABILIZATION CONTROL POWER REQUIREMENTS AT THE GROSS WEIGHT CONDITIONS ANALYZED. INCREASED MOMENTS OF INERTIA DO NOT DRIVE THE SYSTEM UNSTABLE, BUT THE CONTROL POWER REQUIREMENTS DECREASE BY ABOUT SIXTY PER CENT AS THE MUMENTS OF INERTIA ARE INCREASED FROM 2800 SLUGSQ FT TO 3300 SLUG-SW FT. (AUTHOR) (U)

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DDL REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMO7 AD-623 514 ARMY AVIATION TEST ACTIVITY EDWARDS AFB CALIF PRELIMINARY PILOT QUALITATIVE EVALUATION OF THE XV-54 RESEARCH AIRCRAFT. **(U)** DESCRIPTIVE NOTE: LETTER REPT. UCT 65 482 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, FLIGHT TESTING), FLIGHT CONTROL SYSTEMS, RESEARCH PLANES, TURBOJET ENGINES, LANDINGS, OPERATION, (0) STABILITY, FANS IDENTIFIERS: V-5 AIRCRAFT **(U)** THE PRIMARY OBJUBJECTIVE OF THE TESTS WAS TO INVESTIGATE THOSE AIRCRAFT CHARACTERISTICS DIRECTLY INFLUENCED BY THE LIFT-FAN CONCEPT. THE REPORT CONTAINS THE RESULTS OF THE PRELIMINARY PILOT EVALUATION OF THE XV-5A AIRCRAFT DURING THE STABILITY AND CONTROL PORTION OF THE U. S. ARMY FLIGHT TEST PROGRAM.

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DDC REPORT BIBLIDGRAPHY SEARCH CUNTROL NO. /20M07 AU-623 527 VTOL SYSTEMS DIV CURTISS-WRIGHT CORP CALDWELL N J A THEORY FOR VTUL PROPELLER OPERATION IN A STATIC (U) CONDITION. DESCRIPTIVE NOTE: FINAL REPT. FOR JUN 64-MAY 65. 858 ERICKSUN, JOHN C. JR. ; UCT 65 LADDEN, KICHARD M. ; BORST, HENRY V. ; ORDHAY, DUNALD E. . CONTRACT: DA44 177AMC165T PROJ: 1M1214UID14415 MONITUR: USAAVLABS . TR-65-69 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: SUBCONTRACTED TO THERM ADVANCED RESEARCH, INC., ITHACA, N. Y. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, PROPELLERS(AERIAL)), (+PROPELLERS(AERIAL), PERFURMANCE(ENGINEERING)), LIFT, VORTICES, WAKE, STATICS, THEORY, DEFORMATION, PROGRAMMING(COMPUTERS), MATHEMATICAL ANALYSIS (U) A GENERAL THEORY FOR PERFORMANCE CALCULATIONS WAS FORMULATED BASED ON A CONTINUOUS VORTEX REPRESENTATION ALONG THE LINES OF THE CLASSICAL LIFTING-LINE MODEL. AS UPPOSED TO FORWARD FLIGHT, THE DEFURMATION OF THE WAKE IS APPRECIABLE JUST BEHIND THE PROPELLER, AND ITS DETERMINATION CUNSTITUTES THE HEART OF THE STATIC PROBLEM. A COMPUTER PROGRAM HAS BEEN DEVELUPED TO CALCULATE BUTH THE INFLOW AT THE PROPELLER AND THE INDUCED VELOCITY AT ANY FIELD POINT FOR AN ARBITRARY DESCRIPTION OF THE TRAILING VURTEX SHEETS. TO APPROAIMATE THE FURCE-FREE CONDITION IMPOSED ON THE WAKE, AN INITIAL WAKE HYPOTHESIS DERIVED FROM THE THEORY OF THE GENERALIZED ACTUATOR DISK WAS FIRST USED. THE RESULTING COMPARISONS WITH BOTH DETAILED AND GROSS MEASUREMENTS WERE UNSATISFACTORY AND A REFINED HYPOTHESIS WAS DERIVED. THE REFINED WAKE HYPOTHESIS PROVIDES & MORE REASONABLE REPRESENTATION OF THE 'PITCH' OF THE ELEMENTS OF THE DEFORMED TRAILING VORTEA SHEETS AS WELL AS THE (0) ENVELOPE OF THEIR TRAJECTORIES. (AUTHOR)

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DDC REPORT BIBLIOGKAPHY SEARCH CONTROL NU. /ZOMO7

AD-626 617 1/5 REPUBLIC AVIATION CORP FARMINGDALE N Y

FEASIBILITY STUDY ON THE DESIGN AND DEVELOPMENT OF A VTOL BLAST CONTROLLING PLATFORM. (U)

DESCRIPTIVE NUTE: TECHNICAL REPT., AUG 65 87P BARTHA,S. ;RINGLER,F. H. ; REPT. NO. C-6091-U5 CONTRACT: DA-22-U79-ENG-435 PROJ: DA-1-DU21701A047 MONITUR: AEWES, 3-123

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES; LANDING MATS); (+LANDING MATS; VERTICAL TAKE-OFF PLANES); (+EXHAUST; DEFLECTION); MODEL TESTS; FLASIBILITY STUDIES; DESIGN; AIRCRAFT ENGINES; JET ENGINES

A CUNCEPT WAS DEVELOPED FOR A PORTABLE VERTICAL TAKE-OFF AND LANDING BLAST DIVERTING PLATFORM WHICH WOULD DIRECT THE EXHAUST BLAST AWAY FROM THE AIRCRAFT AND INTO THE AIR TO PREVENT TERRAIN ENROSION, HOT GAS REINGESTION, GROUND EFFECTS, AND SIGNATURE. THE PLATFORM WOULD BE ASSEMBLED ON SITE FROM MODULAR SECTIONS, EACH SECTION CONTAINING DEFLECTOR VANES AND TOPPED BY A LOAD BEARING GRID. THE FEASIBILITY OF THIS CONCEPT HAS BEEN DEMONSTRATED BY SCALE MODEL TESTING. THE RESULTS INDICATE THAT SUCH A PLATFORM IS EFFICIENT IN CONDUCTING ENGINE EXHAUST BLAST AND ACCOMPANYING ENTRAINED AIR WAY FROM THE AIRCRAFT. SIGNIFICANT REDUCTION IN THRUST LOSS AND LOWER SURFACE TEMPERATURE ON THE AIRCRAFT MUDEL WERE OBSERVED. (AUTHOR)

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DOL REPORT BIBLIOGRAPHY STARCH CONTROL NO. /ZOMO7

AD-627 361 1/3 HUGHES TOOL CO CULVER CITY CALIF AIRCRAFT DIV

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COMPONENT TESTING XV-YA HOT CYCLE RESEARCH AIRCRAFT.

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DESCRIPTIVE NOTE: SUMMARY REPT. 29 SEP 62-15 MAR 65, NOV 65 199P DEVEAUX,G. D. : REPT. NO. HTC-AD-64-26 (385-T-16) CONTRACT: DA-44-177-AMC-877(T) TASK: IM:21401014403 MONITUR: USAAVLA65, TR-65-38

UNCLASSIFIED REPORT

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SUPPLEMENTARY NOTE: SEE ALSO AD-621 684.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, ROTOR BLADES(RUTARY WINGS)), (+ROTOR BLADES(ROTARY WINGS), TESTS), JET HELICOPTER ROTORS, FATIGUE(MECHANICS), ROTARY WINGS, FREQUENCY, JUINTS, RESEARCH PLANES (U) IDENTIFIERS: V-9 AIRCRAFT (U)

THE COMPONENT TESTS INCLUDED FATIGUE TESTS OF THE BLADE RUGT-END AND CONSTANT SECTION AREAS, HUB GIMBAL SYSTEM, SFAR-TO-SEGMENT AND ROOT-FITTING-TO-SPAR ATTACHMENTS, AND MATERIAL EVALUATION TESTS OF THE BLADE SPARS. SEALING TESTS WERE CONDUCTED ON THE JUINT BLTWEEN THE Y-DUCT AND TRIDUCT IN THE HUB AREA, THE JUINT AREA BETWEEN THE GAS GENERATOR AND DIVERTER VALVE, AND THE FIXED-DUCT JUINT ON THE ROTOR BLADE. BLADE NATURAL FREQUENCY TESTS WERE CONDUCTED TO ENSURE THAT THE NATURAL FREQUENCIES OF THE ROTOR BLADE WOULD NOT BE IN A CRITICAL FREQUENCY RANGE. THE INSTRUMENTED FLIGHT BLADE WAS CALIBRATED IN A TEST FIXTURE BEFORE THE FLIGHT TEST PROGRAM. (AUTHOR)

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NU. /20M07

AU-627 370 1/2 PRINCETUN UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES

AN ANALYTICAL STUDY OF THE DYNAMICS OF AIRCRAFT IN UNSTEADY FLIGHT, (U)

OCT 65 234P CURTISS,H.C.,JR.; REPT. NO. AEROSPACE/MECHANICAL SCI-709 CONTRACT: DA-44-177-AMC-8(T) TASK: 1D121401A14203 MONITOR: USAAVLABS, TR-65-48

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

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DESCRIPTORS: (+AIRCRAFT, AERODYNAMICS), (+VERTICAL TAKE-OFF PLANES, AERODYNAMICS), FLIGHT, DIFFERENTIAL EQUATIONS, DYNAMICS, STABILITY

THE DYNAMIC RESPONSE OF CONVENTIONAL AND VTOL AIRCRAFT WITH VARYING FLIGHT VELOCITY IS INVESTIGATED. IT IS ASSUMED THAT THE DYNAMIC MOTIONS OF AIRCRAFT MAY BE DESCRIBED BY LINEAR DIFFERENTIAL EQUATIONS WHOSE COEFFICIENTS (STABILITY DERIVATIVES) ARE FUNCTIONS OF FLIGHT VELOCITY, AND THEREFORE VARY WITH TIME. PRIMARY EMPHASIS IS PLACED ON THE EVALUATION OF THE GENERAL NATURE OF THE VEHICLE RESPONSE AND ITS DEPARTURE FROM FROZEN SYSTEM (CONSTANT COEFFICIENTS) CHARACTERISTICS. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTRUL NO. /20107

AD-625 669 1/1 Kellett Aircraft Corp Willow Gruve Pa

DOWNWASH TESTS OF THE DUAL TANDEM DUCTED PROPELLER VTOL RESEARCH AIRCRAFT CONFIGURATIONS TO EVALUATE ENGINE INLETS, PROTECTION DEVICES AND STUDY AERODYNAMIC INTERFERENCE, (U)

NOV 65 158P CURTISS,H. C. ,JR.; REPT. NU. 179780-12, CONTRACT: NO#-64-0439

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTONS: (+VERTICAL TAKE-OFF PLANES, DUWNWASH), (+AERODYNAMIC CONFIGURATIONS, RESEARCH PLANES), ENGINE AIR SYSTEMS COMPONENTS, FLIGHT IESTING, DRAG, THRUST, PRUPELLER BLADES, SIMULATION, INTERFERENCE, SAFETY DEVICES (U)

A FULL SCALE HALF-MODEL SIMULATION OF A DUAL TANDEM DUCTED PROPELLER VIOL AIRGRAFT WAS TESTED UNDER THE SEVERE ENVIRONMENT CAUSED BY OPERATION SIMULATING VERTICAL FLIGHT IN CLOSE PROXIMITY TO SAND AND CRUSHED STONE COVERED TERRAIN. FOUR ENGINE INLET PROTECTION DEVICES WERE EVALUATED IN THIS SERIES OF TESTS. A WING-LIKE DEFLECTOR DEVICE WAS TESTED IN TWO CONFIGURATIONS OF DIFFERENT CHORD LENGTHS. A FULL INLET SCREEN AND A BLOCKED HALF-SCREEN INLET PROTECTION DEVICE WERE ALSO TESTED. IT WAS FOUND THAT DUE TO ITS LOCATION IN THE UPFLOW REGION, THE FULL SCREEN TENDED TO COLLECT PARTICLES AND THEREBY AGGRAVATED INLET INGESTION. THE BLOCKED HALF-SCREEN AND THE DEFLECTOR DEVICES SIGNIFICANILY REDUCED INGESTION, BUT HERE NOT SUFFICIENTLY EFFECTIVE TO POSITIVELY PREVENT ENGINE DAMAGE. TESTS OVER CRUSHED STUNE CAUSED SIGNIFICANTLY WORSE INLET INGESTION AND AIRFRAME DAMAGE PROBLEMS THAN (0) THOSE EXPERIENCED OVER SAND. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20407

AD-629 UD4 14/2 1/3 PRINCETUN UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES

A SURVEY OF V/SIGL WIND TUNNEL WALL CURRECTIONS AND TEST TECHNIQUES, (U)

DEC 65 87P OLCOTT, JOHN W. ; REPT. NU. 725, CONTRACT: NONR-1858(14) PROJ: NR-212-155.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES: MODEL TESTS), (+WIND TUNNELS, CORRECTIONS), TEST METHODS, ERRURS, WAKE, LIFY, REVIEWS, WIND TUNNEL MUDELS, DESIGN, TILT WINGS, PROPELLERS(AERIAL), AIRSHIPS IDENTIFIERS: FLYING WIND TUNNELS

A DISCUSSION OF WIND TUNNEL BOUNDARY CORRECTIONS AS THEY APPLY TO VIOL MODEL TESTING IS PRESENTED. CUNVENTIONAL WALL CORRECTION THEORY IS INADEQUATE SINCE IF FAILS TO ACCOUNT FOR BUTH THE PRESENCE OF A HIGHLY DEVELOPED WAKE AND THE TOTAL LIFT ACTING ON THE MUDLL. CORRECTION THEORIES THAT DU CONSIDER THE LIFT AND WAKE CHARACTERISTICS OF VTOL DESIGNS GIVE SATISFACTORY RESULTS. PROVIDED THERE IS NO WAKE DISTORTION DUE TO THE INTERFERENCE OF TUNNEL WALLS. BOTH THE HEYSON AND KIRKPATRICK VTOL BOUNDARY CORRECTION THEORIES ARE EXAMINED AND THEIR LIMITATIONS DISCUSSED. A COMPARISON OF FREE AIR AND TUNNEL RESULTS FOR A .165SCALE NORTH AMERICAN AVIATION TILT WING DESIGN AND A FREE AIR STUDY OF AN EARLY HAMILTON STANDARD XC 142 PROPELLER MODEL ARE DISCUSSED. THE PROPELLER DATA AGREED WITH THEORETICALLY PREDICTED VALUES, BUT DISCREPANCIES, PARTICULARLY IN DRAG FORCE, APPEARED WHEN THE AIRSHIP NORTH AMERICAN AVIATION DATA WERE COMPARED WITH SIMILAR JUNNEL RESULTS. THE EXALT CAUSE OF THE DIFFERENCES WAS NOT DETERMINED. THE IMPURTANCE OF THE VTOL MODEL WAKE IS SUBSTANTIATED. MINIMUM TUNNEL SIZES NECESSARY TO AVOID WAKE IMPINGEMENT AND DISTURBANCE ARE PRESENTED. (AUTHOR) (U)

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DDC REFORT BIBLIOGRAPHY SEARCH CONIROL NO+ /20007 AD-630 924 1/1 20/4 GRUMMAN AIRCRAFT ENGINEERING CORP BETHPAGE N Y

WIND TUNNEL TEST OF 1/7 SCALE MODEL OV-1.

DESCRIPTIVE NUTE: FINAL REPT., DEC 65 BUP SHEPHEARD, FRED W.; CONTRACT: DA-44-177-AMC-271(T) TASK: IP125901A14203, MONITOR: USAAVLABS, TR-65-73

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, AERODYNAMIC CHARACTERISTICS), MODEL TESTS, WIND TUNNEL MODELS, DRAG, LIFT, PITCH(MOTION), AIRCRAFT CANÚPIES, NACELLES, FUSELAGES, AIRPLANE MODELS (U) IDENTIFIERS: V-1 AIRCRAFT (U)

WIND TUNNEL TESTS WERE CONDUCTED ON A 1/7 SCALE MODEL OF THE OV-1 AIRPLANE TO DETERMINE THE POWER-OFF DRAG, LIFT, AND PITCHING MOMENT CUEFFICIENTS OF THE MODEL AND ITS VARIOUS COMPONENTS. SIGNIFICANT DRAG DIFFERENCES WERE MEASURED BETWEEN PRODUCTION CANUPY AND NACELLE CONFIGURATIONS AND STREAMLINED FUSELAGE AND NACELLE CONFIGURATIONS, BUT ARE NOT CONSIDERED APPLICABLE. NO OTHER SIGNIFICANT DRAG DIFFERENCES WERE MEASURED. (AUTHOR) (U)

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OUC REPORT BIBLINGRAPHY SEARCH CUNTRUL NO. /20M07 1/3 21/5 AD-631 413 HUGHES TOUL CO CULVER CITY CALIF AIRCHAFT DIV GROUND AND FLIGHT TESTS, XV-9A HOT CYCLE RESEARCH (0) AIRCRAFT. DESCRIPTIVE NUTE: SUMMARY REPT., 10 AUG 64-5 FEB 65. 156P PIEPER, C. W. I MAR 66 REPT. NU. HTC-AD-65-13. CUNTRACT: DA-44-177-AMC-877(T) TASK: 1M121401014403, MONITOR: USAAVLABS . TK-65-68 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: DESCRIPTORS: (+GAS TURBINES, THERHUDYNAMIC CYCLES). (+VERTICAL TAKE-UFF PLANES, TESTS), (THERMODYNAMIC CYCLES, HELICOPTER ENGINES) . (HELICOPTER ENGINES, PERFORMANCE(ENGINEERING)), HELICOPTER ROTORS, FLIGHT TESTING, STRUCTURAL PRUPERTIES, FROPULSION, RESEARCH PLANES, FEASIBILITY STUDIES, TEST EQUIPMENT, (U) LOADING (MECHANICS), COULING (U) IDENTIFIERS: V-9 AIRCRAFT THE PERFORMANCE, STRUCTURAL QUALITIES, AND FEASIBILITY OF THE HOT CYCLE ROTOR AND PROPULSION SYSTEM WERE SUCCESSFULLY VERIFIED FOR ALL NORMAL HELICOPTER FLIGHT MODES. GROUND TESTS CONSISTED OF PREFLIGHT AND TIE-DOWN TESTS, WHICH PROVIDED A FUNCTIONAL CHECKOUT OF THE AIRCRAFT SYSTEMS AND TEST INSTRUMENTATION AND A FINAL CHECKOUT UF THE COMPLETED AIKLRAFT PRIOR TO START OF FLIGHT TESTS. THE 15 HOURS OF FLIGHT TESTING INCLUDED EVALUATION OF

AIRCRAFT AND ROTOR SYSTEM PERFORMANCE, FLIGHT LOADS, COOLING, AND FLYING QUALITIES IN VARIOUS FLIGHT

MODES. (AUTHOR)

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DDC REPORT BIBLIDGRAPHY SEARCH CUNIROL NO. /ZDM07 AD-634 777 1/1 DAVID TAYLOR MODEL BASIN WASHINGTON D C AERUDYNAMICS LAB WIND-TUNNEL INVESTIGATION OF THE HOVERING, TRANSITION, AND CRUISING PERFORMANCE OF AN ARRESTED (U) ROTOR (TRIDENT) VTOL AIRCRAFT CONCEPT. DESCRIPTIVE NUTE: FINAL REPT., BRASSEUR, GARY N. IMAGUIRE, FE8 66 43P WILLIAM B. 1 REPT. NO. OTM8-2172, DTM8-AERO-1101 PROJ: .632-542. UNCLASSIFIED REPORT DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, PERFURMANCE (ENGINEERING)), HOVERING, RUTARY

WINGS, MODEL TESTS, AERODYNAMIC CHARACTERISTICS.

WINGS, FLIGHT TESTING

WIND-TUNNEL TESTS WERE CONDUCTED TO EVALUATE STATIC STABILITY AND CUNTROL CHARACTERISTICS WITH EMPHASIS ON DETERMINING THE MAGNITUDE OF TRANSITION PROBLEMS. EVALUATING THE COMPATIBILITY OF THE COMPETING INTERNAL AND EXTERNAL AERODYNAMIC REQUIREMENTS FOR HIGH STATIC LIFT AND EFFICIENT CRUISING WAS AN ADDITIONAL TEST OBJECTIVE. TEST RESULTS SHOW THAT THE MUDEL EXHIBITS A STRONG DIRECTIONAL TRIM SHIFT THROUGH TRANSITION. THE PATTERN SELECTED FOR ROTOR ARRESTMENT DURING EVALUATION OF THE TRANSITION CHARACTERISTICS WAS NOT ACCEPTABLE ON THE BASIS OF POWER REQUIRED TO SUPPORT VEHICLE WEIGHT OR CONTROL OF TRAJECTORY, THE RESULTS FURTHER INDICATED THAT THE PERFORMANCE PUTENTIAL OF THE DUCTED RUTOR -NOZZLE SYSTEM MAY BE LIMITED BECAUSE OF THE STRUCTURAL REQUIREMENTS. MODEL ROTOR DUCT DESIGN, FROM THE STANDPOINT OF INTERNAL AEROUYNAMICS, WAS COMPROMISED BY ADDING STRUCTURE TO ACCOMMUDATE THE WING BENDING LOAUS FOR HIGH-SPEED CRUISING. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07

AD+633 269 1/4 5/8 BELL AEKOSYSTENS CO BUFFALO N Y

APPLICATION OF PILOT-CONTROLLER INTEGRATION TECHNIQUES TO A REPRESENTATIVE V/STOL AIRCRAFT. (U)

DESCRIPTIVE NOTE: FINAL REPT., OCT 65 156P GAUL:JOHN W. : REPT. NO. 2226-903001, CONTRACT: AF 33(615)-1866, PROJ: AF-8219, TASK: 821904, MONITOR: AFFDL, TR-65-200

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, +FLIGHT CONTROL SYSTEMS), DESIGN, PILOTS, MAN-MACHINE SYSTEMS, COSTS (U) IDENTIFIERS: X-22 AIRCRAFT (U)

THE REPORT PRESENTS FINAL RESULTS OF A STUDY OF THE APPLICATION OF PILOT-CONTROLLER INTEGRATION (PCI) DESIGN TECHNIQUES TO THE FLIGHT CONTROL SYSTEM OF A REPRESENTATIVE V/STOL AIRCRAFT. UNDER THIS PROGRAM THE VALIDITY OF THE CONCEPT WAS ESTABLISHED IN THE APPLICATION TO THE X-22A V/ STOL. IN THIS APPLICATION THE PCI TECHNIQUE INDICATED THE AREAS OF THE X-22A FLIGHT CONTROL SYSTEM WHERE MODIFICATIONS WOULD RESULT IN THE GREATEST IMPROVEMENT TO THE PROBABILITY OF MISSION ACCOMPLISHMENT. DESIGN MODIFICATIONS WERE MADE AND AN ITERATION USING THE TECHNIQUE WAS ACCOMPLISHED AND THE PAYOFF WAS EVALUATED. THE DIGITAL PROGRAM WAS DEVELOPED AND APPLIED TO THE X-224 HAS GENERAL APPLICABILITY TO OTHER AIRCRAFT. SEVERAL IMPROVEMENTS TO THIS PROGRAM AS WELL AS TO THE DETAILS OF TECHNIQUE APPLICATION ARE SUGGESTED. (AUTHOR)

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SEARCH CUNTROL ND. /ZDM07 DDC REPORT BIBLIDGRAPHY AD-634 943 21/5 1/3 GENERAL ELECTRIC CO CINCINNATI OHIO FLIGHT PROPULSION LAB DEPT (0) X353-58 PROPULSION SYSTEM SPECIFICATION. JAN 62 106P REPT. NO. SPECIFICATION-112. CUNTRACT: DA-44-177-10-715. UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPORT ON VZ-11 LIFT FAN FLIGHT RESLARCH AIRCRAFT PROGRAM. SEE ALSU AD-634 944. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, • PROPULSION), SPECIFICATIONS, DUCTED FANS, TURBUJET ENGINES, AIRCRAFT ENGINES, RESEARCH (U) PLANES, MILITARY REQUIREMENTS (U) IDENTIFIERS: V-5 AIRCRAFT, X353-58 ENGINE THIS SPECIFICATION COVERS THE CHARACTERISTICS OF THE X353-58 CONVERTIBLE VISTOL PROPULSION SYSTEM INTENDED FOR USE IN A PILOTED FLIGHT RESEARCH AIRPLANE. THE GENERAL ELECTRIC X353-56 ENGINE IS A HIGH LIFT-WEIGHT HATIO CONVERTIBLE ENGINE FOR TURBUJET OPERATION AND AUGMENTED LIFT OPERATION. THE DASIC X353-58 ENGINE CUMPRISES A TURBOJET ENGINE MUDIFIED FOR NON-REHEAT OPERATION. A TIP-TURBINE LIFT FAN AUGMENTING TURBOJET THRUST FOR V/STOL LIFT AND PROPULSIVE THRUSTS, A GAS DIVERTER VALVE FOR SELECTING ENGINE OPERATING MODE, AND ASSUCIATED ENGINE CONTROLS AND ACCESSURIES. THE THO PART SCHOLL ON EACH LIFT FAN PERMITS INCURPORATION OF THE X353-58 INTO AN AIRPLANE POWERPLANT CONFIGURATION COMPRISING TWO (2) BASIC X353-58 CONVERTIBLE ENGINES PNEUMATICALLY COUPLED SUCH THAT EACH IURBOJET PROVIDES HALF OF THE REQUIRED DRIVING POWER FUR EACH OF THE LIFT FANS. ROTORS OF THE TWO LIFT FAWS ROTATE IN OPPOSITE DIRECTIONS TO MINIMIZE GYROSCUPIC RELATIONS. ALL PERFORMANCE FIGURES, WEIGHTS, QUANTITIES, ETC., IN THIS SPECIFICATION ARE GIVEN FOR ONE X353-58 (ONE TURBOJET ENGINE, UNE FAN, ONE DIVERTER VALVE) (U) UNLESS SPECIFICALLY STATED UTHERWISE.

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UDC REPORT BIBLIDGRAPHY SEARCH CONTROL NO. /ZOMO7

AD-634 944 1/3 21/5 GENERAL ELECTRIC CO CINCINNATI OHIO FLIGHY PROPULSION LAB DEPT

X376 PITCH FAN SPECIFICATION.

NAR 62 56P REPT+ NO+ SPECIFICATION-113, CONTRACT: DA-44-177-TC-715,

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SUPPLEMENTARY NOTE: REPORT ON YZ-11 LIFT FAN Flight Research Aircraft Program. See Also Ad-634 946.

DESCRIPTORS: (*DUCTED FANS, FLIGHT CONIROL SYSTEMS), (*VERTICAL TAKE-OFF PLANES; *FLIGHT CONTROL SYSTEMS), GAS TURBINES, SPECIFICATIONS, TUBOJET ENGINES, AIRCRAFT ENGINES, RESEARCH PLANES, PITCH(MOTION) IDENTIFIERS: V-5 AIRCRAFT, X376 FAN, X353-5B

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THIS SPECIFICATION COVERS THE CHARACTERISTICS OF THE X376 PITCH FAN INTENDED FOR USE IN A PILUTED FLIGHT RESEARCH AIRPLANE. THE GENERAL ELECTRIC X376 PITCH FAN IS A HIGH LIFTWEIGHT RATIO GAS-DRIVEN LIFT FAN FOR SUPPLYING AUGMENTED CONTRUL AND TRIM FORCE IN V/STOL SYSTEMS. THE X376 PITCH FAN COMPRISES A SINGLE STAGE, TIP-TURBINE DRIVEN LIFT FAN SUPPLIED WITH TURBOJET EXHAUST GAS BLEED THROUGH TWO SEPARATE NOZZLE SCRULLS. THE DOUBLE SCRULL ARRANGEMENT PROVIDES SINGLE-ENGINE OPERATING CAPABILITY IN A THO-ENGINE. CROSS-DUCTED LIFT PROPULSION SYSTEM.

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /ZGM07 AD-634 945 1/3 21/5 GENERAL ELECTRIC CO CINCINNATI OHIO FLIGHT PROPULSION LAB DEPT X353-58 PROPULSION SYSTEM FLIGHTWORTHINESS RATING TEST. (U) 11AK 62 30P REPT. NU. SPECIFICATION-114, CONTRACT: DA-44-177-TC-715, UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPORT ON VZ-11 LIFT FAN FLIGHT RESEARCH AIRCHAFT PROGRAM. SEE ALSO AD-634 944. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, • PROPULSION), FLIGHT TESTING, SPECIFICATIONS, DUCTED FANS, TUBUJET ENGINES, AIRCRAFT ENGINES, RESEARCH PLANES, TESTS (U) IDENTIFIERS: V-5 AIRCRAFT, X353-5B ENGINES (U) THIS SPECIFICATION DEFINES THE FLIGHTWORTHINESS RATING TEST REQUIREMENTS FOR THE X353-58 CONVERTIBLE, DUCTED LIFT FAN PROPULSION SYSTEM. THE X353-58 PROPULSION SYSTEM IS COMPRISED OF A J85-GL-5 TURBOJET ENGINE, LESS AFTERBURNER, USED AS A GAS GENERATOR PLUS TWO ADDITIONAL MAJOR COMPONENTS: A DIVERTER VALVE TO DIRECT THE GAS FLOW: AND AN X303-56 LIFT FAN. (U)

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AD-634 946 1/3 21/5 GENERAL ELECTRIC CO CINCINNATI OHIO FLIGHT PROPULSION LAB DEPT

X376 PITCH FAN FLIGHTWORTHINESS RATING TEST. (U)

DESCRIPTIVE NOTE: REVISED ED. APR 62 3UP REPT. NO. SPECIFICATION-115, CONTRACT: DA-44-177-TC-715,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REVISION OF DOCUMENT SUBMITTED 25 MAR 62. REPORT ON VZ-11 LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO AD-634 944/

DESCRIPTORS: (+DUCTED FANS, FLIGHT CONTROL SYSTEMS), (+VERTICAL TAKE-UFF PLANES, +FLIGHT CONTROL SYSTEMS), FLIGHT TESTING, SPECIFICATIONS, GAS TURBINES, AIRCRAFT ENGINES, RESEARCH PLANES, PITCH(MOTION) (U) IDENTIFIERS: V-5 AIRCRAFT, X376 FAN (U)

THIS SPECIFICATION DEFINES THE FLIGHTWORTHINESS RATING TEST REQUIREMENTS FOR THE X376, DUCTED, PITCH TRIM CONTHOL FAN. THE GENERAL ELECTRIC X376 PITCH FAN IS DESIGNED FOR SUPPLYING AUGMENTED CONTROL AND TRIM FORCE IN V/STOL SYSTEMS. IT IS COMPRISED OF A SINGLE STAGE, TIP-TURBINE DRIVEN FAN SUPPLIED WITH TURBOJET EXHAUST GAS BLEED THROUGH TWO SEPARATED NOZZLE SCROLLS. THE DOUBLE SCROLL ARRANGEMENT PROVIDES SINGLE-ENGINE OPERATING CAPABILITY IN A TWO-ENGINE, CROSS-DUCTED LIFT PROPULSION SYSTEM. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20407 AD-634 947 1/3 21/5 GENERAL ELECTRIC CO CINCINNATI OHIO FLIGHT PROPULSION LAB DEPT

X353-58 PROPULSION SYSTEM ACCEPTANCE TEST.

DESCRIPTIVE NUTE: REVISED ED. MAY 62 20P REPT. NO. SPECIFICATION-116, CONTRACT: DA-44-177-TC-715,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REVISION OF DOCUMENT SUBMITTED 15 APR 62. REPORT ON VZ-11 LIFT FAN FLIGHT RESEARCH ARICRAFT PRUGRAM. SEE ALSO AD-634, 945.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES; •PROPULSION); TESTS; SPECIFICATIONS; DUCTED FANS; TUROJET ENGINES; AIRCRAFT ENGINES; RÉSEARCH PLANES; VALUES; ACCEPTABILITY IDENTIFIERS: V-5 AIRCRAFT; X-353-55 ENGINES (U)

THIS SPECIFICATION DEFINES THE ACCEPTANCE TEST REQUIREMENTS FOR THE LIFT FAN AND DIVERTER VALUE CUMPONENTS OF THE X353-58 CONVERTIBLE, DUCTED, LIFT FAN PROPULSION SYSTEM CONFORMING TO SPECIFICATION NU. 112. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMO7

AD-634 948 1/3 21/5 GENERAL ELECTRIC CO CINCINNATI OHIO FLIGHT PROPULSION LAB DEPT

X376 PITCH FAN ACCEPTANCE TEST.

DESCRIPTIVE NUTE: RREVISED ED. MAY 62 29P REPT. NU. SPECIFICATION-117, CUNTRACT: DA-44-177-TC-715,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REVISION OF DOCUMENT SUBMITTED 18 APRIL 1962. REPORT ON VZ-11 LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO AD-634 944.

DESCRIPTORS: (*DUCTED FARS, FLIGHT CONTROL SYSTEMS), (*VERTICAL TAKE-OFF PLANES, *FLIGHT CONTROL SYSTEMS), SPECIFICATIONS, ACCEPTABILITY, TESTS, TURBUJET ENGINES, AIRCRAFT ENGINES, RESEARCH PLANES, PITCH(MOTION) (U) IDENTIFIERS: V=5 AIRCRAFT, X376 FAN (U)

THIS SPECIFICATION DEFINES THE ACCEPTANCE TEST REQUIREMENTS FOR THE X376, DUCTED, PITCH TRIM CONTROL FAN CONFORMING TO SPECIFICATION NO. 113. (U)

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UDC REPORT BIBLIUGRAPHY SEARCH CUNTROL NU. /ZOMO7

AD-634 950 1/3 21/5 GENERAL ELECTRIC CO CINCINNATI UNIO AUVANCED ENGINE AND TECHNOLOGY DEPT

X353-58 PROPULSION SYSTEM FLIGHTWORTHINESS TEST REPORT (PENALTY TESTS). VOLUME I. SUPPLEMENT I. (U)

UCT 63 72P CONTRACT: DA-44-177-TC-715,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON LIFT FAN FLIGHT Research Aircraft program.

DESCRIPTORS: (*PROPULSION, *VERTICAL TAKE-OFF PLANES), FLIGHT TESTING, RESEARCH PLANES, TURBOJET ENGINES, CONVERTIBLE PLANES, DUCTED FANS (U) IDENTIFIERS: V-5 AIRCRAFT, X 353-58 ENGINES (U)

THE REQUIRED 10-HOUR PENALTY TEST TO EVALUATE DESIGN MODIFICATIONS TO THE X353-58 LIFT FAN INLET VANES AND ALUMINUM EXIT LOUVERS WAS COMPLETED IN ACCORDANCE WITH THE SCHEDULE OF TEST RECOMMENDED TO THE ARMY IN THE X353-58 PROPULSION SYSTEM FLIGHTWORTHINESS TEST REPORT. THE TEST WAS COMPLETED ON A SLAVE X353-5B LIFT FAN WHICH WAS ALSO AN ACCEPTANCE TEST VEHICLE. THIS REPORT 15 A SUPPLEMENT TO THE X353-58 PROPULSION SYSTEM FLIGHTWORTHINESS TEST REPORT AND DOCUMENTS THE PENALTY TEST AND RESULTS. IT IS SUBMITTED TO THE U. S. ARMY (TRECOM) IN ACCORDANCE WITH SPECIFICATION 114 TO FORM THE BASIS FOR ESTABLISHING A FLIGHTWORTHINESS RATING FOR THE COMPLETE PROPULSION SYSTEM INCLUDING LIFT FAN INLET VANELS ALUMINUM EXIT LOUVERS AND DIVERTER VALVES. UPON COMPLETION OF THE TEST, THE TINSPECTION RESULTS SHOWED ALL LIFT FAN COMPONENTS INCLUDING INLET VANES AND ALUMINUM EXIT LOUVERS TO BE IN SATISFACTORY CONDITION. THE NEW KOTOR ASSEMBLY TECHNIQUE RECOMMENDED IN THE FWT REPORT AND DESCRIBED IN FRV SPECIFICATION 124 WAS COMPLETELY SUCCESSFUL IN AVOIDING FRETTING. PARTIAL DISASSEMBLY OF THE ROTOR FOLLOWING THE TEST, WITNESSED BY AN ARMY (TRECOM) REPRESENTATIVE, SHOWED ALL OF THE ROTOR HARDWARE TO BE IN EXCELLENT CONDITION. THE XV-SA FLIGHT TYPE DIVERTER VALVE ACTUATION SUCCESSFULLY COMPLETED THE PENALTY TEST PLUS TWO ACCEPTANCE TESTS WITHOUT INCIDENT AND IS IN EXCELLENT (U) CONDITION.

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHO7

AD-634 451 1/3 11/3 GENERAL ELECTRIC CO CINCINNATI UNIO FLIGHT PROPULSION LAB DEPT .

FINISH SPECIFICATION.

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AUG 62 13P REPT. NO. SPECIFICATION-14359-1, CONTRACT: DA-44-177-10-715.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON VZ-11 LIFT FAN FLIGHT RESEARCH AIRCRAFT PRUGRAM.

. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES) +AIRCRAFT FINISHES), SPECIFICATIONS, PROTECTIVE TREATMENTS, RESEARCH PLANES, FINISHES + FINISHING, COATINGS, CORRUSION INHIBITION, ALUMINUM ALLOYS, MAGNESIUM ALLOYS, TITANIUM ALLUYS, STEEL, PIPES, ALLOYS, (U) GLASS TEXTILES (U) IDENTIFIERS: V-5 AIRCRAFT

THE PURPOSE OF THIS SPECIFICATION IS TO DEFINE THE FINISHES NECESSARY TO ASSURE ADEQUATE SURFACE PROTECTION FOR THE MATERIALS USED IN THE ARMY VZ-11 AIRPLANES (MUDEL 143).

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SEARCH CONTROL NO. /20M07 DDC REPORT BIBLIUGRAPHY 21/5 AU-635 100 13 LOCKHEED-GEURGIA"CO MARSETTA (0) XV-4A VTOL RESEARCH AIRCRAFT PROGRAM. DESCRIPTIVE NUTE: SUMMARY REPT., 30 JUN 61-30 SEP 65. 123P NICHULSON, ROBERT LOWRY, MAY 66 RANDALL B. : CONTRACT: DA-44-177-TC-773, DA-44-177-AMC-14(T) PROJ: DA-1F1312010160, MONITUR: USAAVLADS TR-66-45

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SUPPLEMENTARY NOTE:

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DESCRIPTORS: (#VERTICAL TAKE-OFF PLANES, #THRUST AUGMENTATION), RESEARCH PLANES, FLIGHT TESTING, JETS, EJECTION, LIFT, FLIGHT CONTROL SYSTEMS, FEASIBILITY STUDIES, EXHAUST GASES, PROPULSION (U) IDENTIFIERS: V-4 AIRCRAFT (U)

A PROGRAM WAS CONDUCTED TO DETERMINE THE FEASIBILITY OF THE AUGMENTED JET EJECTOR CONCEPT FOR ATTAINING A VTOL CAPABILITY FOR AIRCRAFT. DURING THE FLIGHT TEST PROGRAM, THE ACTUAL VERTICAL THRUST REALIZED WAS ONLY ABOUT 93 PERCENT OF THAT PREDICTED. AND CONSEQUENTLY THE AIRCRAFT, THE XV-4A, HAD A MARGINAL LIFT CAPABILITY. THIS MARGINAL LIFT CAPABILITY SEVERELY LIMITED THE CAPABILITY TO CONDUCT QUANTITATIVE DATA GATHERING DURING THE FLIGHT TEST PROGRAM. THE REPORT PRESENTS THE LIMITED QUANTITATIVE RESULTS OBTAINED AND A BRIEF SUMMARY OF THE AIRCRAFT DESIGN, SYSTEMS, FLIGHT TEST PROGRAM, VTOL LIFT IMPROVEMENT PROGRAM, AND SMALL-SCALE AND FULL-SCALE WIND TUNNEL PROGRAMS. THE FEASIBILITY OF THE AUGMENTED JET EJECTOR CONCEPT WAS DEMONSTRATED; HUWEVER, THIS CONCEPT IS NOT CONSIDERED TO BE CUMPETITIVE WITH OTHER CONCEPTS FOR ATTAINING A (U) VTOL CAPABILITY. (AUTHOR)

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /ZOHO7

AD-635 489 1/3 GENERAL ELECTRIC CO CINCINNATI OHIO ADVANCED TECHNOLOGY AND DEMONSTRATOR PROGRAMS DEPT

GROUND VIBRATION TEST RESULTS.

APR 66 107P REPT. NO. 167, CONTRACT: UA=44-177-TC-715,

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UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON SV-5A LIFT VAN FLIGHT RESEARCH AIRCRAFT. SEE ALSO AD-634 949.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, VIBRATION), TESTS, RESEARCH PLANES, PERFORMANCE (ENGINEERING), CAPTIVE TESTS, RESONANCE, EXPERIMENTAL DATA, MUTION IDENTIFIERS: V-5 AIRCRAFT (U)

THIS REPORT CONTAINS THE RESULTS OF THE EXPERIMENTAL INVESTIGATION OF THE STATIC AND DYNAMIC CHARACTERISTICS OF THE U.S. ARMY XV-5A LIFT FAN RESEARCH AIRCRAFT AS PERTAINING TO THE FLUTTER AND VIBRATION EFFORT ON THE XV-5A AIRCRAFT. (U)

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X-353-58 PR(Repurt. Vul		FLIGHTWORTHINESS TEST	(U)
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CONTRACT: DA	-44-177-TC-715,		
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SUPPLEMENTARY	NOTE: REPT. OF	V VZ-11 LIFT FAN FLIGHT	
		SEE ALSO AD-634 950.	
		VERTICAL TAKE-OFF	
		SEARCH PLANES, TURBOJET	
DEFECTS(MATE	· · · · · · · ·	5, QUALITY CONTROL.	(U)
	V-5. AIRCRAFT,)		(U)
	V-D. AIRCRAFT	1222-20 Endine2	
THIS VOLUME	OF THE FWT REP	ORT PRESENTS	
		DENTIFICATION OF HARDWARE	
		S FOUND AFTER COMPLETION	
		CATIONS NUMBER 114 AND	
115. CERTIF	ICATES OF INSPE	CTION ARE INCLUDED.	
		TICAL WITH URIGINAL	
ASSEMBLY VA	LUES. (AUTHOR)		(U)

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DDC REPORT BIBLIJGRAPHY SEARCH CONTROL NO. /ZOMO7

AD-635 695 1/3 GENERAL ELECTRIC CO CINCINNATI OHIO FLIGHT PROPULSION LAB DEPT

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APH 63 170P REPT. NU. SPECIFICATION-118A, CONTRACT: UA-44-177-TC-715;

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UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFF FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO AD-634 943.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, SPECIFICATIONS), DESIGN, DUCTED FANS, LIFT, TURBUJET ENGINES, RESEARCH PLANES, PROPULSION (U) IDENTIFIERS: V-5 AIRCRAFT, X353-58 ENGINES (U)

THIS SPECIFICATION COVERS A MID-WING, LIFT-FAN POWERED RESEARCH AIRCRAFT. IT SHALL BE PROPELLED BY TWO G. E. X353-58 PROPULSION SYSTEMS. IT SHALL BE CAPABLE OF VIOL AND STOL IN THE FAN-SUPPORTED FLIGHT MODE. THE AIRCRAFT SHALL BE CAPABLE OF CONVENTIONAL WING-SUPPORTED FLIGHT AT HIGH SUBSONIC SPEEDS. THE AIRCRAFT SHALL ALSO BE CAPABLE OF TRANSITION FROM ZERO HORIZONTAL SPEED TO HIGH HURIZONTAL SPEED AND RETURN THROUGH TRANSITION TO HOVERING FLIGHT. IT SHALL BE CAPABLE UF CONVENTIONAL TAKE-OFF AND LANDING. DURING WING-SUPPORTED FLIGHT, CONVENTIONAL CONTROL SURFACES SHALL BE UTILIZED. DURING FAN SUPPORTED FLIGHT, CONTROL SHALL BE ACCOMPLISHED THROUGH MODULATION OF THE ARFLON THROUGH THE FANS. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMO7

AD-633 951 1/3 20/4 1/1 CORNELL AERUNAUTICAL LAB INC BUFFALO N Y

DEVELOPMENT OF A METHOD FOR PREDICTING THE PERFORMANCE AND STRESSES OF VTOL-TYPE PROPELLERS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT. JUN 66 126P TRENKA, ANDREW R.; REPT. NO. CAL-BB-1846-5-1, CONTRACT: DA-44-177-AMC-754T}, TASK: ID1214U1A142, MONITOR: USAAVLABS TR-66-26

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

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DESCRIPTORS: (+VERTICAL TAKE=OFF PLANES, PERFORMANCE(ENGINEERING)), (+PROPELLERS(AERIAL), STRESSES), (+WINGS, AERODYNAMIC CHARACTERISTICS), (+NACELLES, AERODYNAMIC CHARACTERISTICS), PROPELLER BLADES, TESTS, AEROELASTICITY, THRUST, AERODYNAMIC LOADING, MATHEMATICAL PREDICTION (U)

THE REPORT PRESENTS A THEORETICAL METHOD WHICH ALLUWS THE PREDICTION OF RERFORMANCE AND STRESS CHARACTERISTICS OF A SINGLE VIOL-TYPE OF PROPELLER-WING-NACELLE COMBINATION OPERATING IN VARIOUS FLIGHT CONDITIONS FROM HOVERING THROUGH TRANSITION AND INTO AZIAL FLIGHT. THE METHOD INCLUDES (1) THE EFFLCTS OF A DISTORTED WAKE, I. E., THE EFFECTS OF CONTRACTION AND RADIAL AND AXIAL VELOCITY VARIATIONS; (2) THE EFFECTS OF HOVERING CLOSE TO THE GROUNDI (3) THE INTERFERENCE EFFECTS FROM A NACELLE AND WING BURIED IN THE PROPELLER SLIPSTREAM. ALSO PRESENTED ARE EXPERIMENTAL THRUST AND TORQUE DATA. HOWEVER, BECAUSE OF THE INSUFFICIENT ACCURACY OF THE EXPERIMENTAL DATA COLLECTED, NO DEFINITE (U) EVALUATION OF THE MODEL IS MADE. (AUTHOR)

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UDL REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07

AD-636 263 1/3 GENERAL ELECTRIC CO CINCINNATI UNIO ADVANCED ENGINE AND TECHNULOGY DEPT

WEIGHT ANALYSI'S.

NOV 63 19P REPT• NO• 134, CUNTRACT: DA=44=177+[C=715,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT ON XV-5A LIFT FAN, FLIGHT Research Aircraft program, see Also AD-635 695.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, WEIGHT), ANALYSIS, RESEARCH PLANES, DESIGN, DUCTED FANS (U) IDENTIFIERS: V-5 AIRCRAFT (U)

AIRCRAFT WEIGHT INCREASED DURING THE DESIGN AND MANUFACTURING OF THE XV-5A, IN SPITE OF THE CLOSE SURVEILLANCE AND CAREFUL CONSIDERATION OF THE PRINCIPAL PROGRAM OBJECTIVES AND THE BEST WAY TO MEET THE NEEDS OF THE ARMY. THE OVERWEIGHT ESTIMATE OF 335 POUNDS BECOMES SECONDARY WHEN THE ADDITIONAL SYSTEM LIFT (1000 POUNDS) IS CONSIDERED. AT REDUCED LOAD FACTOR 3.72 RATHER THAN 4.0, THE ENDURANCE TIMESUNDER VTOL CONDITIONS ARE PREDICTED TO BE IN ACCORDANCE WITH THE SPECIFICATION.

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UNCLASSIFIED DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM07 AD=636 264 1/3 1/4 GENERAL ELECTRIC CO CINCINNATI OHIO ADVANCED ENGINE AND TECHNOLOGY DEPT PRIMARY FLIGHT CONTROL SYSTEMS STRUCTURAL ANALYSIS. (U) JAN 64 35P REPT. NO. 140, 1 CONTRACT: DA-44-177-TC-715, UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPT ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM, SEE ALSO AD-636 263. DESCRIPTORS: (VERTICAL TAKE-OFF PLANES, +FLIGHT CONTROL SYSTEMS), STRUCTURAL PROPERTIES, ANALYSIS, TESTS, MATHEMATICAL ANALYSIS, STRUCTURES, DUCTED FANS (U) IDENTIFIERS: V-5 AIRCRAFT (U) THE STRUCTURAL ANALYSIS OF MODEL XV-5A PRIMARY FLIGHT CONTROL SYSTEMS IS PRESENTED IN THIS REPORT. THE PRIMARY FLIGHT CONTROL SYSTEMS CONSIST OF CONVENTIONAL STICK AND RUDDER PEDALS MECHANICALLY CONNECTED TU RUDDER, ELEVATOR, AND TO SERVO ACTUATORS, WHICH CONTROL THE AILERONS, WING-FAN EXIT LOUVERS AND NOSE-FAN THRUST MODULATOR. THE STRUCTURAL ANALYSIS IS PRIMARILY INTENDED TO PROVIDE LOAD INFORMATION FOR THE MAJOR COMPONENTS. THE CUNVENTIONAL FLIGHT CONTROL SYSTEMS WERE SATISFACTORILY TESTED IN THE AIRPLANE BY APPLYING LIMIT LUAD TO THE CUCKPIT CONTROLS AND REACTING THE LOAD BY LUCKING THE SURFACES. THE WING-FAN LOUVER AND NOSE-FAN MODULATOR ACTUATING MECHANISMS WERE SATISFACTORILY PROOF TESTED ON THE SIMULATOR. (AUTHUR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMO7

AD-636 573 1/3 GENERAL ELECTRIC CO CINCINNATI OHIO ADVANCED ENGINE AND TECHNOLOGY DEPT

GROUND RESONANCE TEST PLAN.

SEP 63 61P REPT. NO. 128, CONTRACT: DA-44-177-TC-715,

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UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT Research Aircraft Program, see Also AD-636 574.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES; VIBRATION), TESTS, RESONANCE, TEST METHODS, RESEARCH PLANES (U) IDENTIFIERS: V-5 AIRCRAFT (U)

THIS REPORT DESCRIBES THE DETAILED PLAN FOR DETERMINING THE EXPERIMENTAL VIBRATION CHARACTERISTICS OF THE U.S. ARMY MODEL XV-5A LIFT-FAN FLIGHT RESEARCH AIRPLANE. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NO. /ZDM07

AD-636 574 1/3 GENERAL ELECTRIC CO CINCINNATI UHIO AUVANCED ENGINE AND TECHNOLUGY DEPT

STRUCTURAL ANALYSIS OF WING SECONDARY COMPONENTS.

DEC 63 98P REPIONO 138, CONTRACT: DA-44-177-TC-715,

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SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT Research Aircraft Prugram, see Also AD-635 695.

DESCRIPTORS: (+VERTICAL TAKE=OFF PLANES; STRUCTURAL PROPERTIES); (+WINGS; VERTICAL TAKE=OFF PLANES); RESEARCH PLANES; STRUCTURAL PARTS; DUCTED FANS; OILERONS; FLAPS; TRAILING EDGE; DOORS (U) IDENTIFIERS: V=5 AIRCRAFT (U)

STRUCTURAL ANALYSIS OF THE FLAP, AILERON, WING FAN CLOSURE DOORS, WING TRAILING EDGE, AND WING FITTINGS FOR THE U.S. ARMY XV-5A LIFT FAN RESEARCH AIRCRAFT ARE PRESENTED IN THIS REPORT. FOR EACH COMPONENT, A SUMMARY TYPE ANALYSIS IS PRESENTED PRIMARILY WITH THE INTENT OF GIVING STRUCTURAL CONFIGURATION, FINAL CRITICAL LOADING, AND ASSUMPTIONS NADE. STRUCTURAL PROOF TESTS WERE CONDUCTED SATISFACTURILY ON THE BASIC WING, THE FAN DOORS, FAN FITTINGS, FLAP AND AILERON. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOND7 AD-638 360 21/5 1/3 HUGHES TOOL CO CULVER CITY CALIF AIRCRAFT DIV XV-94 HUT CYCLE RESEARCH AIRCRAFT PROGRAM. **(U)** DESCRIPTIVE NOTE: SUMMARY REPT. 29 SEP 62-15 MAR 65. JUN 66 78P COHAN, S. HIRSH, N. B. : HTC-AD-65-27. REPT. NO. CUNTRACT: DA-44-177-AMC-877(T), TASK: 1M121401014403. MONITOR: USAAVLABS TR-66-10 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: DESCRIPTORS: (+VERTICAL TAKE=OFF PLANES, ROTARY WINGS), RESEARCH PLANES, PROPULSION, GAS GENERATING SYSTEMS, DESIGN, CAPTIVE TESTS, FLIGHT TESTING **(U)** IDENTIFIERS: V-9 AIRCRAFT, HOT CYCLE PROPULSION SYSTEMS, YT-64 GAS GENERATOR (U) THE REPORT SUMMARIZES A RESEARCH PROGRAM COVERING THE DESIGN, FABRICATION, AND TEST OF THE XY-9A HOT CYCLE RESEARCH AIRCRAFT. DISCUSSION OF THE PROGRAM IS BROKEN INTO FIVE MAJOR AREAS: DESIGN AND FABRICATION, ENGINE AND WHIRL TESTS, COMPONENT TESTING, GROUND TESTS, AND FLIGHT TESTS. DURING THE PROGRAM, CONDUCTED FROM 29 SEPTEMBER 1962 THROUGH 15 MARCH 1965, THE FLIGHT FEASIBILITY OF THE HOT CYCLE ROTOR WAS SUCCESSFULLY VALIDATED. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NU. /20M07 AD-639 229 1/3 GENERAL ELECTRIC CO CINCINNATI OHIO AUVANCED ENGINE AND TECHNOLUGY DEPT FINAL SYSTEMS ANALYSIS AND FLIGHT SIMULATION REPORT.

(U)

MAR 65 226P REPT. NU. 157-VOL-1, CUNTRACT: DA-44-177-TC-715,

VOLUME I.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON XV+5 LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, +FLIGHT SIMULATORS), (+RESEARCH PLANES, VERTICAL TAKE-OFF PLANES), ANALYSIS, TESTS, LIFT IDENTIFIERS: V-5 AIRCRAFT (U)

A COMPREHENSIVE DOCUMENTATION OF THE FLIGHT SIMULATUR STUDY IS GIVEN. SIMULATOR INVESTIGATIONS OF HIGH SPEED CUNVENTIONAL FLIGHT ARE DESCRIBED. THE CONSTRUCTION OF THE XV-5A FLIGHT SIMULATOR FROM INITIAL DEVELOPMENT OF METHODS FUR INCORPORATION OF THE AIRCRAFT AERO-PROPULSION CHARACTERISTICS INTO THE ANALOG COMPUTER TO FINAL CHECKOUT OF THE COMPLETED HYDRAULIC AND CONTROLS SIMULATOR IS GIVEN.[U]

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMO7

AD-639 230 1/3 GENERAL ELECTRIC CO CINCINNATI OHIO ADVANCED ENGINE AND TECHNOLUGY DEPT

FINAL SYSTEMS ANALYSIS AND FLIGHT SIMULATION REPORT. (U)

MAR 65 121P REPT. NO. 157-VOL-2, CONTRACT: DA-44-177-TC-715,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON XV-5 LIFT FAN FLIGHT RESEARCH AIRCRAFT PRUGRAM. SEE ALSO AD-639 229.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES,	
SIMULATION), (*RESEARCH PLANES, VERTICAL TAKE-OFF	
PLANES), FLIGHT SIMULATORS, FLIGHT TESTING,	
ANALYSIS, STABILITY, HOVERING, LIFT	(U)
IDENTIFIERS; V-5 AIRCRAFT	(U)

STABILITY AUGMENTATION (SA) SYSTEM GAINS WERE OPTIMIZED BY PILOTED FLIGHT SIMULATOR EVALUATION OF HOVERING UNDER GUSTY WIND CONDITIONS. WHILE OPERATION OF THE SA SYSTEM POSES NO PROBLEMS DURING TRANSITION, STABILITY AUGMENTATION IS UNNECESSARY ABOVE 40 KNOTS IAS. FOR THE 2,500 FT. HOT DAY CONVITIONS SIMULATED, THE RAPIDITY WITH WHICH A CONSTANT ALTITUDE TRANSITION FROM HOVERING COULD BE ACCOMPLISHED WAS LIMITED BY POWER AVAILABLE AND. AT THE MORE AFT C.G. LUCATIONS WHEN USING A NOSE FAN THRUST REVERSAL CAPABILITY OF 308, BY LONGITUDINAL TRIM CAPABILITY. AN AUTOMATIC HORIZONTAL TRIM FEATURE HAS BEEN SELECTED FOR TRANSITION WHICH PROGRAMS THE TAIL TO THE FULL 20 DEGREE INCIDENCE LIMIT AT ALL LOUVER VECTOR ANGLES OF 40 DEGREES OR LESS. CONVERSION BETWEEN CONVENTIONAL AND FAN FLIGHT MODES IS ACCOMPLISHED BY TIMED SEQUENCING OF THE WING FAN DOUR OPENING AND HORIZONTAL TAIL INCIDENCE CHANGE AS A FUNCTION OF DIVERTER VALVE MOTION. FAILURE STUDIES HAVE SHOWN THAT UNCUMMANDED TAIL HOTION COULD RESULT IN A DANGEROUS (U) FLIGHT CONDITION. (AUTHOR)

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THE U.S. ARMY XV-5A SATISFACTORILY COMPLETED AN EXTENSIVE FLIGHT TEST PROGRAM CONSISTING OF INVESTIGATIONS OF THE HOVERING, TRANSITION AND CONVENTIONAL FLIGHT REGIMES. A TOTAL OF 45 FLIGHT HOURS WERE ACCOMPLISHED DURING WHICH 53 VERTICAL TAKE-OFFS, 72 CONVENTIONAL TAKE-OFFS, 17 FAN FLIGHT MODE TAKE-OFFS AT FORWARD SPEED, AND 74 CONVERSIONS BETWEEN FAN AND CONVENTIONAL FLIGHT MODES WERE PERFORMED. ORIGINAL FLIGHT TEST OBJECTIVES WERE SYSTEMATICALLY ACCOMPLISHED IN SUCCESSFULLY DEMUNSTRATING THE FEASIBILITY OF THE LIFT FAN CONCEPT OF FLIGHT. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHO7 AU-639 232 1/3 GENERAL ELECTRIC CO CINCINNATI OHIO ADVANCED ENGINE AND TECHNOLUGY UEPT (U) PHASE I FLIGHT TEST RESULTS. VOLUME II. MAR 66 215P REPT. NO. 166-VOL-2. CONTRACT: DA-44-177-TC-715, UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPT. ON XV-5 LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO AD-639 231. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, FLIGHT TESTING), (*RESEARCH PLANES, FLIGHT TESTING), LIFT, DUCTED FANS, STABILITY, THERMODYNAMICS, AIRCHAFT EQUIPMENT, PROPULSION, LANDING GEAR, (U) LOADING(MECHANICS) (U) IDENTIFIERS: V-5 AIRCRAFT CUNTENTS: CUNVENTIONAL FLIGHT TEST RESULTS (PERFORMANCE, STABILITY AND CONTROL. THERMODYNAMICS); AIRCRAFT SYSTEMS (HYDRAULIC, ELECTRICAL, PROPULSION SYSTEM HISTORY, XV-5A LANDING GEAR, AIRSPEED SYSTEM); STRUCTURES AND (0) LOADS.

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NO. /20M07	
AD-639 233 1/3 GENERAL ELECTRIC CO CINCINNATI UHIO AUVANCED ENGINE TECHNULUGY DEPT	AND
PHASE I FLIGHT TEST RESULTS. VOLUME III.	(U)
MAR 66 248P REPT• NO• 166-VOL-3, CUNTRACT: DA-44-177-TC-715,	
UNCLASSIFIED REPORT	
SUPPLEMENTARY NOTE: REPT. ON XV-5 LIFT FAN FLIGHT Research Aircraft prugram. See also AD-639 232.	
DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, FLIGHT TESTING), (+RESEARCH PLANES, FLIGHT TESTING), GRAPHICS, LIFT, DUCTED FANS, STABILITY, FLIGHT CONTROL SYSTEMS IDENTIFIERS: V-5 AIRCRAFT	(U) (U)
THE VOLUME CONSISTS OF APPENDIX FIGURES Exclusively.	(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDMO7

AD-639 235 ' 1/1 1/3 GENERAL ELECTRIC CO CINCINNATI OHID ADVANCED ENGINE AND TECHNOLOGY DEPT

ESTIMATED DYNAMIC STABILITY CHARACTERISTICS.

(U)

SEP 64 13UP REPT• NO• 151, CONTRACT: DA-44-177-TC-715,

.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, STABILITY:, (+RESEARCH PLANES, VERTICAL TAKE-OFF PLANES), DYNAMICS, LIFT, DUCTED FANS, AERODYNAMIC CHARACTERISTICS (U) IDENTIFIERS: V-5 AIRCRAFT (U)

THE REPORT PRESENTS THE DYNAMIC STABILITY CHARACTERISTICS OF THE U.S. ARMY XV-5A LIFT FAN RESEARCH AIRCRAFT BASED ON THEORETICAL AND LMP1³¹CAL ESTINATES OF DYNAMIC STABILITY DERIVATIVES AND STATIC AERODYNAMIC CHARACTERISTICS DERIVED FROM SCALE MODEL WIND TUNNEL TESTS. EXCEPT FOR A PRESENTATION OF THE LIFT FAN NATURAL DAMPING CONTRIBUTIONS TO FLIGHT IN THE LIFT FAN MODE, THE REPORT IS RESTRICIED TO ANALYSIS OF CONVENTIONAL FLIGHT CHARACTERISTICS-INVESTIGATION SHOWS THAT THE DYNAMIC STABILITY CHARACTERISTICS OF THE AIRCRAFT ARE SATISFACTORY FOR THE RESEARCH OBJECTIVES WITHIN THE EXAMINED FLIGHT ENVELOPE. (AUTHOR)

DDC REPORT BIBLINGRAPHY SEARCH CONTROL NO. /ZUMO7 1/3 1/1 TECHNOLOGY DEPT ESTIMATED STATIC STABILITY AND CONTROL CHARACTERISTICS. MAR 64 230P CONTRACT: DA-44-177-TC-715, UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PRUGRAM. THE XV-SA IS A INO-ENGINE, TWO-PLACE V/STOL RESEARCH AIRCRAFT WITH A DESIGN GROSS WEIGHT OF 9200 POUNDS AND AN ASPECT RATIO 3.42 WING UF 260 SQUARE FEET. IN CONVENTIONAL FLIGHT MODE THE AIRCRAFT HAS DESIGN MAXIMUM SPEED OF 450 KNOTS. IN FAN FLIGHT MODE THE AIRCRAFT CAN SUSTAIN FLIGHT AT ANY SPEED FROM HOVERING TU SPEEDS IN EXCESS OF CONVENTIONAL STALL SPEED. THE REPORT REPRESENTS AN ESTIMATE THE XV-5A AERODYNAMIC CHARACTERISTICS, BASED ON AND 1/6 SCALE MODELS. IN THE FAN FLIGHT MODE, THE AIRCRAFT IS ESTIMATED TO BE STATICALLY UNSTABLE IN PITCH WITH THE MOST AFT CG AT LOW SPEEDS BELOW APPROXIMATELY 70 KNOTS BUT WITH AN INCREASING STABILITY WITH SPEED TO THE CONVERSION SPEED WHERE THE STABILITY LEVEL CORRESPONDS TO THAT FOR CONVENTIONAL FLIGHT. THE AIRCRAFT POSSESSES POSITIVE LATERAL AND DIRECTIONAL STATIC STABILITY FLIGHT AND THE EFFECTIVENESS OF THE CONVENTIONAL FAN OPERATION. THE EXIT LOUVER CONTROL SYSTEM IS

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DESCRIPTORS: (+VERTICAL TAKE=OFF PLANES, AERODYNAMIC CHARACTERISTICS), (*RESEARCH PLANES, VERTICAL TAKE-OFF PLANES), FLIGHT CONTROL SYSTEMS, STATICS, STABILITY, MUDEL TESTS, WIND TUNNEL MODELS, DUCTED FANS, HOVERING, LIFT IDENTIFIERS: V-5 AIRCRAFT

A POWER-OFF FLAPS-DOWN STALL SPEED OF 89 KNOTS AND A THEORETICAL AND EMPIRICAL CONSIDERATIONS, INCLUDING THE RESULTS OF 420 HOURS OF WIND TUNNEL TESTS OF 1/8 WITH SIDESLIP AT ALL FORWARD SPEEDS IN FAN-POWERED FLIGHT CONTROL SYSTEM IS SHOWN TO BE UNAFFECTED BY CAPABLE OF PROVIDING THE REQUIRED PROPULSIVE FORCE FOR ACCELERATION OF THE AIRPLANE FROM A MINIMUM OF 10 KNOTS REARWARD TO CONVERSION SPEED AND PROVIDES A THRUST ATTENUATION OF UP TO 228 FOR HOVERING LIFT (U) CONTROL. (AUTHOR) 74

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AD-639 236 GENERAL ELECTRIC CO CINCINNATI UHIO ADVANCED ENGINE AND

REPT. NU. 146.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMO7

AD-640 338 1/3 GENERAL ELECTRIC CO CINCINNATI OHIO ADVANCED ENGINE AND TECHNOLOGY DEPT

FUSELAGE STRUCTURAL ANALYSIS. VOLUME IV. ENGINE INLET, THRUST SPOILER. PITCH FAN LOUVERS. (U)

MAR 65 44P REP.T. NU. 144, CUNTRACT: DA-44-177-TC-715.

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UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES; FUSELAGES); (+RESEARCH PLANES; FUSELAGES); (+FUSELAGES; STRUCTURAL PROPERTIES); AIRCRAFT ENGINE DUCTS; SPOILERS; DUCTED FANS; THRUST; PITCH(MOTION); ANALYSIS (U) IDENTIFIERS: V-5 AIRCRAFT (U)

THE STRUCTURAL ANALYSES OF THE ENGINE AIR INLET. THE THRUST SPOILER INSTALLATION, AND THE PITCH FAN LOUVER INSTALLATION OF THE U. S. ARMY XV-5A LIFT RESEARCH AIRCRAFT ARE PRESENTED. (U)

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PROPERTIES, INSTRUMENTATION, PERFORMANCE(ENGINEERING) (U) IDENTIFIERS; V-5 AIRCRAFT (U)

THE REPORT DESCRIBES THE DETAILED PLANS FOR THE FULL-SCALE WINDTUNNEL TESTING OF THE U. S. ARMY XV-5A LIFT-FAN RESEARCH AIRCRAFT. THE TEST PRUGRAM IS DESIGNED TO INVESTIGATE THE AERUDYNAMIC AND STRUCTURAL BEHAVIOR OF THE AIRCRAFT DURING SIMULATED TRANSITION, CONVERSION AND LOW SPEED CUNVENTIONAL FLIGHT. DETAILED TEST SCHEDULES, INSTRUMENTATION AND DATA REQUIREMENTS AND OPERATIONAL LIMITS ARE DESCRIBED FOR THE TESTS THAT WILL BE PERFORMED AT THE NASA - AMES RESEARCH CENTER IN THE FULL-SCALE, 40 BY 80 FOOT, WINDTUNNEL FACILITIES. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NO+ /ZOMO7
AD-640 340 1/3 General Electric CO Cincinnati Ohio Auvanced Engine and Technology Dept
STRUCTURAL PROOF TEST PROGRAM. (U)
66 77P CONTRACT: DA=44=177=TC=715;
UNCLASSIFIED REPORT
SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN RESEARCH AIRCRAFT PROGRAM.
DESCRIPTORS: (+VERTIGAL TAKE-OFF PLANES: STRUCTURAL
PROPERTIES) (TRESEARCH PLANES, STRUCTURAL
PROPERTIES), TEST, LUADING (MECHANICS) (U) IDENTIFIERS: V-5 AIRCRAFT (U)
THE TEST PROGRAM IS DESIGNED TO DEMONSTRATE INTEGRITY OF AIRCRAFT STRUCTURE AND THE INFORMATION PRESENTED WILL BE USED TO ESTABLISH DETAIL TEST
CONDITIONS TO BE SIMULATED DURING TEST HAVE DEEN
SPECIFIED IN THE AIRPLANE STRUCTURAL DESIGN
CRITERIA AND HAVE BEEN FOUND CRITICAL. A DETAILED LISTING OF ALL TEST DATA REQUIREMENTS IS
GIVEN. THE PARTICULAR LUADS AND REACTIONS TO BE APPLIED TO THE AIRFRAME AND THE MAJOR COMPONENTS ARE
THE STRATEST ALVING WITH THE STRENGTH TESTE COME
ADDITIONAL CONTROL SYSTEM TESTS ARE TO BE PERFORMED AND ARE ALSU DESCRIBED. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTRUL NO. /ZDM07 AD-640 945 1/1 1/3 PRINCETUN UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES AN ANALYTICAL STUDY OF FACTORS INFLUENCING THE LONGITUDINAL STABILITY OF TILT-WING VTOL AIRCRAFT. (U) JUL 66 108P BEPPU ,G. ;CURTISS,H. C. , JR: REPT. NU. 756, CONTRACT: DA-44-177-AMC-8(T), DA-19125901A142 PROJ: 1P125901A142-33 TASK: MONITUR: USAAVLABS TR-66-53 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, PITCH(MOTION)), STABILITY, ANALYSIS, TILT WINGS, HOVERING, TRANSPORT PLANES (U) IDENTIFIERS: C-142 AIRCRAFT (U) AN ANALYTICAL METHOD FOR PREDICTING THE STABILITY CHARACTERISTICS OF TILT-WING VTOL AIRCRAFT IN THE TRANSITION SPEED RANGE IS PRESENTED. SAMPLE CALCULATIONS BASED UN AN ASSUMED TILT-WING VTOL TRANSPORT CONFIGURATION OF THE XC-142A CLASS WITH DOUBLE SLOTTED FLAPS ARE GIVEN. PARTICULAR EMPHASIS IS PLACED ON THE SENSITIVITY OF THE RESULTS TO VARIOUS ASSUMPTIONS MADE IN THE ANALYSIS. THE CONTRIBUTIONS OF THE VARIOUS AIRCRAFT COMPONENTS AND THE AERODYNAMIC INTERACTIONS OF THE CUMPONENTS TO THE STABILITY DERIVATIVES ARE DISCUSSED, AS WELL AS THE CHANGES IN THE CHARACTERISTIC MODES OF MOTION OF THE VEHICLE THAT RESULT FROM VARIATIONS IN THE STABILITY DERIVATIVES. THE TRIM CONDITIONS OF THE VEHICLE ARE SHOWN TO BE QUITE SENSITIVE TO THE PREDICTION OF THE FLAP CHARACTERISTICS. A LIMITED COMPARISON OF THE CALCULATED RESULTS WITH EXPERIMENTAL DATA OBTAINED FRUM A DYNAMIC MODEL OF THE XC-142A, WHICH IS SOMEWHAT DISSIMILAR FROM THE ASSUMED CONFIGURATION, IS PRESENTED. THIS COMPARISON INDICATES THAT THE TRENDS OF THE STABILITY DERIVATIVES ARE CORRECTLY PREDICTED. THE AGREEMENT BETWEEN THEORY AND EXPERIMENT IS GOOD IN HOVERING; HOWEVER, AS THE WING INCIDENCE IS REDUCED, THE DIFFERENCE BETWEEN THEORY AND EXPERIMENT BECOMES QUITE LARGE. (AUTHOR) **(U)**

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ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMO7

AD-641 371 1/1 1/3 AIR FURCE FLIGHT TEST CENTER EDWARDS AFB CALIF

IMPURTANT VSTOL AIRCRAFT STABILITY DERIVATIVES IN HOVER AND TRANSITION. (U)

DESCRIPTIVE NUTE: FINAL REPT... UCT 66 27P RAMPY.J.M.; REPT. NO. FTC-TR-66-29

UNCLASSIFIED REPORT

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, STABILITY), (+AERODYNAMIC CHARACTERISTICS, VERTICAL TAKE-OFF PLANES), HOVERING, FLIGHT, SIMULATORS, MATHEMATICAL ANALYSIS, MOTION, TEST FACILITIES

TO DESIGN BETTER GROUND TEST FACILITIES AND TO SPECIFY HANDLING WUALITIES CRITERIA, THE AERODYNAMIC PARAMETERS INVOLVED MUST BE IDENTIFIED. THE PURPOSE OF THE STUDY WAS TO IDENTIFY THESE PARAMETERS FOR THE CRITICAL FLIGHT REGIME OF HOVER THROUGH TRANSITION. BOTH ANALOG AND DIGITAL COMPUTERS WERE USED. THE PURPOSE OF THE ANALUG SIMULATION WAS TO QUALITATIVELY ANALYZE THE BEHAVIOR OF VSTOL AIRCRAFT TO CONTROL INPUTS AND IDENTIFY THE MOST IMPORTANT DERIVATIVES. TWO TYPICAL VSTUL AIRCRAFT WERE INVESTIGATED. THE METHOD USED TO DETERMINE THE IMPORTANT DERIVATIVES WAS THAT OF VARYING THE STABILITY DERIVATIVES ABOUT SOME BASIC VALUE. THE AMOUNT OF SIMULATUR RESPONSE IDENTIFIED THE MOST IMPORTANT DERIVATIVES. NEXT. THE DIGITAL COMPUTER WAS USED TO AFFIX A MAGNITUDE TO THE RELATIVE IMPORTANCE OF EACH DERIVATIVE. TO ESTABLISH THE RELATIVE IMPORTANCE, A SENSITIVITY FACTOR WAS DERIVED. THE INFORMATION NECESSARY TO CALCULATE THIS FACTOR WAS OBTAINED FRUM A NATHEMATICAL ANALYSIS OF THE EQUATIONS OF MOTION. THE IMPORTANT DERIVATIVES WERE IDENTIFIED FOR BOTH LONGITUDINAL AND LATERAL-(U) DIRECTIONAL MOTION. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NU+ /20M0/ AD=642 938 1/2 LTV AERUSPACE CURP DALLAS TEX LTV VUUGHT AERONAUTICS DIV

RESEARCH ON VIOL WATER HOVEN EFFECTS.

SEP 66 146P MARSH;K. R. ; REPT. NU. 2=55400/6R=6090 CONTRACT: NOUD14=66=C0095

UNCLASSIFIED REPORT

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, HOVERING), (+HOVERING, WATER), AMPHIBIAN PLANES, TRANSPORT PLANES, AIRPLANE MODELS, DOWNWASH, MODEL TESTS, PERFORMANCE(ENGINEERING) (U) IDENTIFIERS: C-142 AIRCRAFT (U)

A SERIES OF TESTS WERE MADE WITH A POWERED MODEL OF THE XC-142A AIRPLANE HOVERING OVER GROUND AND OVER A WATER FILLED TANK. SIX CUMPONENT MEASUREMENTS WERE MADE OF THE FURCES AND MOMENTS ACTING ON THE MODEL, MEASUREMENTS WERE MADE OF THE WATER SPRAY RECIRCULATED THRU THE OUTBOARD PROPELLER AND PICTURES WERE TAKEN OR THE SPRAY PATTERNS DEVELOPED. THE FORCE DATA SHOWED A SLIGHT REDUCTION IN MODEL NORMAL FORCE WHEN HOVERING OVER WATER RATHER THEN THE GROUND. THERE WAS CONSIDERABLE SCATTER IN THE MOMENT DATA. MEASUREMENTS OF SPRAY BEING RECIRCULATED THRU THE PROP WERE FOUND TO BE TOLERABLE EVEN AT THE MOST CRITICAL CONDITIONS. WHILE THERE WAS CONSIDERABLE SPRAY GENERATED BY THE DOWNWASH, IT WAS BLOWN AWAY FROM THE MODEL LEAVING THE MODEL RELATIVELY CLEAR OF SPRAY. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07

AD-644 191 1/4 1/3 ARNULD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN

ON THE RELATIVE IMPORTANCE OF THE LOW SPEED CONTROL Requirement for v/stol Aircraft, (U)

DEC 66 3UP GOLDBERGER,STEPHEN ; REPT. NO. AEDC-TR-66-205 CONTRACT: AF 40(600)-1200 PR0J: AR0-BB3602

UNCLASSIFIED REPORT

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SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH ARO, INC., TULLAHUMA, TENN.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, FLIGHT SPEEDS), (+FLIGHT SPEEDS, FLIGHT CONTROL SYSTEMS), SHORT TAKE-OFF PLANES, STABILIZATION SYSTEMS, DESIGN, AERODYNAMIC CHARACTERISTICS, PILOTS (U) IDENTIFIERS: V-5 AIRCRAFT (U)

THE CLOSED LOUP DYNAMIC RESPONSE OF A V/STOL AIRPLANE, PILOT, AND AUTOSTABILIZATION SYSTEM WAS STUDIED WITH THE PURPUSE OF DEMONSTRATING WHICH AIRPLANE PARAMETERS ARE MOST IMPORTANT IN DETERMINING THE AIRPLANE'S LON SPEED ELIGHT CHARACTERISTICS. THE INFLUENCE OF THE STABILITY AUGMENTATION SYSTEM WAS FOUND TO BE SO GREAT THAT THE OTHER PARAMETERS ARE SMALL BY COMPARISON. THE MOST IMPORTANT STABILITY AND CUNTROL PARAMETER IN LOW SPEED, V/STOL AIRCRAFT FLIGHT, THEREFORE; IS CONTROL POWER. (AUTHOR)

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DDC H	REPORT BIBLIOGRAPHY SEARCH CUNTROL NU. /20M07	
GENER	997	ND
PRELI	IMINARY SYSTEMS ANALYSIS AND SIMULATION.	(1)
REPT . N	EP 63 225P No. 127 IT: DA-44-177-TC-715	
	UNCLASSIFIED REPORT	
	1ENTARY NUTE: REPORT ON XV-5A LIFT FAN T RESEARCH AIRCRAFT PROGRAM. SEE ALSO AU- 79.	
SIMULA	PTORS: (+VERTICAL TAKE-OFF PLANES, Atiun), (+Research planes, simulation), Sis, hovering, flight, stabilization	
		(U) (U)
OF-FR DEGRE	ANALOG WORK PERFORMED INCLUDED THE SIX-DEGREE- REEDOM HOVER SIMULATION; THE LONGITUDINAL THREE- EE-UF-FREEDUM TRANSITION SIMULATION; THE ITUDINAL THREE-DEGREE-OF-FREEDOM CONVERSION	
SIMUL CUNVE GAS G	LATION, THE SIX-DEGREE-OF-FREEDUM PERTURBATION ENTIONAL FLIGHT SIMULATION, AND THE SIMULATION OF GENERATUR CUNTRUL FUR WING-FAN THRUST.	F
STRUC Work	ORTING ANALYSES INCLUDED ROLL-YAW COUPLING AND CTURAL FEEDBACK IN THE PITCH MODE. FURTHER ACCOMPLISHED INVOLVED THE STABILITY AUGMENTATIO Em specification; the development of the bridge	N
VARIO SPECI	EPT FOR ROLL AND YAW LOUVER CONTROL; SUPPORT OF OUS HARDWARE TESTS; THE GENERATION OF THE IFICATION FOR THE DEFLOREZ POINT LIGHT SOURCE	
DURIN TESII	AL DISPLAY; FURNISHING CONSOLATION SERVICES NG THE DEFLUREZ DISPLAY INSTALLATION AND ING, AND DEVELOPING THE YAW, ROLL AND PITCH CTION COSINE RELATIONSHIPS. (AUTHOR)	(U)

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DDL REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07

AD-645 998 1/3 GENERAL ELECTRIC CO CINCINNATI UNIO AUVANCED ENGINE AND TECHNOLOGY DEPT

INSTALLED SYSTEMS FUNCTIONAL TEST SUMMARY.

MAR 64 21P REPT. NU. 148 CONTRACT: DA-44-177-TC-715

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UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON XV-5A LIFT FAN Flight Research Aircraft Prugram.

DESCRIPTORS: (+VERIICAL TAKE-OFF PLANES, TESTS), (+RESEARCH PLANES, TESTS), HOVERING, FLIGHT, LIFT, AIKCRAFT ENGINES, PROPULSION (U) IDENTIFIERS: V-5 AIRCRAFT (U)

THE THE XV-5A AIRCRAFT 5/N 24506 WAS GROUND TESTED IN ALL AREAS PERTAINING TO HOVER, FORWARD FAN SUPPORTED FLIGHT, AND LOW SPEED CONVENTIONAL FLIGHT AND IS ACCEPTABLE TO PROCEED INTO ACTIVE FLIGHT TESTING. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NU. /ZOMO7 AD-645 999 1/3 GENERAL ELECTRIC CO CINCINNATI OHIO AUVANCED ENGINE AND TECHNOLOGY DEPT NOSE LANDING GEAR DROP TEST REPORT. **(U)** MAR 65 23P REPT. NO. 155 CUNTRACT: DA-44-177-TC-715 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPORT ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO AD-645 997. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, LANDING GEAR), (*RESEARCH PLANES, LANDING GEAR), (*LANDING GEAR, DROP TESTING), NOSE WHEELS, SHOCK ABSONBERS, (U) LOADING(MECHANICS) IDENTIFIERS: V-5 AIRCRAFT (U) THE RESULTS OF THE TESTS DEMONSTRATE SATISFACTORY ENENGY ABSORBTION CHARACTERISTICS OF THE SHOCK ABSORBER. THE FIRST TEST CONDITION REDULTS MEETS THE REQUIREMENTS OF THE DEVIATION ALLOWANCE. THE VERTICAL REACTION EACEEDS THE ORIGINAL REQUIREMENTS FOR APPROXIMATELY .US SECONDS AT A STRUT STROKE OF 4.15 INCHES WITH A MAXIMUM OF 6600 POUNDS. THE SECOND CONDITION RESULTS MEETS THE TEST REQUIREMENTS. THE OFFICIAL TEST FOR CONDITION THREE WAS RUN WITH AN ADDITIONAL 200 POUNDS ON THE JIG THAT WAS ANTICIPATED TO CORRECT FOR FRICTION IN THE DROP TOWER. THE RESULTS INDICATE, HOWEVER, EXCESSIVE ENERGY INPUT. A PRIOR RUN IS ALSO INCLUDED WITH

ENERGY INPUT. A PRIOR RUN IS ALSO INCLUDED WITH THE CORRECT JIG WEIGHT AND WITH INSUFFICIENT ENERGY INPUT TO SHOW THE EFFECT OF THE WEIGHT CHANGE. BOTH RUNS ARE WELL WITHIN THE MAXIMUM ALLOWABLE VERTICAL REACTION. (AUTHOR)

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DDL REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M0/

AD#646 UDU 1/3 GENERAL ELECTRIC CO CINCINNATI UNIO ADVANCED TECHNOLOGY AND DEMUNSTRATON PROGRAMS DEPT

FLUTTER MODEL TEST REPORT.

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SUPPLEMENTARY NOTE: REPORT ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM.

> DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, MODEL TESTS), (*RESEARCH PLANES, MODEL TESTS), (*FLUTTER, WING-BODY CONFIGURATIONS), AILERONS, ROTATION, FREQUENCY, LIFT, PROPULSION (U) IDENTIFIERS: V-5 AIRCRAFT (U)

THE REPORT COVERS THE WIND-TUNNEL TESTING, IN THE FLUTTER REGIME OF A DYNAMICALLY SIMILAR MODEL OF THE XV-5A LIFT-FAN RESEARCH AIRCRAFT. THE TEST WAS RESTRICTED ENTIRELY TO AN INVESTIGATION OF THE WING-FUSELAGE COMBINATION AND AS SUCH NO EMPENNAGE WAS REPRESENTED. TEST OBJECTIVES WERE SLANTED TOWARD VERIFICATION OF PREVIOUS ANALYTICAL INVESTIGATIONS WITH CLOSE ATTENTION PAID TO UNCOVERING ANY TRANSONIC EFFECTS WHICH MIGHT HAVE BEEN CRUDELY REPRESENTED ANALYTICALLY. THE TESTS WERE COMPLETED TO THE POINT OF ACHIEVING A 5 PERCENT MARGIN ON EQUIVALENT SPEED FOR THE HIGHEST AILERON ROTATIONAL FREQUENCY STUDIED, APPROXIMATELY 18.9 CPS. ONE ACTUAL CASE OF FLUTTER OCCURRED, AT M = 0.75 AND AT A DYNAMIC PRESSURE (Q) OF APPROXIMATELY 600 PSF FOR AN AILERON ROTATIONAL FREQUENCY OF 14.9 CPS. A SECOND CASE UF FLUTTER OCCURRED AT M = 0.75 AND A Q GREATER THAN 600 PSF AN AILERON RUTATIONAL FREQUENCY OF 16.1 CPS1 FI HUNGVER, THIS LATTER CASE OF FLUTTER WAS NOT CONSIDERED VALID DUE TO THE APPARENT FATIGUING OF AN AILERON SPRING BRACKET, RESULTING IN ESSENTIALLY A **(U)** FREE-FLUATING SURFACE. (AUTHOR)

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DDC REPORT BIBLIGGRAPHY SEARCH-CUNTROL NO. /ZOMO7 AD-646 280 . 1/3 14/4 GENERAL ELECTRIC CO CINCINNATI UNIO AUVANCED ENGINE AND TECHNOLOGY DEPT PRELIMINARY RELIABILITY REPORT. (U) AUG 63 72P REPT. NO. 125 CONTRACT: DA-44-177-TC-715 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPORT ON XV-54 LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO AD-646 289. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, RELIABILITY), (*RESEARCH PLANES, RELIABILITY), PROPULSION, LIFT, FANS, STRESSES, CONTROL (U) IDENTIFIERS: V-5 AIRCRAFT (U) CONTENTS: XV-54 RELIABILITY PROGRAM; X353-58 AND \$376 PROPULSION; AIRCRAFT SUB-CONTRACTORS RELIABILITY PROGRAM. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMO7

AD-646 281 1/3 GENERAL ELECTRIC CO CINCINNATI OHIO ADVANCED ENGINE AND TECHNOLUGY DEPT

STRUCTURAL DESIGN LOADS.

MAR 64 319P REPT. NU. 143 CONTRACT: DA-44-177-TC-715

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON XV-5A LIFT FAN Flight Research Aircraft Prugram. See also Ad-646 280.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES; LOADING(MECHANICS)), (*RESEARCH PLANES, LOADING(MECHANICS)), DESIGN, STRUCTURAL PARTS; MANEUVERABILITY, AERUELASTICITY, LIFT, FANS; PROPULSION IDENTIFIERS: V-5 AIRCRAFT

THE REPORT SHOWS THE METHODS OF ANALYSIS, CALCULATED DESIGN LOADS, MANEUVERING TIME-HISTORIES, AEROELASTIC CHARACTERISTICS AND A COMPILATION OF OTHER PERTINENT CHARACTERISTIC LOADING DATA. THE ANALYSES EXTENSIVELY UTILIZED XV-5A WIND-TUNNEL MODEL DATA AND MECHANIZED DIGITAL COMPUTER (IBM 704) PROGRAMS. FROM THESE STUDIES: AINFRAME STRENGTH REQUIREMENTS WERE DEVELOPED. PROGRESSIVE PARAMETRIC EVALUATION OF THE AIRPLANE'S INHERENT CAPABILITIES THEN SERVED TO CORROBORATE THE AIRFRAME STRUCTURAL INTEGRITY OR, AS FOR ONE PARTICULAR MANEUVER, DEFINED SAFE FLIGHT-ENVELOPE OPERATING LIMITS. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NO. /ZOMO7 AD-646 282 1/3 GENERAL ELECTRIC CO CINCINNATI OHIO ADVANCEU ENGINE AND TECHNOLOGY DEPT (U) MAIN LANDING GEAR DROP TEST REPORT. MAR 64 259 REPT . NO. 147 CONTRACT: DA-44-177-TC-715 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO AD-646 281 . DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, LANDING GEAR), (*RESEARCH PLANES, LANDING GEAR), (*LANDING GEAR, DROP TESTING), LIFT, FANS, PROPULSION, (U) EXPERIMENTAL DATA, SHOCK ABSURBERS (0) IDENTIFIERS: V-5 AIRCRAFT THE SHOLK ABSORBER PORTION OF THE 1510L100 MAIN LANDING GEAR, BUT USING A DUMMY CYLINDER, WAS TESTED ON 2 AUGUST 1963, IN ACCORDANCE WITH THE H. W. LOUD TEST PRUCEDURE 1510LTP-4, REVISION 1A1. THE REPORT PRESENTS THE SUCCESSFUL COMPLETION OF THE ESTABLISHED TEST RE UIREMENTS. (U) (AUTHOR)

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DDL REPORT BIBLIOGRAPHY SEARCH CUNTROL NO. /20M07

AD-646 283 1/3 20/4 GENERAL ELECTRIC CO CINCINNATI OHIO ADVANCED ENGINE AND TECHNULUGY DEPT

PREDICTED VIBRATION AND ACOUSTIC ENVIRONMENTAL STUDY.

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SUPPLEMENTARY NOTE: REPORT ON XV-5A LIFT FAN Flight Research Aircraft Program. See also AD-646 282.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, AEROELASTICITY); (+RESEARCH PLAMES, AEROELASTICITY); VIBRATION, LIFT; FANS; PROPULSION, ACOUSTICS; FATIGUE(MECHANICS); FAILURE(MECHANICS); AIRPLANE PANELS; DESIGN (U) IDENTIFIERS: V-5 AIRCRAFT (U)

THE ANALYSIS INDICATES THAT THE PROPOSED WING SKIN PANELS WILL NOT EXPERIENCE FATIGUE FAILURE AS A RESULT OF ACOUSTIC EXCITATION SUSTAINED DURING THE 250 HOUR DESIGN LIFE OF THE AIRCRAFT. THE VIBRATION ENVIRONMENT OF THE AIRCRAFT IS EXPECTED TO BE SIMILAR TO THAT OF OTHER JET AIRCRAFT OF COMPARABLE RATED THRUST. BASED ON THE ANTICIPATED VIBRATION LEVELS AND THE RELATIVELY SHORT DESIGN LIFE OF THE AIRCRAFT. COMPONENTS THAT MAY BE SUBJECTED TO SIGNIFICANT OSCILLATORY LOAD SHOULD BE INVESTIGATED FOR FATIGUE ON AN INDIVIDUAL BASIS BY THE DESIGN GROUP INVOLVED. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NO. /20407	
AD-647 367 1/3 21/5 HUGHES TOOL CO ÇULVER CITY CALIF AIRCHAFT DIV	
20-HOUR FOLLOW-ON FLIGHT TEST PROGRAM, XV-9A HOT CYCLE RESEARCH AIRCRAFT. (U)	
DESCRIPTIVE NUTE: SUMMARY REPT., 17 MAK-23 DEC 65, DEC 66 220P PIEPER,C. W. ;HIRSH,N. B. ;	
REPT: NU: HTC-AD-66-4 CUNTRACT: DA-44-177-AMC-225(T) TASK: 1M131001D15701	
MUNITUR: USAAVLABS TR=66-81 UNCLASSIFIED REPORT	
DESCRIPTORS: (+RESEARCH PLANES, FLIGHT TESTING),	
(•VERTICAL TAKE-OFF PLANES, PLIGHT TESTING), (•ROTARY WINGS, PERFORMANCE(ENGINEERING)), PROPULSION, COOLING, LOADING(MECHANICS),	
NOZZLE GAS FLOW, HELICOPTER ROTORS, GAS GENERATING SYSTEMS (U) IDENTIFIERS: V-9 AIRCRAFT, HOT CYCLE PROPULSION	
THE REPURT SUMMARIZES ADDITIONAL TECHNICAL DATA FUR	
EVALUATION OF HOT CYCLE PROPULSION SYSTEM PERFORMANCE AND OPERATING CHARACTERISTICS. THE TESTS WERE PERFORMED FROM 30 APRIL THROUGH 26	
AUGUST 1965 AND INCLUDED AN EVALUATION OF THE PERFORMANCE, STRUCTURAL QUALITIES, AND STABILITY AND CONTROL OF THE HOT CYCLE ROTOR AND PROPULSION	
SYSTEM IN GREATER DEPTH THAN THAT PRACTICAL DURING THE INITIAL 15-HOUR FLIGHT TEST. THE 20 HOURS OF FLIGHT TESTING INVOLVED EXPANSION OF FLIGHT ENVELOPE	
AND INCLUDED EVALUATION OF AIRCRAFT AND ROTOR SYSTEM PERFURMANCE: FLIGHT LOADS, COOLING, AND FLYING QUALITIES IN VARIOUS FLIGHT MUDES. A GROUND TEST OF THE TETHERED RUTOR SYSTEM WAS PERFORMED AT THE	
CONCLUSION OF FLIGHT TESTING, FOLLOWED BY A TEARDOWN INSPECTION OF THE AIRCRAFT. THE TEARDOWN INSPECTION WAS COMPLETED ON 23 DECEMBER 1965.	
(AUTHOR) (U)	

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DDC REPORT BIBLIUGRAPHY SEARCH CUNIROL ND. /20407 AD-647 383 1/3 GENERAL ELECTRIC CO CINCINNATI UNIO AUVANCED ENGINE AND TECHNULUGY UEPT LANDING GEAR CRITERIA GROUND LOADS AND REACTIONS. (u) OCT 53 151P REPT . NO . 131 CUNTRACT: DA-44-177-TC-715 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. DESCRIPTORS: (VERTICAL TAKE-OFF PLANES, LANDING GEAR): (*RESEARCH PLANES, LANDING GEAR), (+LANDING GEAR, LOADING(MECHANICS)), LANDING IMPACT, AIRCRAFT LANDINGS, COMPUTER PROGRAMS, FUSELAGES, TAXIING, LIFT, FANS, PROPULSION (U) IDENTIFIERS: V-5 AIRCRAFT (U) THE MAIN LANDING GEAR IS PROVIDED WITH A TWO-

POSITION FEATURE: THE PUSITION FORWARD FOR CONVENTIONAL LANDING, AND THE POSITION AFT FOR VERTICAL LANDING, CRITERIA WAS GENERATED FOR BOTH CUNVENTIONAL AND VERTICAL LANDING. CALCULATIONS OF GROUND LOADS WERE BASED ON METHODS IN MIL-A-B862. A CUMPUTER PROGRAM WAS DEVELOPED WHICH PROVIDES FUSELAGE REACTIONS AND INTERNAL MEMBER LOADS FOR ALL LANDING AND TAXIING CONDITIONS. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NU. //OM07 AD=647 .384 1/3 GENERAL ELECTRIC CO-CINCINNATI OHIO AUVANCED ENGINE AND TECHNOLOGY DEPT (U) EMPENNAGE STRESS ANALYSIS REPORT. 110 V ذ ہ 144P REPT. NU. 132 CONTRACT: DA-44-177-TC-715 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPT. ON XV-54 LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. DESCRIPTORS: (VERTICAL TAKE-OFF PLANES, TAILS(AIRCRAFT)), (+KESEARCH PLANES, TAILS(AIRCRAFT)), (+TAILS(AIRCRAFT) STRESSESI, MATHEMATICAL ANALYSIS, LOADING(HECHANICS), LIFT, KANS, (U) PROPULSION IDENTIFIERS: V-5 AIRCRAFT (U) THIS REPORT PRESENTS THE STRESS ANALYSIS OF THE MODEL XV-5A EMPENNAGE. THE STRUCTURE ANALYZED INCLUDES THE HORIZONTAL AND VERTICAL STABILIZERS, AND THE ELEVATOR AND RUDUER. THE ANALYSES, WRICH ARE INTENDED TO PROVIDE SUMMARY TYPE INFURMATION, INCLUDE CRITICAL GOADING DATA; COMPUTATION OF INTERNAL STRESSES AND SHEARS, AND BRIEF DETAILED ANALYSES TO FIND MARGINS OF SAFETY OF THE MAJOR COMPONENTS. THE EMPENNAGE WAS SUCCESSFULLY PROOF TESTED TO LIMIT LOAD. CONVITIONS F-12 AND F-13 WERE COMBINED TO PRODUCE THE CRITICAL SYMMETRICAL CONDITION. THE CRITICAL UNSYMMETRICAL ROLLING MOMENT OF CONDITION AF-6 WAS APPLIED DURING THE FUSELAGE UNSYMMETRICAL TEST CONDITION. ALL LOADS ARE ULTIMATE VALUES, **(U)** UNLESS OTHERWISE STATED. (AUTHOR)

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DOC REPORT BIBLIOGRAPHY SEARCH CUNTROL NU. /20M07 AD-647 386 1/3 GENERAL ELECTRIC CO CINCINNATI UNIO AUVANCED ENGINE AND TECHNULUGY DEPT WIND TUNNEL TEST REPORT. LIFT FAN PUWERED SCALE MODEL. (U) NOV 63 162P 137 REPT. NO. CUNTRACT: DA-44-177-TC-715 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCHAFT PROGRAM. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, MODEL TESTS), (*RESEARCH PLANES, MODEL TESTS), AERODYNAHIC CHARACTERISTICS, GROUND EFFECT, FLIGHT, HOVERING, FANS, LIFT, PROPULSION, WINGS, WIND TUNNELS, STATICS (U) IDENTIFIERS: V=5 AIRCRAFT (U) DATA MERE OBTAINED TO DEFINE THE STATIC CHARACTERISTICS IN AND OUT OF GROUND EFFECT: AERUDYNAMIC CHARACTERISTICS IN FORWARD FLIGHT FOR THE

TRANSITION, CONVERSION, AND LOW SPEED CONVENTIONAL FLIGHT MODES: AND FLIGHT CHARACTERISTICS AT LOW TRANSLATIONAL SPEEDS NEAR HOVERING IN VERTICAL. LATERAL, AND REARWARD DIRECTIONS. IN ADDITION. WING SURFACE STATIC PRESSURES AND WING FAN INLET CLOSURE DOOR HINGE MOMENTS WERE MEASUNED. THE DATA INDICATE AN ADVERSE GROUND EFFECT ON STATIC LIFT AT HEIGHTS LESS THAN 2 WING FAN DIAMETERS WITH A REDUCTION OF APPROXIMATELY 6% AT 1.0 DIAMETER. A CORRESPONDING REDUCTION IN FAN POWER AT CONSTANT FAN RPH COMPENSATES FOR THE LIFT REDUCTION IF OPERATION AT CONSTANT POWER IS CONSIDERED. THE EFFECTS OF WING FAN AND NOSE FAN OPERATION ARE DESTABILIZING WITH RESPECT TO ANGLE OF ATTACK. NOSE FAN OPERATION IS SLIGHTLY DESTABILIZING IN YAW, BUT THE DATA INDICATE PUSITIVE LATERAL-DIRECTIONAL STABILITY FOR THE ENTIRE RANGE OF THRUST COEFFICIENT IN FAN-POWERED FLIGHT. A FAVORABLE GROUND EFFECT ON LIFT IS UBTAINED WITH INCREASING FORWARD SPEED AS WOULD OCCUR DURING SHURT TAKE-OFF OPERATION, WITH AN INCREASE OF APPROXIMATELY 228 ABOVE THE OUT-OF-GROUND EFFECT LIFT AT A THRUST COEFFICIENT OF +885. THE DATA OBTAINED IN GROUND EFFECT WERE UNCORRECTED FOR WALL EFFECTS BUT THIS CORRECTION IS BELIEVED TO BE SMALL COMPARED WITH THE LIFT INCREASE SHOWN. (AUTHOR) (U) 95

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SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN Flight Research Aircraft Program. See also Au-647 395.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, MODEL TESTS), (+RESEARCH PLANES, MODEL TESTS), #IND TUNNEL MODELS, AIRPLANE MODELS, INSTRUMENTATION, TABLES, TEST ENUIPMENT, LIFT, FANS, PROPULSION (U) IDENTIFIERS: V-5 AIRCRAFT (U)

SUMMARY TABLES, GRAPHS, MUDEL DESCRIPTION, INSTRUMENTATION, CONDITIONS TESTED, VALIDITY OF DATA AND OTHER INFORMATION ARE PRESENTED. (U)

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UDC REPORT BIBLIOGRAPHY SEARCH CUNTRUL NU. /LOHOY AU-647 395 1/3 GENERAL ELECTRIC CO CINCINNATI UHIO AUVANCED ENGINE AND TECHNOLOGY DEPT ONE-FIFTH SCALE INLET MODEL WIND TUNNEL TEST REPORT, (U) VULUME II. MAR 65 61UP REPT . NO . 154-VOL-2 CONTRACT: DA-44-177-TC-715 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPT. ON XV-SA LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO AD-647 394, AD-649 396. DESCRIPTORS: INVERTICAL TAKE-OFF PLANES, MODEL TESTS), (*RESEARCH PLANES, MODEL TESTS), TABLES, WIND TUNNEL MODELS, AIRPLANE MODELS, LIFT, FANS, PROPULSIUN, SUBSUNIC (U) CHARACTERISTICS (U) IDENTIFIERS: V-5 AIRCRAFT TABULATED DATA ARE PRESENTED FOR THE LOW SPEED (U) TESTS (MACH O TO 0.2).

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UDC REPORT BIBLIOGRAPHY SEARCH CONFROL NO. /ZOMO/ AD-647 396 1/3 GENERAL ELECTRIC CO CINCINNATI UNIO ADVANCED ENGINE AND TECHNOLOGY DEPT ONE-FIFTH SCALE INLET MODEL WIND TUNNEL TEST REPORT. VOLUME III. (U) MAR 65 25UP RZPT. NO. 154-VOL-3 CONTRACT: DA-44-177-TC-715 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO AD-647 395. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, HODEL TESTS), (*RESEARCH PLANES, MODEL TESTS), TABLES, WIND TUNNEL MODELS, AIRPLANE HODELS, LIFT, FANS, PROPULSION, SUBSONIC CHARACTERISTICS (U) IDENTIFIERS: V-5 AIRCRAFT (U) TABULATED DATA ARE PRESENTED FOR THE HIGH SPEED TESTS (MACH 0.4 TO 0.85). (9)

DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07 AD-645 006 1/3 21/5 GENERAL ELECTRIC CO CINCINNATI UHIO ADVANCED ENGINE AND TECHNOLOGY DEPT

INSTALLATION: OPERATION AND MAINTENANCE INSTRUCTIONS FUR X353-68 AND X376 FANS. (U)

66 427P REPT. NO. 124 CONTRACT: DA-44-177-TC-715

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SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN Flight Research Aircraft Program.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, FANS), (*RESEARCH PLANES, FANS), (*FANS, PROPULSION), TURBOJET ENGINES, LIFT, UPERATION, MAINTENANCE, INSTRUCTION MANUALS, ASSEMBLING (U) IDENTIFIERS: V-5 AIRCRAFT (U)

THE X353-58 PROPULSION SYSTEM CONSISTS OF A J85-GE-5 TURBOJET ENGINE (LESS AFTERBURNER) USED AS A GAS GENERATOR, A DIVERTER VALVE TO DIHECT THE GAS FLOW, AND AN X353-56 LIFT FAN EQUIPPED WITH VECTORABLE DISCHARGE LOUVERS. THE X376 PITCH TRIM CONTROL FAN DERIVES ITS POWER FROM TURBINE DISCHARGE SLEED OF J85-GE-5 TURBOJET ENGINES (LESS AFTER-BURNERS). THE X376 IS A PARTIAL ADMISSION TIP TURBINE-DRIVEN FAN WHICH IS CONNECTED TO THE J85 ENGINES [HROUGH AIRFRAME-PROVIDED DUCTING. THE FAN EMPLOYS TWO SEPARATE SCROLLS CONTAINING THE [URBINE INLET NOZZLES] THIS FEATURE PROVIDES FOR ONE-ENGINE-OUT OPERATION. (U)

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /2007

AD-646 007 1/3 GENERAL ELECTRIC LO CINCINNATI UHIO ADVANCED ENGINE AND TECHNOLOGY DEPT

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NOV 63 318P REPT. NO. 133 CUNTRACT: DA-44-177-TC-715

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SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM.

DESCRIPTORS: (•VERTICAL TAKE-OFF PLANES, LANDING GEAR), (•RESEARCH PLANES, LANDING GEAR), (•LANDING GEAR, STRESSES), NOSE "HEELS, MECHANICAL FASTENERS, FANS, LIFT, PROPULSION (U) IDENTIFIERS: V-S AIRCRAFT (U)

THE REPORT CONSISTS OF DATA SUBSTANTIATING THE STRUCTURAL INTEGRITY OF THE NOSE LANDING GEAR ASSEMBLY AND THE TRUNNION PINS REQUIRED FOR ATTACHMENT TO THE AIRPLANES (U)

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SEARCH CONTROL NO. /ZOMO7 DDC REPORT BIBLIUGRAPHY AU-651 899 20/4 1/3 DAVID TAYLOR MODEL BASIN WASHINGTON D C AERODYNAMICS LAB WIND-TUNNEL INVESTIGATIONS OF A 1/20-SCALE POWERED MODEL OPEN-OCEAN V/STOL SEAPLANE. (U) DESCRIPTIVE NOTE: SUMMARY REPT., THOMAS , RICHARD 0. 1 49P JÁN 67 REPT. NO. 07M8-2181, 0TM8-AER0-1106 UNCLASSIFIED REPORT DESCRIPTORS: (+SEAPLANES, MODEL TESTS), (+VERTICAL TAKE-OFF PLANES, AERODYNAMIC CHARACTERISTICS), CONVERTIBLE PLANES, FLIGHT, STALLING, WING-BUDY CONFIGURATIONS, CANARD CONFIGURATION, CENTER OF GRAVITY, TILT WINGS, (U) DESIGN, HOVERING LOW-SPEED WIND-TUNNEL TESTS WERE CONDUCTED ON A 1/ 20-SCALE POWERED MOUEL OF A PROPOSED OPEN-OCEAN V/ STOL SEAPLANE DESIGN. HOVER AND TRANSITION POWER REQUIRED AND CLIMB AND DESCENT SPEEDS AT VARIOUS FLIGHT PATH ANGLES WERE DETERMINED. THE EFFECT OF FULL-SPAN SPOILERS UN WING AND CANARD STALLING CHARACTERISTICS THROUGH TRANSITION WAS BRIEFLY INVESTIGATED. A COMPARISON OF CRUISE PERFORMANCE OF THE SEAPLANE AND A CONVENTIONAL TRANSPORT OF EQUIVALENT SIZE WAS MADE. AFTER CORRECTION OF THE SEAPLANE MODEL CRUISE LIFT LURVE AND DRAG POLAR TO FULL-SCALE REYNOLDS NUMBER, CRUISE PERFORMANCE OF THE SEAPLANE WAS FOUND TO COMPARE FAVORABLY WITH THAT OF THE CONVENTIONAL MONOPLANE. IN THE TRANSITION MODE, THE MODEL IS LONGITUDINALLY UNSTABLE AT HIGH WING TILTS AND DIRECTIONALLY STABLE AT ALL WING TILTS FOR THE INITIAL CENTER-OF-GRAVITY LUCATION. WITH THE PRESENT RELATIONSHIP OF WING, CANARD, AND CENTER OF GRAVITY, THE MUDEL CANNOT BE TRIMMED IN PITCH BY VARYING ONLY INCIDENCE OF THE CANARD WITH UNIFORM THRUST SETTING ON ALL ENGINES. DIFFERENTIAL THRUST, THE MECHANISM ENVISIONED FOR HOVER CONTROL, IS NECESSARY FOR PITCH TRIM AND CONTROL THROUGHOUT MUST OF THE TRANSITION MODE. (AUTHOR) (U)

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07

AD-653 563 1/3 GENERAL ELECTRIC CO CINCINNATI UNIO ADVANCED ENGINE AND TECHNOLOGY DEPT

FUSELAGE STRUCTURAL ANALYSIS. VULUME I. SHEAR AND BENDING.

(U)

FEB 64 2358 REPT. NO. 144-975-1 Contract: DA-48 177-16-715

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SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN Flight Research Aircraft Program. See Also Volume 2, AD-653 564.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, FUSELAGES), (+RESEARCH PLANES, FUSELAGES), (+FUSELAGES, STRUCTURAL PROPERTIES), SHEAR STRESSES, BENDING, LIFT, DUCTED FANS, ANALYSIS, LOADING(MECHANICS), TABLES (U) IDENTIFIERS: V-5 AIRCRAFT (U)

THE FINAL STRESS ANALYSIS OF THE U. S. ARMY XV-5A LIFT FAN RESEARCH AIRCRAFT FORWARD AND AFT FUSELAGE SECTIONS IS PRESENTED. THE FORMARD AND AFT SECTIONS OF THE FUSELAGE ARE CONVENTIONAL AIRLHAFT SEMI-MONOCOQUE STRUCTURES, AND THE CENTER SECTION IS A WELDED TUBULAR SPACE TRUSS. THE ANALYSIS OF THE LONGITUDINAL BENDING MEMBERS AND SNINS OR WEBS IS CONTAINED. THE PRIMARY INTENT OF THE REPORT IS TO PROVIDE A TABULATION OF INTERNAL SHEAR AND BENDING STRESS DISTRIBUTIONS FOR THE FINAL CRITICAL LOADING CONDITIONS. CRITICAL MARGINS OF SAFETY OF PRIMARY CUMPONENTS ARE COMPUTED. STRUCTURAL ADEQUACY WAS ALSO DEMONSTRATED BY PRUOF TESTS SIMULATING THE CRITICAL CUNDITIONS. ALL LOADS SHOWN ARE ULTIMATE VALUES. (AUTHOR) (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CUNTROL NO. /20M07 AD-053 564 1/3 GENERAL ELECTRIC CO CINCINNATI UHIO ADVANCED ENGINE AND TECHNOLOGY DEPT FUSELAGE STRUCTURAL ANALYSIS. VULUME II. CENTER (U) FUSELAGE AND ENGINE MOUNTS. FEB 64 430P REPT. NO. 144-106-2 CONTRACT: DA-44-177-[C-715 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPT. ON XV-54 LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO VOLUME 1, AD-653 563. DESCRIPTORS: (VERTICAL TAKE-OFF PLANES, FUSELAGES), (+RESEARCH PLANES, FUSELAGES), (+FUSELAGES, STRUCTURAL PROPERTIES), (+ENGINE MOUNTS, STRUCTURAL PROPERTIES), AIRCRAFT ENGINES, ANALYSIS, LIFT, DUCTED FANS, PROPULSION, SUPPORTS, LOADING(MECHANICS), ENGINE (U) STRUCTURES, EXHAUST PIPES, TABLES (U) IVENTIFIERS: V-5 AIRCRAFT THE STRUCTURAL ANALYSES OF THE FUSELAGE SPACE FRAME, ENGINE MOUNTS AND THE PROPULSION SYSTEM SUPPORTS OF THE U. S. ARMY AV-SA LIFT FAN RESEARCH AIRCHAFT ARE PRESENTED. THE SPACE FRAME INTERNAL LOADS ANALYSIS WAS PERFORMED UTILIZING THE IBM 704 COMPUTER PROGRAM DEVELOPED IN CUNJUNCTION WITH THE XV-5A HING BASIC COMPONENTS ANALYSIS. THEREFORE. MUCH OF THE REPORT IS MADE UP OF THE DEFLECTIONS AND INTERNAL MEMBER LOADS PROGRAM OUTPUT FOR THE SEVERAL LOADING CONDITIONS INVESTIGATED. THE SPACE FRAME MEMBER CRITICAL LUADS ARE SUMMARIZED AND MEMBER ALLOWABLES AND MARGINS OF SAFETY ARE PRESENTED. THE PROPULSION SYSTEM, INCLUDING CHOSSOVER DUCTS, TAILPIPE AND FORWARD ENGINE SUPPORT IS REVIEWED AND SUPPORTING STRUCTURE ANALYZED FOR CRITICAL LOADING CONDITIONS. (AUTHOR) (U)

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AU-653 565 1/3 GENERAL ELECTRIC CO CINCINNATI UNIO ADVANCED ENGINE AND TECHNOLOGY DEPT

STRUCTURAL ANALYSIS NING BASIC COMPONENTS. (U)

OCT 63 398P REPT. NU. 130 CUNTRACT: DA-44-177-TC-715

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON XV-54 LIFT FAN Flight Research Aincraft Program.

DESCRIPTORS; (+VERTICAL TAKE-OFF PLANES, WINGS), (+RESEARCH PLANES, WINGS), (+WINGS, STRUCTURAL PROPERTIES), ANALYSIS, LIFT, DUCTED FANS, STRUCTURAL PARTS, STRESSES, LOADING(MECHANICS), TABLES (U) IDENTIFIERS: V-5 AIRCRAFT (U)

THE STRUCTURAL ANALYSIS OF THE BASIC WING COMPONENTS OF THE U.S. ARMY XV-5A LIFT FAN RESEARCH AIRCRAFT IS PRESENTED. THE BASIC STRUCTURAL COMPONENTS OF THE WING ARE COMPOSED OF THE TWO SPARS, THE WING LEADING EDGE TORQUE BOX, AND THE SKINS AND RIBS OF THE PANEL OUTBOARD OF THE LIFT FAN. A COMPLETE DIGITAL COMPUTER PROGRAM APPLICABLE TO THIS AND OTHER HIGHLY REDUNDANT STRUCTURES WAS DEVELOPED. SINCE THIS PROGRAM WAS USED IN THE STRUCTURAL ANALYSIS AND DESIGN. THE DEFLECTIONS, INTERNAL LOADS, AND INTERNAL STRESSES FOR CRITICAL FLIGHT CONDITIONS ARE SUMMARIZED IN THE FORM OF PRINTED COMPUTER OUTPUT. (AUTHOR)

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UDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07 AU-653 566 1/1 1/3 GENERAL ELECTRIC CO CINCINNATI UHIO ADVANCED ENGINE AND TECHNOLOGY DEPT WIND TUNNEL TEST REPORT CUNVENTIONAL MODEL. VOLUME I. LOW SPEED FORCE AND MOMENT DATA. (U) JAN 64 414P " REPT. NO. 141-VOL-1 CONTRACT: DA-44-177-TC-715 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPT. ON XV-54 LIFT FAN FLIGHT RESEARCH AIRCHAFT PROGRAM. SEE ALSO VOLUME 2, AD-653 568 AND VOLUME 3, AD-653 569. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, SUBSONIC CHARACTERISTICS), (+RESEARCH PLANES, MODEL TESTS), WIND TUNNEL MODELS, DUCTED FANS, LIFT, FORCE(MECHANICS), MOMENTS, TABLES (U) IDENTIFIERS: V-5 AIRCRAFT (U) THE REPORT PRESENTS THE RESULTS FROM THE WIND TUNNEL TESTS OF A 1/8-SCALE CONVENTIONAL MODEL OF THE U. S. ARMY AV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT. THE TESTS WERE PERFORMED TO DETERMINE THE SUBSONIC AERODYNAMIC CHARACTERISTICS OF THE XV-SA IN ITS CONVENTIONAL FLIGHT CONFIGURATION. VOLUME I CONTAINS THE TABULATED FORCE AND MOMENT DATA FROM THE LOW SPEED (M = 0+285) TESTS+ (U)

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DUC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07

AD-653 568 1/1 1/3 GENERAL ELECTRIC CO CINCINNATI UHIO ADVANCED ENGINE AND TECHNOLOGY DEPT

WIND TUNNEL TEST REPORT CONVENTIONAL MODEL. VOLUME II. LOW SPEED PRESSURE AND HINGE MOMENTS. (U)

JAN 64 344P REPT. NO. 141-VOL-2 CUNTRACT: UA-44-177-TC-715

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SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN Flight Research Aircraft Program. See also volume 1, Au-653 566 AND volume 3, AD-653 569.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, MODEL TESTS), (+RESEARCH PLANES, MODEL TESTS), MOMENTS, PRESSURE, WIND TUNNEL MODELS, LIFT, DUCTED FANS, TABLES, AERODYNAMIC CONTROL SURFACES, AERODYNAMIC CHARACTERISTICS (U) IDENTIFIERS: V-5 AIRCRAFT (U)

THE REPORT PRESENTS THE RESULTS FROM WIND TUNNEL TESTS OF A ONE-EIGHTH SCALE CONVENTIONAL MODEL OF THE U.S. ARMY XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT. VOLUME II PRESENTS HINGE MOMENT COEFFICIENTS AND PRESSURE DATA IN PLOTTED AND TABULAR FORM WITH PERTINENT DETAIL EXPLANATORY INFORMATION: PRESSURE AND HINGE MOMENT DATA WERE NOT RECORDED DURING THE SECOND PHASE OF THE LOW SPEED TESTING. (AUTHOR)

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SEARCH CUNTROL NO. /20M07 DOC REPORT BIBLIOGRAPHY 1/1 AD-653 569 1/3 GENERAL ELECTRIC CO CINCINNATI UHIO ADVANCED ENGINE AND TECHNOLUGY DEPT WIND TUNNEL TEST REPORT CONVENTIONAL MODEL. VOLUME (U) 111. HIGH SPEED (MACH = 0.4 To 0.9). JAN 64 547P REPT. NO. 141-VOL-3 CUNTRACT: DA-44-177-TC-715 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPT. ON XV-54 LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO VOLUME 1, AD-653 566 AND VOLUME 2, AD-653 568. DESCRIPTORS: (VERTICAL TAKE-OFF PLANES, SUBSONIC CHARACTERISTICS), (+RESEARCH PLANES, MODEL TESTS), WIND TUNNEL MODELS, LIFT, DUCTED FANS, AERODYNAMIC CONTROL SURFACES, MOMENTS, AERODYNAMIC (U) CONFIGURATIONS, TABLES (U) IDENTIFIERS: V-5 AIRCRAFT THE VOLUME PRESENTS THE RESULTS OF HIGH SPEED WIND TUNNEL TEST OF A ONE-EIGHTH SCALE MODEL OF THE U.S. ARMY XV-5A LIFT FAN RESEARCH AIRCRAFT. THE TESTS WERE CONDUCTED AT THE DAVID TAYLOR MODEL BASIN 7 X 10 FOOT TRANSONIC WIND TUNNEL FACILITY. CUNVENTIONAL MODEL FORCE, PRESSURE, AND HINGE MOMENT DATA WERE OBTAINED OVER A MACH NUMBER RANGE OF .44 TO .90 AND PITCH AND SIDESLIP RANGES OF -4 TU 15 DEGREES AND -5 TO +5 DEGREES RESPECTIVELY. THE COMPLETE AIRCRAFT WAS THE PRIMARY CONFIGURATION TESTED, WITH THE MAJORITY OF THE VARIATIONS BEING IN CONTRUL SURFACE AND STABILIZER SETTINGS. TESTS WERE ALSO CONDUCTED WITH THE VENTICAL AND HORIZONTAL TAIL SURFACES REMOVED, WITH WING FAN UPPER AND LOWER SURFACE STRUT FAIRINGS REMOVED, AND WITH ENGINE DUCT PRESSURE SURVEY RAKE INSTALLED. (AUTHOR) **(U)**

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DDC REPORT BIBLIUGRAPHY SEARCH CUNTROL NU. /20M0/

AU-654 041 1/3 General Electric co cincinnati uhio Advanced Engine and Téchnology dept

CALCULATED HEIGHT, BALANCE AND MOMENTS OF INERTIA.

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JAN 64 139P REPT. NU. 139 Contract: JA-44-177-TC-715

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SUPPLEMENTARY NOTE: REPT. ON XV-5A LIGHT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, DESIGN), (+RESEARCH PLANES, DESIGN), WEIGHT, STABILITY, MOMENT OF INERTIA, LIFT, PROPULSION, FANS, TABLES (U) IDENTIFIERS: V-5 AIRCRAFT (U)

THE REPORT CONTAINS WEIGHT AND BALANCE AND AIRCRAFT MUMENT OF INERTIA DATA IN SUMMARY AND IN DETAIL. THE SUMMARY DATA IS GIVEN FUR SEVERAL FUEL, FLIGHT TEST INSTRUMENTATION COMBINATIONS CONSIDERED COMPATIBLE WITH THE FLIGHT TEST PROGRAM. PERFORMANCE REQUIREMENTS WERE WRITTEN FOR ENDURANCE MISSIONS OF 20 AND 45 MINUTES AND THEREFORE WEIGHTS DATA ARE GIVEN FOR THE AIRCRAFT WITH FUEL TO PERFORM THESE MISSIONS WITH FLIGHT TEST INSTRUMENTATION INCLUDED. THE DESIGN GROSS WEIGHT OF THE AIRCRAFT IS 9200 LBS., AND THEREFORE DATA IS GIVEN FOR THIS WEIGHT. APPROXIMATELY 85 PERCENT OF THE AIRCRAFT WEIGHT WAS UBTAINED FROM MEASUREMENT OF COMPONENT AND SUB-ASSEMBLY WEIGH S. IN ADDITION, THE AIRCRAFT ITSELF WAS WEIGHED AND THIS ACTUAL WEIGHT HAS BEEN USED TO DERIVE VARIOUS GROSS WEIGHT LOADING CONDITIONS. THE WEIGHT EMPTY GIVEN INCLUDES ONLY THOSE ITEMS REQUIRED BY THE AIRCRAFT SPECIFICATION. IT DUES NOT, FOR INSTANCE, INCLUDE THE AUXILIARY FUEL FANK NOR INSTRUMENTATION OR OTHER TEMPORARY ITEMS INSTALLED FOR INITIAL FLIGHT TEST PURPUSES. HORIZONTAL DISTANCES USED WERE MEASURED FROM FUSELAGE STATION ZERO. VERTICAL DISTANCES ARE MEASURED FRUM A THEORETICAL PLANE 100 INCHES BELOW THE FUSELAGE HORIZONTAL REFERENCE PLANE. (AUTHOR) (U)

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DDL REPORT BIBLIUGRAPHY SEARCH CUNTROL NO. /20M07 1/3 A0-654 042 GENERAL ELECTRIC CO CINCINNATI UHIO ADVANCED ENGINE AND TECHNOLOGY DEPT (U) STRESS ANALYSIS MAIN LANDING GEAR. JAN 64 231P REPT. NO. 142 CONTRACT: DA+44-177-TC-715 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPT. ON XV-5A LIGHT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, LANDING GEAR), (*RESEARCH PLANES, LANDING GEAR), (+LANDING GEAR, STRESSES), STRUCTURAL PROPERTIES, MATHEMATICAL ANALYSIS, LOADING (MECHANICS), LIFT, FAMS, PROPULSION (U) IDENTIFIERS: V-5 AIRCRAFT (U) THE REPORT CONSISTS OF DATA SUBSTANTIATING THE STRUCTURAL INTEGRITY OF THE MAIN LANDING GEAR SHOCK STRUT. (0)

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AU-654 J43 1/1 1/3 14/2 GENERAL ELECTRIC CO CINCINNATI UHIO ADVANCED YECHNOLOGY AND DEMONSTRATOR PRUGRAMS DEPT

FULL SCALE WIND TUNNEL TEST REPORT. (U)

JUN 66 303P REPT. NU. 153 Contract: DA-44-177-TC-715

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SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, FLIGHT TESTING), (*RESEARCH PLANES, FLIGHT TESTING), WIND TUNNELS, HOVERING, AERODYNAMIC CHARACTERISTICS, THERMODYNAMICS, PERFURMANCE(ENGINEERING), LIFT, PROPULSION, FANS IDENTIFIERS: V-5 AIRLRAFT

THE TEST PROGRAM INCLUDED AERODYNAMIC, THERMODYNAMIC AND MECHANICAL EVALUATION OF THE COMPLETE FLIGHT TYPE AIRCRAFT SYSTEM AT FUIGHT SPEEDS EQUIVALENT TO HUVER UP THROUGH 100 KNOTS IN BOTH THE CONVENTIONAL AND FAN POWER MODES OF FLIGHT. THE REPORT SUMMARIZES THE MORE IMPORTANT AERODYNAMIC PERFORMANCE OBTAINED DURING THE TEST PROGRAM. THE DATA ARE PRESENTED GRAPHICALLY IN CUEFFICIENT FURM TO PROVIDE & CONSISTENT BASIS OF COMPARISON. THE AERODYNAMIC RESULTS OBTAINED DURING THESE TESTS MAY BE SUMMARIZED BY SAYING THAT THE AIRCRAFT, AS DESIGNED AND TESTED, HAS ADEQUATE CONTROL POWER, LIFT. HORIZONTAL THRUST AND STATIC STABILITY TO PERMIT SAFE TRANSITIONAL FLIGHT BETWEEN & HOVER LIFT-OFF AND CUNVERSION TO THE JET MODE OF FLIGHT. THE RESULTS OF THIS WIND TUNNEL TEST PRUGRAM HAVE PROVEN TO BE A VALUABLE ASSET DURING CONDUCT OF THE FLIGHT TEST PROGRAM. USING THESE DATA. PREDICTIONS OF AIRCRAFT PERFORMANCE HAVE BEEN VERIFIED BY ACTUAL MEASURED FLIGHT DATA. (AUTHOR) (U)

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DDC REPORT BIBLIUGRAPHY SEARCH CUNTROL NU. /20M0/

AU-654 783 1/1 1/3 LUCKHEED-GEURGIA CO MARIETTA

FULL SCALE TESTS OF THE XV-4A HUMMINGBIRD IN THE AMES 40 x 60 FOOT WIND TUNNEL. (U)

JAN 65 324P REPT. NU. ER=7634 CONTRACT: DA=44~177-[C=7/3

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DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, FLIGHT TESTING), HOVERING, TESTS, WIND TUNNELS, AERODYNAMIC CHARACTERISTICS: PITCH(MUTION), YAN, ANGLE OF ATTACK (U) IDENTIFIERS: V-4 AIRCRAFT (U)

THE TESTS CONSISTED OF 41 RUNS AND A TOTAL OF 944 TEST POINTS. TESTS HERE CONDUCTED OVER A RANGE OF SPEEDS IN ALL PHASES OF FLIGHT FROM HOVER THROUGH TRANSITION TO CONVENTIONAL FLIGHT. PITCH AND YAH RUNS, AS HELL AS CONTROL EFFECTIVENESS RUNS IN ALL THREE MODES WERE MADE. MANY OF THE PITCH RUNS WERE MADE WELL INTO THE SO-CALLED DEEP STALL ANGLE OF ATTACK RANGE. (AUTHUR)

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ODC REPORT BIBLIOGRAPHY SEARCH CUNTROL NO. 140M07 AU-655 U72 1/3 3/5 AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-PATTERSON AFB OHIO EXTERNAL VISIBILITY CRITERIA FOR VTOL AIRCRAFT. (U) DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 JUL 65-1 JUL 66, MAR 67 65P ROBERTS , EDWARD 0. 1 REPT. NO. AFFDL-TR-67-27 PRCJ: AF-1425 TASK: 142501 UNCLASSIFIED REPORT DISTRIBUTION: NO FOREIGN WITHOUT APPROVAL OF AIR FORCE FLIGHT DYNAMICS LABURATORY, ATTN: FDFR. W-P AFB. OHIO. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, HUMAN ENGINEERING), (+VISIBILITY, VERTICAL TAKE-OFF PLANES), PILUTS, SPECIFICATIONS, COCKPITS, LANDINGS. DESIGN (U) IDENTIFIERS: V-4 AIRCRAFT, V-5 AIRCRAFT, X-22 AIRCRAFT, C-142 AIRCRAFT (U) THE REPORT CONTAINS & DISCUSSION OF SOME INFLUENCING FACTORS WHICH AFFECT THE PHYSICAL ABILITY OF THE PILOT TO SEE EXTERNALLY FROM THE AIRCRAFT ALONG WITH THE RESTRICTIONS THEY PRESENT TO THE FIELD OF VIEW. VISIBILITY DATA ARE PRESENTED ON FOUR EXPERIMENTAL VTOL AIRCRAFT, XV-4A, XV-5A, X-22, AND XC-142A, IN THE FORM OF BINOCULAR PHOTOGRAPHS. A CRITERIA TOOL IS PROVIDED BY ESTABLISHING THE DEPRESSION ANGLE OF THE SPHERICAL COORDINATE SYSTEM AS A PARAMETER TO DETERMINE THE VISIBILITY REQUIREMENTS FOR THE TERMINAL LANDING PHASE OF A VTOL AIRCRAFT. FINALLY, AN ABBREVIATED SET OF TABLES IS PRESENTED TO THANSFER THE 'DEGREES-TO-THE-SIDE AND DEGREES-DOWN' COORDINATE ANGLES TO THE ANGLES OF THE SPHERICAL COORDINATE SYSTEM. (AUTHOR) (U)

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. //OMO7 AD-657 321 1/1 1/3 AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-PATTERSON AFB OHIU EFFECTS OF GUST VELOCITY SPATIAL DISTRIBUTIONS ON LATERAL-DIRECTIONAL RESPONSE OF A VIOL AIRCRAFT. (U) DESCRIPTIVE NOTE: FINAL REPT. OCT 65-FEB 67, JUN 67 SWAIN, ROBERT L. ; CONNORS, 37P ALONZU J. : REPT. NO. AFFOL-TR-67-93 AF-8219 PHOJ: TASK: 321903 UNCLASSIFIED REPORT DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, +GUST LOADS), (+ROLL, HOVERING), VELOCITY, MOMENTS, YAW, TURBULENCE, FLIGHT CONTROL SYSTEMS, EQUATIONS OF MOTION, FUSELAGES (U) THE EFFECTS OF SPANWISE DISTRIBUTION OF LONGITUDINAL AND VERTICAL COMPONENTS OF GUST VELOCITY AND LUNGITUDINAL DISTRIBUTION OF THE LATERAL COMPONENT ON THE LATERAL-DIRECTIONAL RESPONSE OF A HOVERING VTOL AIRCRAFT ARE ANALYZED. RESULTS SHOW THAT SPANWISE EFFECTS OF THE LONGITUDINAL AND VERTICAL COMPONENTS ARE NEGLIGIBLE. AND THE LONGITUDINAL DISTRIBUTION OF THE LATERAL COMPONENT IS SIGNIFICANT IN COMPUTING THE POWER SPECTRAL DENSITIES OF GUST-INDUCED SIDE FORCE, YAWING MOMENT, ROLLING MOMENT, AND THE AIRCRAFT SIDESLIP, YAW, AND ROLL RUOT-MEAN-SQUARE RESPONSE ANGLES. IF THE GUST-INDUCED ANGLES OF ATTACK AND SIDESLIP ANGLES ARE IN THE NUNLINEAR RANGE OF LIFT CURVE SLOPE, THE ABUVE CUNCLUSIONS. WHICH ARE BASED ON LINEAR AERODYNAMIC THEURY, MAY NOT HOLD AND AN ANALYSIS BASED ON MOMENTUM TRANSFER OF GUST ENERGY TO THE AIRCRAFT IS RECOMMENDED. FLUN FIELD INTERACTION EFFECTS DUE TO ENGINE INTAKE AND EXHAUST ALSO WERE NOT CONSIDERED. (AUTHOR) (U)

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DDC REPORT BIBLIUGRAPHY SEARCH CUNTROL NO. /40M0/

AU-657 989 1/3 GENERAL ELECTRIL CO CINCINNATI UHIO ADVANCED ENGINE AND TECHNOLOGY DEPT

STRUCTURAL TEST RESULTS.

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MAR 64 365P REPT. NO. 145 CONTRACT: DA-44-177-TC-715

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCHAFT PROGRAM.

DESCRIPTORS: (+VERTIGAL TAKE-OFF PLANES, AIRFRAMES), (+RESEARCH PLANES, AIRFRAMES), (+AIRFRAMES, TESTS), FUSELAGES, SUPPORTS, LOADING(MECHANICS), LIFT, FANS, STRUCTURAL PROPERTIES (U) IDENTIFIERS: V-5 AIRCRAFT (U)

THE DETAILED STATIC TEST PROCEDURES DESCRIBED COVER THE 23 PROOF TESTS AND THE ONE ULTIMATE TEST TO BE ACCUMPLISHED ON THE XV-SA AIRCRAFT. THE PROCEDURES INCLUDE AIRPLANE SUPPORT SYSTEMS, LOADING ARRANGEMENTS AND METHODS OF LOAD APPLICATION, ALONG WITH DETAILED LOAD REACTING STRUCTURES AND LOAD CYLINDER ARRANGEMENTS. TABLES ARE "RESENTED BY WHICH LOAD CYLINDERS MAY BE CALIBRATED PRIOR TO EACH TEST. INSTRUMENTATION DETAILS ARE PROVIDED SHOWING LOCATION OF BOTH STRAIN AND DEFLECTION MEASURING EWUIPMENT AND TIMES OURING WHICH SPECIFIC MEASUREMENTS ARE TO BE MADE. DATA RECORDING DEVICES ARE ALSO INDICATED. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NO. /20M07

AD-657 990 1/3 GENERAL ELECTRIC CO CINLINNATI OHIO ADVANCED ENGINE AND TECHNOLOGY DEPT

FINAL DESIGN WEIGHT REPORT.

JUN 65 139P REPT: NO: 159 CONTRACT: DA-44-177-TC-715

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UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON XV-5A LIFT FAN Flight Research Aircraft Program.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, DESIGN),	
(RESEARCH PLANES, DESIGN), WEIGHT, MOMENT OF	
INERTIA, FUSELAGES, PROPULSION, LIFT, FANS	(U)
IDENTIFIERS: V-5 AIRCRAFT	(U)

THE REPORT CONTAINS WEIGHT AND BALANCE DATA IN SUMMARY AND IN DETAIL. THE SUMMARY DATA ARE GIVEN FUR SEVERAL FUEL AND FLIGHT TEST INSTRUMENTATION CUMBINATIONS CONSIDERED COMPATIBLE WITH THE FLIGHT TEST PROGRAM. PERFORMANCE REQUIREMENTS WERE WRITTEN FOR ENDURANCE MISSIONS OF 2U TO 45 MINUTES AND THEREFORE WEIGHTS DATA ARE GIVEN FOR THE AIRCRAFT WITH FUEL TU PERFORM THESE MISSIONS WITH FLIGHT TEST INSTRUMENTATION INCLUDED. THE DESIGN GROSS WEIGHT OF THE AIRCRAFT IS 9200 LBS., AND THEREFORE DATA ARE GIVEN FOR THIS WEIGHT. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07

AD-657 991 1/3 GENERAL ELECTRIC CO CINCINNATI OHIO ADVANCED ENGINE AND TECHNOLOGY DEPT

INSTALLED SYSTEMS FUNCTIONAL TEST PROCEDURE. (U)

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UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM.

DESCRIPTORS;	(+VERTICAL TAKE-OFF PLANES, AIRCR/	NFT
EQUIPMENT),	(+ RESEARCH PLANES, AIRCRAFT	
EQUIPMENT).	(*AIRCRAFT EWUIPMENT, TESTS),	
PERFORMANCE	(ENGINEERING), LIFT, FANS,	
PROPULSION,	CONTROL STICKS	(U)
IDENTIFIERS:	AIRCRAFT	(U)

THE PURPOSE OF THESE TESTS IS TO DEMONSTRATE THAT THE XV-5A AIRCRAFT SYSTEMS FUNCTION IN ACCORDANCE WITH THE DESIGN REQUIREMENTS. THE TESTING PROCEDURE IS DIVIDED INTO 12 MAJOR TESTS. THE ORDER OF APPEARANCE IS THE DESIRED CHRONOLOGICAL ORDER. WHEN THE AIRCRAFT IS RECEIVED FOR FUNCTIONAL TESTS. THE HYDRAULIC AND PNEUMATIC SYSTEMS WILL HAVE BEEN FLUSHED, FILLED AND BLED IN ACCORDANCE WITH RYAN REPORT 14359-6. THE CONTROLS WILL HAVE BEEN RIGGED IN ACCORDANCE WITH RYAN REPORT 14395-5. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NU. /ZOMO7 AU=657 992 1/3 21/5 GENERAL ELECTRIC CO CINCINNATI UHIO FLIGHT PROPULSION LAB DEPT X353-58 PROPULSION SYSTEM FLIGHTWORTHINESS TEST **REPURT** • VULUME I • (U) JAN 63 196P CONTRACT: 0A-44-177-TC-715 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: REPORT ON VZ-11 LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO AD-634 950. DESCRIPTORS: (+VERTILAL TAKE-OFF PLANES, •PROPULSION), (•RESEARCH PLANES, PROPULSION), FLIGHT TESTING, TESTS, RELIABILITY, FANS, "URBOJET ENGINES, LIFT (U) IDENTIFIERS: V-5 AIRCRAFT (U) AN X353-58 PROPULSION SYSTEM COMPRISED OF TWO J85-GE-5 TURBOJET ENGINES WITHOUT AFTERBURNERS, THO X353-58 DIVERTER VALVES, ONE X353-5 LIFT FAN AND ONE X375 PITCH TRIM CONTROL FAN WAS ASSEMBLED AND TESIED. THE SPECIFIED TESTING WAS COMPLETED. THE J85 GAS GENERATORS WERE UNAFFECTED BY THE PRESENCE OF THE X353-58 PHOPULSION SYSTEM. THE DIVERTER VALVES AND THE PITCH FAN MET OR EXCEEDED PERFORMANCE REQUIREMENTS AT ALL OPERATING CUNDITIONS. THE LIFT FAN MET OR EXCLEDED PERFORMANCE REWUIREMENTS AT ALL BUT ONE CONDITION (SINGLE ENGINE LIFT). THERE WERE ONLY MINOR DISCREPANCIES FOUND IN THE DIVERTER VALVE AND PITCH FAN HARDWARE AT DISASSEMBLY. THE LIFT FAN HAD CONSIDERABLE DAMAGE RESULTING FROM THE SHEUDING OF A SMALL METAL TAB FROM THE ROTOR DURING THE LAST ENDURANCE CYCLE OF THE TEST. LIFT FAN ALUMINUM INLET VANES AND EXIT LOUVERS WERE OF GENERALLY POOR MANUFACTURING QUALITY AND DID NOT SATISFACTORILY COMPLETE THE TEST. IT WAS RECUMMENDED THAT & FLIGHTWORTHINESS RATING BE ASSIGNED TO THE X353-58 PROPULSION SYSTEM UPON SATISFACTORY COMPLETION OF A 10-HOUR PENALTY TEST OF NEW LIFT FAN INLET VANES AND EXIST LOUVERS. (AUTHOR) (U)

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DUC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20H07

AD-657 993 1/3 1/1 GENERAL ELECTRIC CO CINCINNATI UNIO ADVANCED ENGINE AND TECHNOLOGY DEPT

FLIGHTWORTHINESS AND RELIABILITY SUMMARY REPORT. (U)

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UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN Flight Research Aircraft.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, FLIGHT	
TESTING), (•RESEARCH PLANES, FLIGHT TESTING),	
RELIABILITY, SAFETY, LIFT, FANS,	
PERFURMANCE(ENGINEERING), STANDARDS,	
PROPULSION	(U)
IDENTIFIERS: V-5 AIRCRAFT	(U)

THE DATA INDICATE THAT THE XV-5A AIRCRAFT IS SAFE AND AIRHORTHY. THIS CONCLUSION WAS SUBSTANTIATED BY ANALYSIS, GROUND TEST AND FLIGHT TEST. THE XV-5A IS SHOWN TO BE STRUCTURALLY SOUND AND SUITABLE FOR USE IN A FLIGHT TEST PROGRAM OF AT LEAST 250 HOURS. THE AIRPLANE WAS MANUFACTURED TO EXACTING AIRCRAFT STANDARDS IN CHOICE AND USE OF MATERIALS, COMPONENTS AND SUBSYSTEMS, AND WAS MANUFACTURED AND TESTED WITH STRICT QUALITY CUNTROL STANDARUS MAINTAINED. SAFETY AND AIRWORTHINESS OF THE XV-5A VTOL AIRCRAFT, USING THE LIFT FAN CONCEPT, WAS DEMONSTRATED. FLIGHT TESTS INDICATE THAT CONTROLLABILITY IS ADEQUATE AND IN AGREEMENT WITH ACCEPTABLE STANDARDS. CONTROL IS SATISFACTORY IN VIOL AND CTUL THROUGHOUT THE FLIGHT ENVELOPE: AND DURING GROUND ROLL AND TAXI. FLUTTER ANALYSIS, AND EXPERIMENTAL GROUND, WIND TUNNEL AND FLIGHT TESTS INDICATE THAT THE AIRCRAFT IS FREE OF FLUTTER WITHIN THE PRESCRIBED FLIGHT ENVELOPE. (AUTHOR) (U)

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SEARCH CONTROL NO. /20M07 DDC REPORT BIBLIOGRAPHY AU-657 994 1/3 GENERAL ELECTRIC CO CINCINNATI UHIO ADVANCED ENGINE AND TECHNOLOGY DEPT CALCULATED HEAT TRANSFER AND COULING SYSTEM PERFORMANCE, VOLUME II. (U) JUN 65 339P REPT. NO. 160-VOL-2 CONTRACT: DA-44-177-TC-715 UNCLASSIFIED REPORT AVAILABILITY: MICROFICHE ONLY AFTER ORIGINAL COPIES EXHAUSTED. SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO VOLUME 1, AD-657 995. DESCRIPTORS: INVERTICAL TAKE-OFF PLANES, COOLING + VENTILATING EQUIPMENT), (*RESEARCH PLANES, COOLING + VENTILATING EQUIPMENT), (+COOLING + VENTILATING EQUIPMENT, PERFORMANCE(ENGINEERING)). COULING, HEAT TRANSFER, AIRFRAMES, THERMAL (U) INSULATION. THERMAL ANALYSIS (U) IDENTIFIERS: V-5 AIRCRAFT VULUME II CUNTAINS SUPPORTING DATA INCLUDING TEST RESULTS PROVIDING THE BASIS FOR ESTIMATES OF EXTERNAL AIRFRAME HEATING, METHODS USED IN CALCULATION OF

CUOLING SYSTEM PERFURMANCE AND AN ANALYSIS OF

STRUCTURAL PROTECTION SYSTEMS.

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DDC REPORT BIBLIUGRAPHY SEARCH CUNTROL NO. /40M07

AD-65/ 995 1/3 GENERAL ELECTRIC CO CINCINNATI UHIO ADVANCED ENGINE AND TECHNULOGY DEPT

CALCULATED HEAT TRANSFER AND COOLING SYSTEM PERFORMANCE, VOLUME I.

JUN 65 303P REPT. NO. 160-V0L-1 Cuntract: DA-44-177-TC-715

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UNCLASSIFIED REPORT AVAILABILITY: AVAILABLE IN MICRUFICHE ONLY. SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN FLIGHT RESEARCH AIRCRAFT PROGRAM. SEE ALSO VOLUME 2. AD-657 994.

DESCRIPTORS: (•VERIICAL TAKE=OFF PLANES, COOLING + VENTILATING EQUIPMENT), (•RESEARCH PLANES, COOLING + VENTILATING EQUIPMENT), (•COOLING + VENTILATING EQUIPMENT, PERFORMANCE(ENGINEERING)), COOLING, HEAT TRANSFER, TURBOJET ENGINES, DOANWASH, THERMAL INSULATION, FUSELAGES (U) IVENTIFIERS: V=5 AIRCRAFT (U)

BASED ON ANALYSIS AND LIMITED TEST DATA, THE AIRCRAFT COULING AND STRUCTURAL PROTECTION SYSTEMS ARE BELIEVED TO HAVE SUFFICIENT PERFORMANCE CAPABILITY TO PERHIT ORDERLY CONDUCT OF INSTALLED SYSTEM FUNCTIONAL, NASA-AMES 401 X 801 WIND TUNNEL, AND EDWARDS AIR FORCE BASE FLIGHT TEST PROGRAMS EVEN THOUGH EXTERNALLY INDUCED ENVIRONMENTAL TEMPERATURES TO 1040F DEVELOP DURING FAN MODE OPERATION. OCCASIONAL LOCAL AND MINOR OVERHEATING PRODLEMS ARE EXPECTED WITHIN THE BROAD RANGE OF POSSIBLE OPERATING CONVITIONS: HOWEVER, IT IS EXPECTED THEY CAN BE OVERCOME WITH MINOR STRUCTURAL MODIFICATIONS, INSTALLATION OF ADDITIONAL INSULATION, AND/OR MINOR MODIFICATION OF OPERATIONAL PROCEDURES. LACK OF DETAILED KNOWLEDGE OF THE EXTERNALLY INDUCED ENVIRONMENT MADE COOLING AND STRUCTURAL SYSTEMS DESIGNS AND ANALYSIS DIFFICULT. IN AN ATTEMPT TO GAIN FURTHER INSIGHT TO THIS CUMPLEX PROBLEM, A PROCEDURE WAS DEVELOPED WHEREBY EXISTING LITERATURE DATA ON DOWNWASH PHENOMENA COULD BE APPLIED QUANTITATIVELY TO THE XV-SA INDUCED ENVIRONMENT. RESULTS SHOW DIRECTIONAL EFFECTS OF AIRCRAFT CONTROL SEITINGS. AND INDICATE THE STRONG PUSSIBILITY OF HOT WAS INGESTION BY THE ENGINE AND CUOLING SYSTEM AIR INLET. THESE RESULTS ALSO INDICATE MEANS WHEREBY ADVERSE EFFECTS MAY BE MINIMIZED OR ELIMINATED. (AUTHOR) 121 (U)

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AD-657 997 1/3 GENERAL ELECTRIC CO CINCINNATI UNIO ADVANCED ENGINE AND TECHNOLOGY DEPT

FUSELAGE STRUCTURAL ANALYSIS. VOLUME III. FRAMES, BULKHEADS AND FITTINGS. (U)

FEB 64 98P REPT. NO. 144-VOL-3 CONTRACT: DA-44-177-TC-715

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UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPT. ON XV-5A LIFT FAN Flight Research Aircraft Program. See Also Volume 2: AD-653 564 AND Volume 4: Au-640 338.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, FUSELAGES), (+RESEARCH PLANES, FUSELAGES), (+FUSELAGES, STRUCTURAL PROPERTIES), LOADING(MECHANICS), AIRFRAMES, FITTINGS, MATPEMATICAL ANALYSIS, SUPPORTS (U) IDENTIFIERS: V-5 AIRCRAFT (U)

A SUMMARY TYPE LOAD ANALYSIS IS PRESENTED FOR EACH CUMPONENT. WITH THE PRIMARY INTENT OF SHOWING THE STRUCTURAL CONFIGURATION, FINAL CRITICAL LOADING AND UNUSUAL ASSUMPTIONS MADE. STRUCTURAL ADEQUACY OF MANY OF THE PRIMARY COMPONENTS WAS DEMONSTRATED BY PROOF TESTS. (U)

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SEARCH CONTROL NO. /20M07 DDC REPORT BIBLIOGRAPHY AD-661 187 1/3 1/2 CORNELL AERONAUTICAL LAB INC BUFFALO N Y PERFORMANCE AND STRESSES OBTAINED ON AN ISOLATED VTOL-TYPE PROPELLER OPERATING IN HOVERING. (U) TRANSITIONAL, AND AXIAL FLIGHT. DESCRIPTIVE NOTE: TECHNICAL REPT. JUN 65-JAN 67. 97P AUG 67 TRENKA, ANDREW R. : REPT. NO. CAL-88-1840-5-2 CUNTRACT: UA-44-177-AMC=75(T) TASK: 1F125901A142 TK-67-37 MUNITOR: USAAVLABS UNCLASSIFIED REPORT DESCRIPTORS: (VERTILAL TAKE-OFF PLANES, PROPELLERS(AERIAL)), (+PROPELLERS(AERIAL), PERFURMANCE (ENGINEERING)), STRESSES, FLIGHT, HOVERING, TEST EWUIPHENT, CALIBRATION. (U) AERODYNAMIC LOADING EXPERIMENTAL PERFORMANCE AND BLADE STRESSES MEASURED UN A THREE-BLADED VTOL-TYPE PROPELLER TESTED IN FREE AIR ARE PRESENTED. THE ISOLATED PROPELLER WAS TESTED OVER RANGES OF PROP SPEED. FURMAND VELOCITY, BLADE ANGLE SETTING, AND THRUST AXIS TO FREE-STREAM ANGLE. CORRELATION WITH A THEORETICAL HETHOD OF PREDICTING PROPELLER PERFORMANCE AND BLADE STRESSES WAS MADE. IT WAS FOUND THAT WHEN THE PROPELLER WAS OPERATING IN A FLIGHT CONDITION FOR WHICH THE THEORY WAS DEVELOPED. CURRELATION BETWEEN THEORY AND EXPERIMENT WAS GUOD. WHEN THE PROPELLER WAS OPERATING IN A FLIGHT CUNDITION WHERE VERY SMALL POSITIVE OR NEGATIVE EFFECTIVE ANGLES OF ATTACK NERE ENCOUNTERED. CORRELATION BETWEEN THEORY AND EXPERIMENT WAS POOR. (U) (AUTHOR)

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UNCLASSIFIED UDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07 AU-661 253 1/2 5/10 THERM ADVANCED RESEARCH INC ITHACA N Y EXPERIMENTAL STUDY OF PILOT VISIBILITY FROM A VTOL AIR/SEA CRAFT NEAR THE OCEAN SURFACE. (U) DESCRIPTIVE NOTE: INTERIM REPT, 22 JUN 66-21 JUN 67 JUL 67 39P TAN.P. M. HALE.R. W. ; ORDHAY D. E. I REPT. NO. TAR-TR-6704 CUNTRACT: N00014-66-C-0320 UNCLASSIFIED REPORT DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, DOWNWASH), (+PILUTS, +VISIBILITY), OCEANS, SPRAYS. SURFACES. FLIGHT (U) A MAJOR PROBLEM ASSOCIATED WITH THE OPERATION OF A VTOL AIR/SEA CRAFT NEAR THE OCEAN SURFACE IS THE IMPAIRMENT OF PILOT VISIBILITY. CLOUDS OF SPRAY, GENERATED BY DOWNWASH IMPINGEMENT ON THE WATER SURFACE, SURROUND THE AIRCRAFT AND BLOCK THE PILOT'S VIEN. THE OBJECTIVE OF THE STUDY WAS TO DETERMINE PROMISING METHODS FOR ALLEVIATING THE PROBLEM. A MUDEL-SCALE EXPERIMENTAL FACILITY WAS CONSTRUCTED TO STULY THE DETAILS OF SPRAY GENERATION AND THE CHARACTERISTICS OF THE RESULTING SPRAY PATTERN. SEVERAL SPRAY ALLEVIATION DEVICES WERE THEN DESIGNED AND TESTED. TO EVALUATE THEIR EFFECTIVENESS, A TECHNIQUE FOR QUANTITATIVE MEASUREMENT OF VISIBILITY WAS DEVELOPED. COMPARATIVE TESTS WERE CONDUCTED WITH AND WITHOUT THE SPRAY ALLEVIATION DEVICES. (AUTHOR) (U) ł 125 UNCLASSIFIED

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UDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07 AU-661 592 1/2 810 8/13 CORNELL AERONAUTICAL LAB INC BUFFALO N Y QUANTITATIVE TERRAIN STUDY OF VTOL LANDING SITE DISTRIBUTIONS AND OF EFFECTS ON PENETRATION. DESCRIPTIVE NOTE: FINAL REPT. 1 JUL 66-30 JUN 67. JUN 67 125P WOOD, W. F. ITHUNG, H. L. ILEWANDOWSKI.G. M. ; REPT. NO. CAL-VE-2303-D CONTRACT: AF 33(015)-3483 MONITOR: ASD TR=67=18 UNCLASSIFIED REPORT

DESCRIPTORS: (*AIRCRAFT LANDINGS, */ERRAIN), (*VERTICAL TAKE-UFF PLANES, AIRCRAFT LANDINGS), DISTRIBUTION, LANDING FIELDS, SITE SELECTION, PROBABILITY, MAPS, SUIL MECHANICS, AERIAL PHOTUGRAPHY, ALASKA, THAILAND, INDIA, NEVADA, ITALY, EAST GERMANY, WEST GERMANY, TRAFFICABILITY, PENETRATION

A VTOL SITE IS ASSUMED TO REQUIRE A GROUND SLOPE OF IUS OR LESS AND BE CLEAR OF TREES. ALSO THERE CAN BE NO BOULDERS UVER 2 FEET HIGH OR GULLIES DEEPER THAN 2 FEET. SINGLE SITES, IF SWUARE, SHOULD BE 200 FEET ON A SIDE AND IF CIRCULAR 250 FEET IN DIAMETER. ASSAULT SITES, IF SQUARE, SHOULD BE 1500 FEET ON A SIDE AND 2000 FEET IN DIAMETER, IF CIRCULAR. PROBABILITY DISTRIBUTIONS OF DISTANCES TO SINGLE AND ASSAULT SITES. BASED ON A STUDY OF ENVIRONMENTAL LITERATURE, TOPOGRAPHIC MAPS AND AERIAL PHOTOGRAPHS ARE PRESENTED FOR THAILAND, INDIA, NEVADA, ITALY, GERMANY AND ALASKA. A VTOL SITE MAY BE EXPECTED WITHIN A FEW MILES IN ALL BUT THE MOST UNFAVORABLE ENVIRONMENTS. SITES LOCATED ON RESIDUAL SOILS WUULD SELDOM BE TOO SUFT FOR VTOL OPERATIONS, BUT ALLUVIAL SOILS SHOULD BE AVGIDED WHEN POORLY DRAINED. PRIOR KNOWLEDGE OF ANALOGOUS SITUATIONS, AERIAL PHOTOGRAPHY AND DIRECT OBSERVATION PROVIDE THE BEST INFORMATION FOR EVALUATING CANDIDATE SITES. (AUTHOR) (U)

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DDC REPORT BIBLIUGRAPHY SEARCH CUNTROL NO. /ZOMO7

AU-662 715 1/3 14/4 ARMY AVIATION MATERIEL LABS FORT EUSTIS VA

XV-5A MAINTENANCE AND SYSTEMS EVALUATION.

DESCRIPTIVE NOTE: REPT. FOR 27 JAN-15 NOV 65. JUL 67 216P MASSIE.ROBERT K. ; REPT. NO. USAAVLABS-TR-67-53 TASK: AA-65-21

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DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, DESIGN), (*RESEARCH PLANES, MAINTAINABILITY), RELIABILITY, PERFORMANCE(ENGINEERING), PRUPULSION, FANS, EFFECTIVENESS, HEATING, AIRCRAFT EQUIPMENT IDENTIFIERS: V-5 AIRCRAFT, EVALUATION (U)

THE DATA COMPILED DURING THIS EVALUATION WERE USED TO DETERMINE THE EFFECTIVENESS OF DESIGN AS IT APPLIES TO MAINTAINABILITY OF THE OVERALL AIRCRAFT. ITS SYSTEMS. AND ITS SUBSYSTEMS AND. IN CASES OF DEFICIENCIES, TO RECOMMEND IMPROVEMENTS AND TO SPECIFY AREAS THAT REQUIRE FURTHER RESEARCH BEFORE DERIVATIVE AV-SA-TYPE AIRCRAFT ARE CONSTRUCTED. EACH PROBLEM AREA WAS ANALYZED TO DETERMINE WHETHER THE DISCREPANCIES RESULTED FROM THE AUSTERE RESEARCH AIRCRAFT PROGRAM OR WHETHER THEY WERE INHERENT IN THE LIFT-FAN CONCEPT. RESULTS OF THIS SIUDY UNCOVERED THE DESIRABLE AND UNDESIRABLE FEATURES OF 10 OF THE XV-SA AIRCRAFT SYSTEMS. DESIGN REFINEMENTS THAT WILL BE REQUIRED TO BUILD THE LIFT-FAN CONCEPT INTO AN OPERATIONAL MODEL ARE NOT BEYOND THE ENGINEERING TECHNOLOGY AVAILABLE DURING THE 1967-1971 TIME PERIOD. (AUTHOR) (U)

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /40M07 AD-663 848 1/3 1/1 PRINCETON UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES AN EXPERIMENTAL INVESTIGATION OF THE LONGITUDINAL DYNAMIC STABILITY CHARACTERISTICS OF A FOUR-PROPELLER TILT-HING VTOL MODEL. (U) DESCRIPTIVE NOTE: TECHNICAL REPT. SEP 67 124P CURTISSON C. , JR.; PUTMAN, W. F. ; LEBACWZ, J. V. ; REPT. NO. 774 UA-44-177-AMC-8(T) CUNTRACT: PROJ: DA-1P125901A142 TASK: 1P125901A14233 MUNITUR: USAAVLABS TR=66-80 UNCLASSIFIED REPORT DESCRIPTORS: (VERTICAL TAKE-OFF PLANES, PITCH(MOTION)), AIRPLANE MUDELS, SCALE, FLIGHT, TILT WINGS, AERODYNAMIC CHARACTERISTICS, PROPELLERS (AERIAL), TRANSPORT PLANES, ANGLE OF ATTACK, OSCILLATION, DAMPING (U) THE RESULTS OF EXPERIMENTS CONDUCTED TO EVALUATE THE LONGITUDINAL STABILITY CHARACTERISTICS OF A 1/10 SCALE DYNAMIC MUDEL OF A FOUR_PROPELLER TILT-WING VTOL TRANSPORT ARE PRESENTED AND DISCUSSED. THE PRINCETON DYNAMIC MODEL TRACK WAS USED TO MEASURE THE STATIC STABILITY AND THE TRANSIENT RESPONSE OF THE MUDEL AT WING INCIDENCES FROM 90 DEGREES TO 40 DEGREES. THE RESULTS ARE INTERPRETED IN TERMS OF FULL-SCALE ATHCHAFT CHARACTERISTICS. ALL DATA ARE PRESENTED FOR A COGO PUSITION OF 908 MAC (THE MOST FURWARD C.G. POSITION OF THE AIRCRAFT IS 158 MAC) AND THE HORIZONTAL TAIL AND FLAP PROGRAM DIFFER FROM THOSE PRESENTLY USED ON THE AIRCRAFT. THE TRANSIENT MOTIONS AT WING INCIDENCES ABOVE 70 DEGREES WERE SIMILAR AND DOMINATED BY HIGH SPEED STABILITY AND LOW ANGULAR DAMPING RESULTING IN AN UNSTABLE OSCILLATION OF APPROXIMATELY A 9-SECOND PERIOD FOR THE FULL-SCALE AIRCRAFT. THE RESPONSES AT WING INCIDENCES BELOW 70 DEGREES WERE MORE COMPLEX DUE TO A RAPID DECREASE IN THE SPEED STABILITY FROM A LARGE POSITIVE VALUE ABOVE 70 DEGREES TO A NEGATIVE VALUE AT 60 DEGREES.

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07

AU-666 247 1/3 20/4 1/1 DYNASCIENCES CORP BLUE BELL PA

INVESTIGATION OF PROPELLER SLIPSTREAM EFFECTS ON HING PERFORMANCE. (U)

DESCRIPTIVE NUTE: TECHNICAL REPT... NOV 67 213P GEORGE.M. IKISIELOWSKI.E. I REPT. NO. DCR-234 CONTRACT: C. 44-177-AMC-394(T) PROJ: DA-1F125901A142 TASK: 1F125901A14231 MUNITUR: USAAVLABS TR-67-67

UNCLASSIFIED REPORT

DESCRIPTORS: (•VERTICAL TAKE-OFF PLANES, AERODYNAMIC CHARACTERISTICS), (•PROPELLERS(AERIAL), INTERACTIONS), WIND TUNNEL MUDELS, LIFT, DRAG, PITCH(MOTIUN), MOMENTS, INTERACTIONS, PERFURMANCE(ENGINEERING), ASPECT RATIO, TAPER, MODEL TESTS, TILT WINGS (U) IDENTIFIERS: SLIPSTREAM (U)

A THEORETICAL AND EXPERIMENTAL STUDY WAS CONDUCTED TO DETERMINE THE EFFECTS OF PROPELLER SLIPSTREAM ON WING PERFORMANCE. PREVIOUSLY DEVELOPED THEORETICAL ANALYSES WERE EAPANDED AND MODIFIED TO ACCOUNT FOR RADIAL VARIATION OF THE PROPELLER SLIPSTREAM VELOCITY. THE EXPERIMENTAL PROGRAM CONSISTED OF WIND TUNNEL TESTS CUNDUCTED WITH A MOTOR-PROPELLER SYSTEM NOUNTED ON A SEMISPAN WING MODEL. THE WING MODEL UTILIZED HAS A CHORU TO PROPELLER DIAMETER OF •46. AN ASPECT RATIO OF 6.37 (3.18 FOR SEMISPAN), A TAPER RATIO OF 1.0, AND A NACH DO15 AIRFOIL SECTION. THE WING MODEL HAS EIGHT FLOATING WING SEGMENTS WITH AND WITHOUT A 45-DEGREE SIMULATED SPLIT FLAP. LOCATED WITHIN EACH FLOATING WING SEGMENT IS A THREE-LOMPONENT STRAIN GAGE BALANCE TO PROVIDE MEASUREMENTS OF LIFT, DRAG, AND PITCHING MUMENT. THE MEASUREMENTS OF TOTAL WING LIFT, DRAG, AND PITCHING MOMENT WERE OBTAINED WITH THE SIX-COMPONENT MAIN WIND TUNNEL BALANCE. THE TEST DATA OBTAINED INCLUDED THE EFFECTS OF THE VARIATION OF PROPELLER SLIPSTREAM VELOCITY BY UTILIZING TWO PROPELLERS OF DIFFERENT GEOMETRIES. PROPELLER RUTATION FOR ALL TESTS WAS DOWN AT THE WING TIP. THE EXPERIMENTAL AND THEORETICAL RESULTS ARE COMPARED: IN GENERAL, GUOD CORRELATION IS OBSERVED. (AUTHUR) (U) 129

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DDC REPORT BIBLINGRAPHY SEARCH CONTROL NO. /2007 AU-667 140 1/3 14/4 FEDERAL AVIATION AGENCY WASHINGTON D C FLIGHT STANDARDS SERVICE FAA DEVELOPMENTS RELATIVE TO DESIGN OF NEW AIRCRAFT STRUCTURES. (U) 66 11P DOUGHERTY JAMES E. : UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: PREPARED FOR PRESENTATION AT THE FAA MAINTENANCE SYMPOSIUM +CONTINUED RELIABILITY OF TRANSPORT TYPE AIRCRAFT STRUCTURE', WASHINGTON, U. C., 2-4 NOV 66. DESCRIPTORS: (+TRANSPORT PLANES, +SUPERSUNIC PLANES). (+VERTICAL TAKE=OFF PLANES, DESIGN), COMMERCIAL PLANES, AIRFRAMES, AVIATION SAFETY, SHORT TAKE-OFF PLANES, RELIABILITY, MAINTENANCE, ROTARY WINGS. HELICOPTERS (U) IDENTIFIERS: SUPERSONIC TRANSPORT PLANES, FEDERAL AVIATION REGULATIONS, CRASHWURTHINESS (U) THE FULLOWING BROAD AREAS ARE COVERED: (1) SUPERSONIC TRANSPORTS; (2) TRANSPORT DESIGNS UNDER FEDERAL AVIATION REGULATION 25: (3) GENERAL AVIATION DESIGNS UNDER FEDERAL AVIATION REGULATION 23: (4) ROTURCRAFT DESIGNS UNDER FEDERAL AVIATION REGULATIONS 27 AND 291 (5) V/STOL AIRCRAFT; (6)

CRASHWORTHINESS AND PASSENGER EVACUATION.

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DUC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07

AD-667 264 1/3 9/2 Melpar ing falls church va

SIMULATION OF HELICOPTER AND V/STOL AIRCRAFT, VOLUME VI, XC-142 ANALOG COMPUTER PROGRAM STUDY: XC-142A SIMULATION EQUATION MECHANIZATION. (U)

DESCRIPTIVE NOTE: FINAL REPT., JAN 65 213P MAKARCZYK,J. A. ;FAITH,R. L. ; CUNTRACT: N61339-1205 MUNITUR: NAVTRADEVCEN 1205-6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO VOLUME 5, AD-615 452.

DESCRIPTORS: (+TRANSPORT PLANES; MATHEMATICAL MOUELS); (+VERTICAL TAKE-OFF PLANES; MATHEMATICAL MODELS); TILT WINGS; ANALOG COMPUTERS; SIMULATION; HELICOPTERS; SHORT TAKE-OFF PLANES; COMPUTER PROGRAMS; FLOW CHARTING; AIRFOILS; AERODYNAMIC CHARACTERISTICS; RESEARCH PLANES (U) IDENTIFIERS: COMPUTER SIMULATION; C-142 AIRCRAFT; XC-142A AIRCRAFT (U)

THE REPORT PRESENTS THE ANALYSIS AND SIMPLIFICATION PROCEDURES THAT ARE REQUIRED TO DEFINE AND PROGRAM THE MATHEMATICAL NOVEL FOR THE AC-142A AIRCRAFT IN A FORM WHICH IS SUITABLE FOR MECHANIZATION AND SULUTION ON A GENERAL PURPOSE ANALOG COMPUTER. THIS PROGRAM WILL ENABLE THE NAVAL TRAINING DEVICE CENTER TO PERFORM DYNAMIC SIMULATION STUDIES FOR A VISTOL TILT-WING AIRCRAFT. SECTION II CONTAINS THE COMPLETE MATHEMATICAL MUDEL OF THE XC-142 WITH ACCOMPANYING DENOTATION AND VALIDATION. IN SECTION 111. THREE SETS OF SIMULATION EQUATIONS ARE PRESENTED. THESE SETS REPRESENT THE COMPLETE SIX DEGREES OF FREEDOM EQUATIONS, LONGITUDINAL MODE EQUATIONS, AND LATERAL-DIRECTIONAL MODE EQUATIONS. SECTION IV CONTAINS THE MECHANIZATION FUNCTIONAL BLUCK DIAGRAMS ALONG WITH THE PATCHING AND OPERATING INSTRUCTIONS REWUIRED FOR THEIR UTILIZATION. SECTION IV ALSO SPECIFIES THE ANALOG COMPUTER INSTALLATION WHICH IS REQUIRED TO SULVE THE MECHANIZATIONS. THE SUBSEQUENT SECTIONS CONTAIN: A DISCUSSION OF PROGRAM LIMITATIONS, CONCLUSIONS, AND RECOMMENDATIONS. (AUTHOR) (U)

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UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07

20-667 936 1/3 1/4 13/7 HARRY DIAMOND LABS WASHINGTUN D C FLUIDIC STALL SENSING SYSTEM. (U) FE6 68 4UP WARREN , RAYMOND N. ISWARTZ, ELMER L. : REPT. NO. HDL-TR-1368 PROJ DA-19125901A142, HOL-42700 TASK: 19125901A14233 UNCLASSIFIED REPORT DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, STALL-WARNING INDICATORS), (+STALL-WARNING INDICATORS, +FLUID AMPLIFIERS), SHORT TAKE_OFF PLANES, FLOW SEPARATION, ANGLE OF ATTACK, WINGS, STALLING, LIFT. BOUNDARY LAYER, DISPLAY SYSTEMS, FLUIDICS. PROBES, SENSORS (U) IDENTIFIERS: BLOWING, ATTACHED FLOW (U) THE FLUID STALL SENSOR IS A REMUTE INDICATING SYSTEM FOR DETECTING STALL ON AIRCRAFT WINGS. WHEN THE FLOW IS ATTACHED TO THE WING, IT CAUSES ASPIRATION FROM A PROBE JUST ABOVE THE WING SURFACE. SEPARATED FLOW, ASSUCIATED WITH STALL, DECREASES THE ASPIRATION. THE CHANGE IN ASPIRATION IS AMPLIFIED BY A HIGH IMPEDANCE FLUID AMPLIFIER WHICH DRIVES AN INDICATUR. THE POSITION OF INDICATORS FROM SEVERAL PROBES ACROSS THE WING GIVES AN

INDICATION OF THE AMOUNT OF LIFT REMAINING.

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DUC REPORT BIBLIDGRAPHY SEARCH CUNTROL NO. /ZOMO7 AD-667 980 1/3 20/4 1/1 BUEING CO RENTON WASH COMMERCIAL AIRPLANE DIV A GENERAL METHOD FOR DETERMINING THE AERODYNAMIC CHARALTERISTICS OF FAN-IN-WING CONFIGURATIONS. VULUME I. THEORY AND APPLICATION. (U) DESCRIPTIVE NOTE: FINAL REPT., DEC 67 298P RUBBERT P. E. ISAARIS.G. R. ISCHULEY, M. B. ISTANDEN, N. M. IWALLACE, R. E. I CONTRACT: UA=44-177-AMC=323(T) TASK: 1F125901A14234 MONITUR: USAAVLABS TR-67-61A-VOL-1 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: SEE ALSO VOLUME 2. AD-667 981. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, AERODYNAMIC CHARACTERISTICS), DUCTED FANS, WING INLETS, INCOMPRESSIBLE FLOW, LIFT, SHORT TAKE-OFF PLANES, AERODYNAMIC CONFIGURATIONS, POTENTIAL THEORY, THREE-DIMENSIONAL FLOW, BOUNDARY LAYER, JET MIXING FLOW, AXIALLY SYMMETRIC FLOW, FLOW FIELDS. BOUNDARY VALUE PROBLEMS, THRUST VECTOR CONTROL SYSTEMS, ANGLE OF ATTACK, YAN, FLIGHT, FLAPS, COMPUTER PROGRAMS (U) IDENTIFIERS: FAN-IN-WING CONFIGURATIONS. +LIFT FANS. STREAMLINES (1) A GENERAL METHOD IS PRESENTED FOR THE DETERMINATION OF AERODYNAMIC CHARACTERISTICS OF FAN-IN-WING CONFIGURATIONS BY MEANS OF INCOMPRESSIBLE POTENTIAL-FLOW THEORY. THE METHOD IS APPLICABLE TO WINGS. FLAPPED OR UNFLAPPED, AND TO A WIDE VARIETY OF OTHER PUTENTIAL-FLOW BOUNDARY-VALUE PROBLEMS. ARBITRARY WING AND INLET GEOMETRY, FAN INFLOW DISTRIBUTION, THRUST VECTURING. ANGLE OF ATTACK. ANGLE OF YAW. AND FLIGHT SPEEDS FROM HOVER THROUGH TRANSITION CAN BE TREATED. THE THEORETICAL MODEL IS COMPLETELY THREE DINENSIONAL, WITH NO LINEARIZATION OF BOUNDARY CUNDITIONS. THE CALCULATED RESULTS INCLUDE PRESSURE DISTRIBUTIONS, LIFT, INDUCED DRAG AND SIDE FURCE, PITCHING MUMENT, ROLLING MOMENT AND YAWING MOMENT. THE NUMERICAL POTENTIAL-FLO. SOLUTION IS OBTAINED WITH SOURCE AND VORTEX DISTRIBUTIONS ON THE BOUNDARY SURFACES. THE REPRESENTATION IS COMPOSED OF SMALL, CONSTANT-STRENGTH SOURCE SHEET PANELS DISTRIBUTED OVER THE EXTERIOR WING SURFACES. INTERNAL VORTEX FILAMENTS WHICH EMANATE FROM THE WING TRAILING EUGE TO PROVIDE CIRCULATION; . (U) 133

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ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. 720M0	7 .
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BUEING CO RENTON WASH	
GENERAL METHOD FOR DETERMINING THE AERODYNAMIC	
CHARACTERISTICS OF FAN-IN-WING CONFIGURATIONS.	
VULUME II. COMPUTER PROGRAM DESCRIPTION.	(U)
DESCRIPTIVE NOTE: FINAL REPT.,	
DEC 67 235P HINK, GARY R. IGILBERT,	
RICHARD F. ; SUNDSTRUM, KNUT A. ;	
CUNTRACT: DA-44-177-AMC-323(1)	
PROJ: DA-1F125901A142	• , 4 4 • 4
TASK; 3F125901A14234 MUNITOR: 1644444455 TO 15 45 45 400 0	
MUNITOR: USAAVLABS TR-67-618-VOL-2	
UNCLASSIFIED REPORT	
SUPPLEMENTARY NOTES. SPE ALCO HOLDME L	
SUPPLEMENTARY NOTE: SEE ALSO VOLUME 1, AD-667 980.	
DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, AERODYNAMIC	
CHARACTERISTICS), (+DUCTED FANS, COMPUTER	
PROGRAMS), WING INLETS, INCOMPRESSIBLE FLOW,	
LIFT. SHURT TAKE-OFF PLANES, AERUDYNAMIC	
CONFIGURATIONS, POTENTIAL THEORY, THREE-DIMENSIONAL	
FLOW, BOUNDARY LAYER, JET MIXING FLOW, AXIALLY	
SYMMETRIC FLOW, FLOW FIELDS, BOUNDARY VALUE	
PROBLEMS, THRUST VECTOR CONTROL SYSTEMS, ANGLE OF	
ATTACK, YAH, FLIGHT, FLAPS, DIGITAL COMPUTERS	(U)
IDENTIFIERS: FAN-IN-WING CONFIGURATIONS, +LIFT	(07
FANS, LDC-6000 PHOGRAMS, FURTRAN, ASCENT	
PRUGRAMMING LANGUAGE	(U)
THE REPORT DESCRIBES A DIGITAL COMPUTER PROGRAM	
DEVELOPED TO STUDY THE AEROUYNAMIC CHARACTERISTICS () F
FAN-IN-WING CONFIGURATIONS. THE PROGRAM IS WRITTEN	
IN THE FORTHAN IV AND ASCENT LANGUAGES FOR THE	
CUNTRUL DATA CORPORATION 6000-SERIES DIGITAL	
CUMPUTERS. THREE BASIC PACKAGES ARE PROVIDED BY	
THE PROGRAM: A GEUHETRY PACKAGE PRODUCES A	
DETAILED DESCHIPTION OF THE CONFIGURATION. AN	
AERUDYNAMIC PACKAGE PROVIDES A THEORETICAL SOLUTION	
FOR THE POTENTIAL FLOW ABOUT THE CONFIGURATION, AND	A
BUUHDARY-LAYER PACKAGE FURNISHES THE BOUNDARY-LAYER	
CHARACTERISTICS ON THE WING SURFACE. THE REPORT	
PROVIDES A DESCRIPTION OF THE PROGRAM, FLOW CHARTS	
AND SEGMENTATION STRUCTURE DIAGRAMS, AND INPUT DATA	
FURMATS. (AUTHOR)	(U)

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UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07

AD-667 983 1/3 PRINCETUN UNIV N J DEPT OF AEROSPACE AND MECHANICAL Sciences

COMPARISON OF LONGITUDINAL STABILITY CHARACTERISTICS OF THREE TILT-WING VTOL AIRCRAFT DESIGNS, (U)

JAN 66 102P CURNUTT, R. A. ; CURTISS, H. C. JR; REPT. NG. 749 CONTRACT: DA-44-177-AMC-8(T) PROJ: LA-19125901A142 TASK: 19125901A14233 MUNITOR: USAAVLADS TR-66-64

UNCLASSIFIED REPORT

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DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, PITCH(MOTIUN)), (+TRANSPORT PLANES, PITCH(MOTIUN)), RESEARCH PLANES, CONVERTIBLE PLANES, TILT HINGS, STABILITY, DESIGN, RESPONSE, MODEL TESTS, SCALE, HIND TUNNEL MODELS, AIRPLANE MODELS, ANALOG CUMPUIERS, AERODYNAMIC CHARACTERISTICS, CORRELATION TECHNIQUES (U) IDENTIFIERS: C-1+2 AIRCRAFT, XC-142A AIRCRAFT, VZ-2 AIRCRAFT, TRIM(AIRCRAFT), ANGLE OF INCIDENCE (U)

EXPERIMENTAL VALUES OF THE LONGITUDINAL STABILITY DERIVATIVES OF THREE TILT-WING VTOL AIRCRAFT CONFIGURATIONS AS OBTAINED FROM TESTS OF SEVERAL MODELS ARE PRESENTED. RESULTS FROM THE NASA FULL-SCALE WIND TUNNEL AT LANGLEY FIELD. THE PRINCETON TRACK, THE LTV AEROSPAGE CURPURATION WIND TUNNEL AND FLIGHT TEST ARE INCLUDED. AN ANALYSIS IS INCLUDED WHICH UTILIZES RUDI-LOCUS AND ANALUG COMPUTER STUDIES TO COMPARE THE CHARACTERISTIC ROUTS AND TRANSIENT RESPONSE OF THE AIRCRAFT AS THE LUNGITUDINAL DERIVATIVES ARE VARIED WITHIN THE RANGE EXHIBITED BY THESE DATA. TRIM CONDITIONS AT WING INCIDENCES FROM 20 TO 90 DEGREES ARE CONSIDERED. THE THREE CONFIGURATIONS INCLUDED IN THE ANALYSIS WERE FOUND TO EXHIBIT QUITE SIMILAR STABILITY CHARACTERISTICS IN THE LOW-SPEED REGIME. GOOD CORRELATION WAS FOUND TO EXIST BETWEEN NASA WIND TUNNEL DATA AND PRINCETON DYNAMIC MODEL TRACK DATA FOR THE VZ-2 AIRCRAFT. CUNSIDERATION IS GIVEN TO THE IMPORTANCE OF VARIOUS DERIVATIVES IN DETERMINING THE RESPONSE CHARACTERISTICS. A LARGE NUMBER OF ANALOG COMPUTER TRACES ARE INCLUDED, 135

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SEARCH CUNTROL NO. /ZOMO7 DUC REPORT BIBLIUGRAPHY 1/3 14/2 5/9 A0-668 005 BELL AEROSYSTEMS CO BUFFALO N Y STUDY, SURVEY OF HELICOPTER AND V/STOL AIRCRAFT SIMULATUR TRAINER DYNAMIC RESPONSE. VOLUME II. DYNAMIC RESPONSE CRITERIA FOR VISTOL AIRCRAFT FLIGHT TRAINERS. (U) DESCRIPTIVE NOTE: FINAL REPT., 187P STREIFFIH+ G+ # MAY 67 CUNTRACT: N61339-1/53 PROJ: 7681-1 MONITOR: NAVTRADEVCEN 1753-2 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: SEE ALSO VOLUME 1. AU-668 005. DESCRIPTORS: (+VERTICAL TANE=OFF PLANES, FLIGHT SINULATORS), (+FLIGHT SIMULATORS, STANDARDS), SHURT TAKE-OFF PLANES, HELICOPTERS, PERFORMANCE(ENGINEERING), AERODYNAMIC CHARACTERISTICS, TRAINING DEVICES, DESIGN, HANDLING. EQUATIONS OF MUTION, PILOTS, RESPONSE. COMPUTER PROGRAMS, FLIGHT CONTROL SYSTEMS, SIMULATION (U)

THE RESULTS OF A STUDY TO DETERMINE THE DYNAMIC RESPONSE CRITERIA FUR VISTOL AIRCRAFT SIMULATOR TRAINERS ARE PRESENTED. THE FUNDAMENTALS OF V/ STUL DYNAMICS, CONTROL, AND SIMULATION WITHIN THE VARIOUS VISTOL FLIGHT REGIMES ARE DESCRIBED. DIFFILULTIES LIKELY TO BE ENCOUNTERED IN DEVELOPING AN ADEQUATE VISIOL AIRCRAFT SIMULATION ARE ALSO PRESENTED. METHUDS AND PRUCEDURES FOR DETERMINING THE ACCURACY TO WHICH SPECIFIC DYNAMIC RESPONSE PARAMETERS MUST BE SIMULATED ARE PRESENTED, AND BASED UPON THESE, SIMULATION TOLERANCES ARE DEVELOPED FOR EACH SIGNIFICANT HANDLING QUALITIES PARAMETER IN EACH FLIGHT REGIME. THE DYNAMIC ATTRIBUTES OF THE PILUT-AIRCRAFT COMBINATION wITH REGARD TO EACH SPECIFIC PARAMETER ARE DISCUSSED. A DETAILED DESCRIPTION OF VARIOUS V/STUL AIRCRAFT EQUATIONS OF MOTION, TRANSFER FUNCTIONS. AND MODES OF MOTION IS INCLUDED AND THE PRACTICAL LIMITATIONS OF VARIOUS METHODS AND PROCEDURES FOR PROGRAMMING THE EQUATIONS OF MOTION FOR PILOTED FLIGHT SIMULATION PURPOSES ARE DISCUSSED. (AUTHOR) (U)

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /ZOMO7 AU-668 714 1/3 LTV AERUSPACE CURP DALLAS TEX LTV VOUGHT AERONAUTICS DIV RESEARCH ON VIOL WATER HOVER EFFECTS, INCLUDING THE EFFECTS OF WIND AND WAVES. (U) DESCRIPTIVE NOTE: FINAL REPT., APR 68 241P MARSH+KEITH R+ 1 REPT. NU. 2-55400/8R-6140 CUNTRACT: NOUU14-67-C-0488 PROJ: NR-212-167 UNCLASSIFIED REPORT

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, HOVEHING), (+MATER, UOWNWASH), TACTICAL AIR SUPPORT, TILT WINGS, OCEANS, WATER WAVES, WIND, MODELS(SIMULATIONS), ALL-WEATHER AVIATION, ANTISUBMARINE WARFARE, SEA RESCUES, SURFACE PROPERTIES, TEST FACILITIES, TEST EQUIPMENT, DATA PROCESSING SYSTEMS, STABILITY, DIGITAL SYSTEMS, PHOTUGRAPHIC EQUIPMENT, TEST METHODS, MODEL TESTS

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VERY LITTLE IS KNOWN ABOUT THE PROBLEMS ASSOCIATED WITH A VTOL AIRCRAFT HOVERING OVER A WATER SURFACE. SOME OF THE MORE IMPORTANT OF THESE UNKNOWN EFFECTS APPEAR TO BE THE EFFECTS OF SURFACE WINDS AND WAVES ON THE STABILITY AND CONTROL CHARACTERISTICS OF THE HOVERING AIRPLANE. THE EFFECTS OF THE AIRPLANE'S DOWNWASH ON THE WATER SURFACE, AND THE EFFECTS OF SURFACE WINDS AND WAVES ON THE SPRAY GENERATED BY THE AIRPLANE'S DOWNWASH. IN ORDER TO EXAMINE THESE SEENINGLY MORE IMPORTANT EFFECTS, A SPECIAL MODEL TESTING FACILITY HAS BEEN BUILT. THIS FACILITY PERMITS A MODEL SIMULATING A HOVERING AIRPLANE TO BE TESTED AS THE FACILITY GENERATES WAVES OF VARIABLE HEIGHTS AND LENGTHS ON THE WATER SURFACE BELOW THE MUDEL TEST STATION. THE FACILITY CAN ALSO GENERATE A SURFACE WIND. DURING THIS TEST A MODEL OF A TILTING VTOL AIRPLANE WITH FOUR PROPELLERS WAS TESTED AS IT SIMULATED HOVER AT VARYING HEIGHTS AND DISK LOADINGS ABOVE THE VARIABLE WATER SURFACE CONDITIONS. THE EFFECTS OF WATER WAVES ON THE FURCES AND MOMENTS FELT BY THE HOVERING MODEL WERE FOUND TO BE NEGLIGIBLE, AND THE EFFECTS OF THE SURFACE WIND ON THE FORCES AND MOMENTS WERE FOUND TO BE AS WOULD BE PREDICTED WITH A NEGLIGIBLE EFFECT OF WAVES EVEN WITH THE SURFACE WIND. WWW

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DDC REPORT BIBLIDGRAPHY SEARCH CONTROL NO. /ZOHO7

AU-669 226 1/3 1/1 20/4 AUVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT PARIS (FRANCE)

FLUID DYNAMICS OF RUTOR AND FAN SUPPORTED AIRCRAFT AT SUBSONIC SPEEDS. (U)

DESCRIPTIVE NOTE: CONFERENCE PROCEEDINGS. SEP 67 597P REPT. NO. AGARD-CP-22

UNCLASSIFIED REPORT

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SUPPLEMENTARY NOTE: NATO FURNISHED, PRESENTED AT A SPECIALISTS, MEETING OF THE FLUID DYNAMICS PANEL OF AGARD, GOETTINGEN (GERMANY) 11-13 SEP 67.

DESCRIPTORS: (•VERTICAL TAKE-OFF PLANES, SYMPUSIA), HELICUPTERS, HELICOPTER ROTORS, ROTARY WINGS, AERODYNAMIC CHARACTERISTICS, WIND TUNNEL MODELS, MODEL TESTS, FANS, AEROELASTICITY, JETS, LIFT, DEFLECTION, PROPELLERS(AERIAL), AIRPLANE NUISE, VORTICES, SHORT TAKE-OFF PLANES (U) IDENTIFIERS: STOWED ROTOR AIRCRAFT, CROSS FLOW, LIFT FANS, TRANSITION FLIGHT (U)

THE COLLECTION OF PAPERS EMPHASIZES THE FOLLOWING AREAS: ROTORS AND FANS IN HOVER AND TRANSITION, INTERFERENCE WITH THE AIRFRAME AND THE GROUND, GROUND EFFECTS ON ROTORS AND FANS, NOISE PROBLEMS AND TESTING TECHNIQUES. THE TOPICS ARE BASED ON LOW-DISCLUADING DEVICES. (AUTHOR)

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UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMO7 1/3 AD-671 965 15/7 LTV AEROSPACE CURP DALEAS TEX LTV VUUGHT AERONAUTICS DIV DYNAMIC RESPONSE OF THE XC-142A TILT-WING V/STOL AIRCRAFT TO IN-FLIGHT CARGO DELIVERY AT SLOW SPEEDS.(U) DESCRIPTIVE NOTE: FINAL REPT., MAK 68 123P WILSON. JERRY W. :SCHIRA. MIKE P. IDEITERING, J. STEVE ; REPT. NO. 2-53310/6R-6098 CONTRACT: UA=44-177-AMC=327(T) PROJ: DA-1F121401A254 MONITOR: USAAVLABS TR=68-4 UNCLASSIFIED REPORT DESCRIPTORS: (+TRANSPORT PLANES, +AIR DROP OPERATIONS), (+VERTICAL TAKE-OFF PLANES, AIR DROP OPERATIONS), CARGO, AIRSPEED, PAYLOAD, HOVERING, GROUND EFFECT, CARGO PARACHUTES, MILITARY PERSONNEL, TILT WINGS, SIMULATION, MATHEMATICAL MODELS (U) IDENTIFIERS: XC-142A AIRCRAFT, C-142 AIRCRAFT, TRANSITION FLIGHT, EXTRACTION PARACHUTES, GRAPHS (CHARTS) (U) THE POTENTIAL ABILITY OF VISTOL AIRCRAFT TO PERFORM ARMY DRUP MISSIONS AT VARIOUS ALTITUDES WHILE FLYING AT SPEEDS FROM HOVER TO CONVENTIONAL FLIGHT COULD PROVIDE A BASIS FOR PRECISION IN-FLIGHT DELIVERY AND COULD UVERCOME MAJOR OPERATIONAL RESTRICTIONS ASSOCIATED WITH MANY OF THE CONVENTIONAL AIR-DROP TECHNIQUES. THE STUDY WAS PARTIALLY BASED ON ACTUAL AIR-DROP DEMONSTRATIONS. SINGLE CARGO LUADS OF UP TO 3,000 POUNDS WERE GRAVITY DROPPED IN HOVER AND AT 30 KNOTS, AND LOADS OF UP TO 4,000 POUNDS WERE EXTRACTED BY PARACHUTE AT 127 KNOTS. USING THESE FLIGHT DATA TO SET UP A REALISTIC SIMULATION, A MATHEMATICAL MODEL OF THE XC-142A AIRPLANE AND A HUMAN PILOT WERE USED TO EXAMINE THE AIRCRAFT'S RESPUNSE WITH CARGO WEIGHTS UP TO THE AIRPLANE'S MAXIMUM PAYLOAD OF 8,000 POUNDS IN THE LOW-SPEED PORTION OF TRANSITION AND 12,000 POUNDS AT A 127-KNOT FLIGHT CONDITION. THE STUDY SHOWS THAT THE MAXIMUM PAYLOAD COULD BE SUCCESSFULLY DROPPED WITH PROPER PILOT TECHNIQUE. MEANS OF EXTENDING THE AIRPLANE'S AIR-DROP CAPABILITY THROUGH THE USE OF SPECIAL EXTRACTION FORCES AND PARAMETERS APPLICABLE TO THE AIR-DROP SYSTEM WERE STUDIED. (AUTHOR) (U) 140

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FEASIBILITY STUDY OF ADVANCED V/STOL PROPELLER TECHNOLOGY.

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DESCRIPTIVE NOTE: FINAL REPT., JUN 65 385P ADAMSON; W. M.; CUNTRACT: DAAJU2-67-C-0073 PROJ: DA-1G1214010144 TASK: 1G121401014415 MONITOR: USAAVLASS TK-68-33

UNCLASSIFIED REPORT

DESCRIPTORS: (+VERTICAL TAKE=OFF PLANES, WEIGHT), (+PRUPELLERS(AERIAL), WEIGHT), FEASIBILITY STUDIES, PROPULSION GEARS, REDUCTION GEARS, OPTIMIZATION, REDUCTION, DESIGN, PITCH(MOTION), BORON, PROPELLER BLADES, TITANIUM IDENTIFIERS: TRADEOFFS

A FEASIBILITY STUDY OF ADVANCED V/STOL PROPELLER SYSTEMS FOR THE 1970-1975 TIME PERIOD WAS CUNJUCTED. THE PRIMARY OBJECTIVE OF THE STUDY WAS TO INVESTIGATE THE APPLICATION OF NEW MATERIALS AND NEW DESIGN CONCEPTS TO DEFINE THE MAXIMUM REDUCTIONS IN SPECIFIC WEIGHT OF THE COMPLETE PROPELLER SYSTEM (INCLUDING REDUCTION GEARBOX) ATTAINABLE IN THIS TIME PERIOD. PRELIMINARY DESIGNS OF FUTURE PROPELLER SYSTEMS PRESENTED IN THE REPORT ARE OVER 50 PERCENT LIGHTER THAN COMPARABLE PRESENT-DAY V/ STOL SYSTEMS. THREE INTEGRAL GEARBOA PROPELLER SYSTEMS, WITH AND WITHOUT CYCLIC PITCH AND WITH AND WITHOUT & CROSS-SHAFT DRIVE PAD, WERE DEFINED IN THIS REPORT USING THE ADVANCED TECHNOLOGY INDICATED AS FEASIBLE BY THE STUDY. EACH MAJUR COMPONENT OF THE IGB PROPELLER SYSTEN WAS UPTIMIZED AND THEN MERGED INTO COMPLETE SYSTEM DESIGNS. A SUMMARY WEIGHT TABULATION IS PRESENTED SHOWING THE RELATIVE CUNTRIBUTIONS OF EACH MAJOR COMPONENT OF THE PROPELLER SYSTEM TO THE TOTAL INDICATED WEIGHT REDUCTIONS. A SIGNIFICANT PORTION OF THE WEIGHT REDUCTIONS IS SHOWN TO BE ACHIEVABLE BY 1970, SINCE THE TECHNOLOGY REQUIRED IS PRESENTLY UNDER DEVELOPMENT OR IS A NATURAL EXTENSION OF EXISTING TECHNOLOGY. OTHER SIGNIFICANT WEIGHT REDUCTIONS, SUCH AS THOSE RESULTING FROM THE USE OF BORON BLADE SPARS AND TITANIUM GEARING, ARE AT AN EARLY PHASE OF THEIR TECHNOLOGY DEVELOPMENT (U) 141

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DESCRIPTO	KS: (+V	VERTICAL TAKE-OFF PLANES, MODEL	
IESTS), /	RS: (+V Aerodyna	VERTICAL TAKE-OFF PLANES, MODEL AMIC CONFIGURATIONS, ROTARY WINGS.	
AEROUYNAN	RS: (+V Aerodyna 11c load	VERTICAL TAKE-OFF PLANES, MODEL Amic Configurations, Rotary Wings, Ding, Aerodynamic Characteristics.	
AEROUYNAN Shurt tak	RS: (+N AERODYNA MIC LUAD KE=OFF F	VERTICAL TAKE-OFF PLANES, MODEL Amic configurations, rotary wings, Ding, aerodynamic characteristics, Planes, wind tunnel models.	
AEROUYNAN Shurt tak	RS: (+N AERODYNA MIC LUAD KE=OFF F	VERTICAL TAKE-OFF PLANES, MODEL Amic configurations, rotary wings, Ding, aerodynamic characteristics, Planes, wind tunnel models.	
AERODYNAN Shurt tan Downwash	RS: (+V Aerodyna Mic Luad Ke-off F , wake,	VERTICAL TAKE-OFF PLANES, MODEL Amic Configurations, Rotary Wings, Ding, Aerodynamic Characteristics, Planes, Wind Tunnel Models, Hovering	(IJ)
AERODYNAN SHURT TAN DOwnwash IDENTIFIEN	RS: (+V Aerodyna Mic Luad Kemoff F • Wake, RS: Flo	VERTICAL TAKE-OFF PLANES, MODEL AMIC CONFIGURATIONS, ROTARY WINGS, DING, AERUDYNAMIC CHARACTERISTICS, PLANES, WIND TUNNEL MODELS, NOVERING OW BREAKDOWN.	
AERODYNAN SHURT TAN DOwnwash IDENTIFIEN	RS: (+V Aerodyna Mic Luad Kemoff F • Wake, RS: Flo	VERTICAL TAKE-OFF PLANES, MODEL Amic Configurations, Rotary Wings, Ding, Aerodynamic Characteristics, Planes, Wind Tunnel Models, Hovering	(U) (U)
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AERODYNAN SHURT TAN DOWNWASH IDENTIFIEN FENCES(AE AN EXPEN MEANS TO OF DIFFE	RS: (+V AERODYNA MIC LOAD KE=OFF F WAKE, RS: FLO RS: FLO RODYNAM RIMENTAL ALLEVI ERENT ST	VERTICAL TAKE-OFF PLANES, MODEL AMIC CONFIGURATIONS, ROTARY WINGS, DING, AERUDYNAMIC CHARACTERISTICS, PLANES, WIND TUNNEL MODELS, novering OW BREAKDOWN, MICS), TRANSITION FLIGHT L STUDY WAS MADE TO INVESTIGATE SUME IATE FLOW BREAKDOWN BY USING A NUMBER TRAKE OR FENCE CONFIGURATIONS, A	(U)
AERODYNAN SHURT TAN DUWNWASH IDENTIFIEN FENCES(AE AN EXPEN MEANS TO OF DIFFE TUTAL OF	RS: (+V AERODYNA MIC LUAD KE-OFF F WAKE, RS: FLO RODYNAM RIMENTAL ALLEVI ERENT ST 23 DIF	VERTICAL TAKE-OFF PLANES, MODEL AMIC CONFIGURATIONS, ROTARY WINGS, DING, AERUDYNAMIC CHARACTERISTICS, PLANES, WIND TUNNEL MODELS, NOVERING OW BREAKDOWN, MICS), TRANSITION FLIGHT L STUDY WAS MADE TO INVESTIGATE SUME IATE FLOW BREAKDOWN BY USING A NUMBER	(U)

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DUL REPORT SIBLIOGRAPHY SEARCH CUNTROL NO. /20M07 AU-672 272 1/3 5/8 BOLT DERANEK AND NEWMAN INC CAMBRIDGE MASS AN OPTIMAL CONTROL METHOD FOR PREDICTING CONTROL CHARACTERISTICS AND DISPLAY REQUIREMENTS OF MANNED-VEHICLE SYSTEMS. (U) DESCRIPTIVE NOTE: FINAL REPT. 1 JUL 66-31 AUG 67. JUN 66 173P ELKIND, JEROME I. FALB. PETER L. IKLEINMAN, DAVID ILEVISUN, WILLIAM H. REPT. NU. BBN-1559 CONTRACT: AF 33(615)-5160 PKCJ: AF-8219 TASK: 821910 MUNITOR: AFFOL TK-67-187 UNCLASSIFIED REPORT DESCRIPTORS: (VERTICAL LAKE-OFF PLANES, +FLIGHT CONTROL SYSTEMS), SHURT TAKE-OFF PLANES, MAN-MACHINE SYSTEMS, DISPLAY SYSTEMS, ANALYSIS, MATHEMATICAL NODELS, OPTIMIZATION, TIME. HOVERING, WAIN, MATHEMATICAL PREDICTION, PILOTS, PERFORMANCE (HUMAN) (U) IDENTIFIERS: XV-SA AIRCRAFT, OPTIMAL CONTROL THEORY, V-5 AIRCHAFT (U) AN ANALYTIC PROCEDURE FOR DETERMINING INFORMATION DISPLAY REQUIREMENTS AND HUMAN CONTROL AND INSTRUMENT MONITORING CHARACTERISTICS FOR COMPLEX MULTIVARIABLE VEHICULAR CUNTRUL SYSTEMS IS DEVELOPED, THE METHOD IS BASED UPON THE ASSUMPTION THAT THE HUMAN CONTROLLER WILL ACT IN A NEAR OPTIMAL MANNER. OPTIMAL CONTROL THEORY AND ITS ASSOCIATED STATE-SPACE REPRESENTATION IS USED AS THE BASIS FOR THE ANALYTIC PROCEDURE. A MODEL FOR THE HUHAN CONTROLLER IS DEVELOPED IN WHICH THE CONTROLLER'S INHERENT LIMITATIONS ARE APPROXIMATED BY A TIME DELAY. THE MODEL INCLUDES A PREDICTOR FOR CUMPENSATING FOR THIS TIME DELAY: A CONTROLLER FOR PRODUCING THE CONTROL INPUTS TO THE VEHICLE AND A COST FUNCTIONAL THAT IS TO BE MINIMIRIZED. THE CONTROLLER IS ASSUMED TO BE OPTIMAL. SEVERAL SUBOPTIMAL PREDICTORS ARE INVESTIGATED. ONLY QUAURATIC COST FUNCTIONALS ARE CONSIDERED. THE ANALYTIC PROCEDURE ASSUMES THAT THE HUMAN OPERATOR'S CONTROL CHARACTERISTICS CAN BE REPRESENTED BY A SET OF GAINS OPERATING UN THE DELAYED STATE VARIABLES OF THE SYSTEM.

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SEARCH CUNTROL NO. /20M07 UDC REPORT BIBLIUGRAPHY AD-703 882 1/3 1/2 FOREIGN TECHNOLOGY DIV WRIGHT_PATTERSON AFB OHIO VERTICAL TAKEOFF AND LANDING. (U) PAVLENKO, V. F. ; FEB 70 12UP REPT. NO. FTD-MT-24-379-69 PROJ: FTD-7230278 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF MONO. VERTIKALNYI VZLET I POSADKA, MOSCOW, 1968 PI-112, BY ROBERT ALLEN POTTS. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, PERFURMANCE(ENGINEERING)), TAKE-OFF, AIRCRAFT LANDINGS, HELICOPTERS, AIRCRAFT ENGINES, FLIGHT CONTROL SYSTEMS, STABILIZATION, AVIATION SAFETY, (U) JETS, FLIGHT, USSR IDENTIFIERS: ROTARY WING AIRCRAFT. (U) TRANSLATIONS CUNTENTS: CERTAIN CHARACTERISTICS OF FLIGHTS IN NATURE: HELICOPTERS AND ROTARY WING AIRCRAFT: VTOL AIRCRAFT; VTOL AIRCRAFT POWER PLANTS; STABILIZATION AND CUNTROL OF VTUL: TRANSITION CUNUITIONS OF FLIGHT OF VIOL AIRCRAFT: FLIGHT SAFETY OF VTOL AIRCRAFT; EFFECT OF A GAS JET ON THE TAKEOFF-LANDING SITE: ANOMALIES OF FLIGHT (U) CHARACTERISTICS OF VTOL.

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SEARCH CUNTROL NO. /ZOMO7 UDC REPORT BIBLIGGRAPHY A0-704 562 5/10 1/3 BULT BEHANEK AND NEWMAN INC CAMBRIDGE HASS APPLICATION OF OPTIMAL CONTROL THEORY TO THE PREDICTION OF HUMAN PERFORMANCE IN A COMPLEX (U) TASK . DESCRIPTIVE NOTE: FINAL REPT. JAN 68-SEP 69. BARON, SHELDON TELKIND, JEROME MAR 70 156P I. ;KLEINHAN, DAVID L. :MILLER, DUNCANC. ; LEVISON, WILLIAM H. A REPT. NO. BBN=1776 F33615-68-C-1192 CONTRACT: PROJ: AF-8219 MONITUR: AFFUL TR=69=81 UNCLASSIFIED REPORT (+REACTION(PSYCHOLOGY), THEORY). DESCRIPTORS: (•PERFORMANCE(HUMAN), MATHEMATICAL PREDICTION), I+VERTICAL TAKE-OFF PLANES, HANDLING), HOVERING, SCIENTIFIC RESEARCH, MATHEMATICAL MODELS, PROGRAMMING(COMPUTERS), FEEDBACK, PITCH(MOTION), FLIGHT CONTROL SYSTEMS, SCANNING, AIR FORCE RESEARCH, HUMAN LNGINEERING (U) IUENTIFIERS: XV-5A AIRCRAFT, V-5 AIRCRAFT, CONTROL THEORY. FEEDBACK CONTROL, TASK COMPLEXITY, MANUAL CUNTROL TASKS (U) A PROCEDURE IS DEVELOPED FOR USING HUMAN RESPONSE THEORY AND THE ANALYTIC METHODS OF OPTIMAL CONTROL THEORY TO AMALYZE A COMPLEX MANUAL CONTROL TASK. THE CENTRAL ELEMENT IN THE PROCEDURES IS A MODEL OF THE HUMAN OPERATOR THAT IS BASED ON THE ASSUMPTION THAT WELL-TRAINED OPERATORS PERFORM OPTIMALLY SUBJECT TO CERTAIN INHERENT LIMITATIONS. RECENT RESULTS IN HUMAN RESPONSE THEORY PROVIDE THE REPRESENTATION OF THE HUMAN'S LIMITATIONS. OPTIMAL CONTROL THEORY IS THEN USED TO PREDICT CLOSED-LOOP HUMAN AND SYSTEM PERFORMANCE. THE MANUAL CONTROL OF THE LONGITUDINAL POSITION OF A HOVERING VTOL VEHICLE IS ANALYZED USING THE DEVELOPED TECHNIQUES. (U) (AU1HOR)

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SEARCH CONTROL NO. /ZOMO7 DDC REPORT BIBLIUGRAPHY AD-706 374 1/3 BELL HELICOPTER CO FORT WORTH TEX A STABILITY AND CUNIROL PREDICTION METHOD FOR HELICOPTERS AND STOPPABLE RUTOR AIRCRAFT. VOLUME (U) III: PROGRAMMER'S MANUAL. DESCRIPTIVE NOTE: FINAL REPT. DEC 68-FEB 70. 37P BIRD BILLY J. ; MAR 70 CUNTRACT: F33615-69-C-1121 PROJE AF-8219 TASK: 821907 MUNITUR: AFFOL TR-69-123-V0L-3 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: SEE ALSO VOLUME 2, AD-706 918, AND VOLUME 4. AD-706 919. DESCRIPTORS: (+HELICUPTERS, STABILITY), (+VERTICAL TAKE-UFF PLANES, STABILITY). INSTRUCTION MANUALS, SUBROUTINES, ROTOR BLADES (ROTARY WINGS), HELICOPTER ROTORS, PRUGRAMMING(LOMPUTERS), CONTROL, DIGITAL COMPUTERS (U) IDENTIFIERS: +STOPPABLE ROTOR AIRCRAFT (U) THE REPORT DESCRIBES A MATHEMATICAL MODEL OF ROTURCRAFT THAT MAY HE USED TO DETERMINE CHARACTERISTICS OF PERFURMANCE, STABILITY, RESPONSE, AND RUTUR BLADE LOADS. THE COMPLEXITY OF THE EQUATIONS USED REQUIRES THE USE OF A DIGITAL COMPUTER FUR EFFICIENT SOLUTION. THIS VOLUME CONTAINS AIDS FOR THE CUMPUTER PRUGRAMMER. THE PROGRAMMING AIDS ARE DIVIDED INTO TWO GROUPS: BACKGROUND MATERIAL FUR THE PROGRAMMER JUST STARTING TO WORK ON THIS COMPUTER PROGRAM AND THE DETAILED EXPLANATION OF THE COMPUTER GENERATED DOCUMENTATION WHICH IS NECESSARY FUR ANY PROGRAMMER TO WORK EFFECTIVELY ON THIS PROGRAM. (AUTHOR) (U)

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DDC REPORT BIBLIDGRAPHY SEARCH CONTROL NU. /ZOMO7 AU-706 918 1/3 BELL HELICOPTER CO FORT WORTH TEX A STABILITY AND CONTROL PREDICTION METHOD FOR HELICOPTERS AND STOPPABLE ROTOR AIRCRAFT. VOLUME II: USER'S MANUAL. (U) DESCRIPTIVE NOTE: FINAL REPT. DEC 68-FEB 70. FEB 70 164P BIRD, BILLY J. MCLARTY. TYCE T. I CUNTRACT: F33615-69-C-1121 PROJ: AF=8219 TASK: 821907 MONITOR: AFFOL TR=69-123-VOL-2 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: SEE ALSO VOLUME 3. AD-706 374. DESCRIPTORS: (+HELICUPTERS, STABILITY), (+VERTICAL TAKE-OFF PLANES, STABILITY), ROTOR **BLAUES(ROTARY WINGS), RESPONSE.** LOADING (MECHANICS), PERFORMANCE (ENGINEERING), PRUGRAMMING(COMPUTERS), EQUATIONS OF MOTION, HELICOPTER ROTORS, MATHEMATICAL PREDICTION, CUNTROL (U) IDENTIFIERS: +STUPPABLE ROTOR AIRCRAFT (U) THE VOLUME PRESENTS ALL DUCUMENTATION AVAILABLE TO ALC THE USER OF THE COMPUTER PRUGRAM DEVELOPED IN THIS WORK. THE INPUT FORMAT SECTION PROVIDES AN EXPLANATION OF ALL OF THE QUANTITIES INPUT TO THE COMPUTER PROGRAM. MANY OF THE INPUTS ARE DEFINED BY EQUATIONS SHOWING HOW THEY FUNCTION IN THE PROGRAM. THIS MAKES THE USE OF THE INPUTS AS CLEAR AS POSSIBLE. FOUR TYPICAL SETS OF INPUT DATA ARE INCLUDED AS MORKING EXAMPLES. THE OUTPUT GUIDE GIVES A THOROUGH DISCUSSION OF ALL OF THE FORMS OF COMPUTER OUTPUT OBTAINED BY THE USER. (AUTHOR) (U)

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DDC REPORT BIBLIOGNAPHY SEARCH CONTROL NO. /ZOMO7 AD-706 419 1/3 BELL HELICOPTER CO FORT WORTH TEX A STABILITY AND CONTROL PREDICTION METHOD FOR HELICOPTERS AND STOPPABLE RUTOR AIRCRAFT. VOLUME IV: APPENDICES. (U) DESCRIPTIVE NOTE: FINAL REPT. DEC 68-FEB 70, HAR 70 312P BIRD,BILLY J. ; CUNTRACT: F33615-69-C-1121 PROJ: AF-8219 TASK: 621907 MONITUR: AFFOL TR-69-123-VOL-4 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: SEE ALSO VOLUME 3. AD-706 374. DESCRIPTORS: (+HELICOPTERS, STABILITY), (+VERTICAL TAKE-OFF PLANES, STABILITY), SUBROUTINES, COMPUTER PROGRAMS, ROTOR BLADES(ROTARY WINGS), HELICOPTER ROTORS. CONTROL, PERFORMANCE(ENGINEERING) (U) IDENTIFIERS: +STOPPABLE ROTOR AIRCRAFT (U) CUNTENTS: VARIABLE DEFINITIONS! SUBROUTINES AND COMMONS CONTAINING EACH COMMON AND VARIABLE: COMMONS AND VARIABLES IN EACH SUBROUTINE AND COMMON' SUBROUTINES CONTAINING EACH VARIABLE, BY CONMON: PROGRAM SECTIONS CONTAINING EACH VARIABLE, BY COMMON: AND FORTHAN LISTING. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07 AU-707 831 1/3 CURNELL ALRONAUTICAL LAD INC BUFFALO N Y FLIGHT RESEARCH DEPT A FLIGHT INVESTIGATION OF LATERAL-DIRECTIONAL HANDLING WUALITIES FOR VISTOL AIRCRAFT IN LOW SPEED MANEUVERING FLIGHT. (U) DESCRIPTIVE NOTE: FINAL REPT. AUG 68-AUG 69, MAR 70 189P DOETSCH+K-H+ + JR. GOULD+ D. G. IMCGREGOR, D. M. I CONTRACT: AF 33(615)-3736 PROJ: AF-698DC TASK: 698DC00 MONITOR: AFFUL TK=69=41 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH NATIONAL AERONAUTICAL ESTABLISHMENT, OTTAWA (ONTARIO), NAE-LTR-FK-12. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, HANDLING), ROLL, MANEUVERABILITY, FLIGHT SIMULATORS, FLIGHT TESTING, FLIGHT SPEEDS, APPRUACH (U) AN INVESTIGATION TO DETERMINE THE RANGES OF VARIOUS LATERAL DERECTIONAL CHARACTERISTICS REQUIRED TO PROVIDE ADEQUATE FLYING QUALITIES FOR TURNING MANEUVERS AT LOW SPEED WAS UNDERTAKEN USING AN AIRBORNE V/STOL AIRCRAFT SIMULATOR. FIVE PARAMETERS WERE VARIED IN A SYSTEMATIC MANNER: THE DAMPING RATIO, THE FREQUENCY, AND THE RATIO AND THE FREQUENCY OF THE NUMERATOR OF THE ROLL-ANGLE TO AILERON-CUNTROL-INPUT TRANSFER FUNCTION. THE PILOTS PERFORMED A LOW SPEED, VISUAL MANEUVERING TASK AND DOCUMENTED THEIR ASSESSMENT OF THE CHARACTERISTICS THROUGH EXTENSIVE CUMMENTS AND A NUMERICAL RATING. THE REPORT PRESENTS ALL THE DATA CATEGORIZED WITH RESPECT TO THE FEST PARAMETERS. (AUTHOR) (U)

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ART SIUDY FOR IMPROVING PROPELLER STATIC PERFORMANCE FOR V/STOL AIRCRAFT APPLICATIONS. THE INFORMATION OBTAINED DURING THESE TESTS CAN BE USED TO MORE ACCURATELY PREDICT STATIC THRUST FOR FUTURE PROPELLER DRIVEN V/STOL AIRCRAFT. (AUTHOR) (U)

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07

AD-709 096 1/3 1/1 NAVAL PUSIGRADUATE SCHOUL MUNTEREY CALIF

AN INVESTIGATION OF GROUND EFFECT ON VERTICAL TAKEOFF AIRCRAFT.

DESCRIPTIVE NOTE: MASTER'S THESIS; JUN 70 76P THOMPSON; CHARLES DOUGLAS ;

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DESCRIPTORS: (+VERTICAL TAKE=OFF PLANES, +GRUUND EFFECT), PRESSURE, FUSELAGES, VELOCITY, NOZZLE GAS FLUW, JETS, THESES

THE THEORETICAL SOLUTION FOR THE FLOW BENEATH V/ STOL AIRCRAFT WAS EXTENDED TO INCLUDE TILTED JET CONFIGURATIONS. A LABORATORY MODEL WAS CONSTRUCTED TO TEST THE EFFECT OF VARIATION OF THE PARAMETERS GOVERNING THE FLOW. FREE STREAMLINE PLOTS. PRESSURE COEFFICIENTS ON THE GROUND AND FUSELAGE AND VELOCITY PROFILES IN 'THE NOZALES WERE DETERMINED FROM HOT-WIRE ANEMOMETER TRAVERSES AND MICROMANOMETER READINGS. EXPERIMETAL DATA COMPARED FAVORABLY WITH THE THEORETICAL DETERMINATIONS. (AUTHOR)

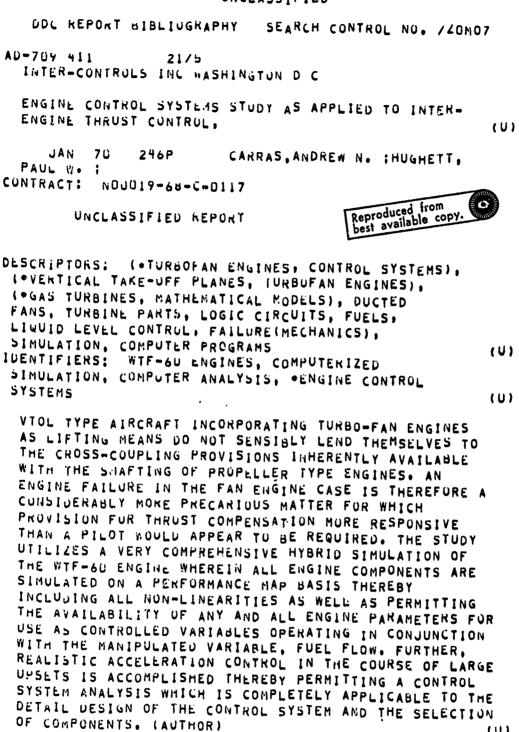
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DDC REPORT BIBLIUGRAPHY SEARCH CUNTRUL NU. /ZOMO7 AU-709 475 1/4 HUNLYWELL INC MINNEAPOLIS MINN MANNED SYSTEMS TECHNOLOGY GROUP AIRCRAFT DISPLAYS FUR STEEP-ANGLE APPROACHES. (U) DESCRIPTIVE NOTE: FINAL REPT. NOV 67-DEC 68, JUL 7U 278P WOLF, JAMES D. THOPPE, RICHARD 8. ; REPT. NO. 12571-FR1 CUNTRACT: NDOU14-68-C-0191 PROJ: NR-213-061 MUNITUR: JANAIR 601215 UNCLASSIFIED REPORT DESCRIPTORS: (+APPROACH, +DISPLAY SYSTEMS), (*HELICOPTERS, APPROACH), (*VERTICAL TAKE-OFF PLANES, APPRUACH), AIRCRAFT LANDINGS, FLIGHT PATHS, MATHEMATICAL MODELS, SINULATION (U) IDENTIFIERS: UH-1 AIRCRAFT, H-1 AIRCRAFT, XV-5 AIRCRAFT, V-5 AIRCRAFT (U) THE PRIMARY OBJECTIVE OF THE PROGRAM WAS TO INVESTIGATE AIRCRAFT DISPLAY REQUIREMENTS FOR STEEP-ANGLE APPROACHES AND LANDINGS WITH 1975-1980 ERA TACTICAL ROTARY-WING AND V/STOL AIRCRAFT. THE STUDY WAS CUNDUCTED WITH VARIABLE-VELOCITY SIMULATIONS OF BELL UH-1 AND RYAN XV-5 AIRCRAFT. ALTERNATIVE DISPLAY FURMATS WERE DEVELOPED AND EMPIRICALLY EVALUATED BY MEANS OF REAL-TIME MAN-IN-THE-LUOP SIMULATION TECHNIQUES. IN AUDITION, APPROACH ANGLE AND PROFILE CHARACTERISTICS WERE SYSTEMATICALLY VARIED TO ASCERTAIN THEIR EFFECTS ON TASK PERFORMANCE. INTERPRETED WITHIN THE CUNSTRAINTS IMPOSED UPON AND BY THE SIMULATIONS. RESULTS OF THE STUDY INDICATED THAT MANUALLY CONTRULLED IFR STEEP-ANGLE APPROACHES AND LANDINGS ARE PUSSIBLE WITH ALL DISPLAY FURMATS EVALUATED. GENERALLY, HORIZONTAL SITUATION DISPLAY FORMATS WERE FOUND TO YIELD MORE ACCURATE AND PRECISE PILOTING PERFORMANCE WITH BUTH VEHICLES. EFFECTS OF APPROACH-PROFILE VARIATIONS WERE MINOR, WHILE EFFECTS OF APPROACH ANGLE DID VARY AS A FUNCTION OF THE VEHICLE FLOWN AND THE AXIS OF ERROR OR PERFORMANCE MEASUREMENT. (AUTHOR) (U)

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UDL REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /ZOMO/ A0-710 590 1/3 AIR FORCE FLIGHT DYNAMICS LAB WRIGHT=PATTERSON AFB OHIU A NEW APPROACH TO THE SPECIFICATION AND EVALUATION OF FLYING QUALITIES. (U) DESCRIPTIVE NUTE: FINAL REPT.. 71P ANDERSON, RONALD 0. : JU11 70 REPT. NO. AFFDL-TR-69-120 AF-8∠19 PROJ: TASK: 821909 UNCLASSIFIED REPORT DESCRIPTORS: (VERTICAL TAKE-OFF PLANES, PERFORMANCE(ENGINEERING)), MAN-MACHINE SYSTEMS. PILOTS, HOVERING, NATHEMATICAL PREDICTION. SPECIFICATIONS, PERFORMANCE(HUMAN), FLIGHT CONTROL SYSTEMS (U) IDENTIFIERS: EVALUATION (U) A STUDY OF THE LORRELATION OF PILOT MODEL PARAMETERS AND CLUSED-LUOP PERFORMANCE WITH PILOT OFINION OF VIOL HOVER DYNAMICS WAS CONDUCTED. THE ENCOURAGING RESULTS SUGGESTED A PILOT-VEHICLE ANALYSIS METHOD OF PREDICTING PILOT MODEL PARAMETERS. CLOSED-LOOP PILOT-VEHICLE PERFORMANCE WITH GUST INPUTS, AND PILOT OPINIUN RATINGS FOR A WIDE RANGE OF VEHICLE DYNAMICS. THIS APPROACH WAS, IN TURN, USED TO PREDICT RATINGS FOR COMPARISON WITH FIXED BASE, MOVING BASE, AND FLIGHT TEST RESULTS FOR VER CONVITIONS. AGAIN THE RESULTS WERE PROMISING. AND A NEW METHOD OF SPECIFYING HOVER DYNAMICS FOLLOWED NATURALLY. THE NEW PILOT-VEHICLE ANALYSIS CONCEPT. CALLED THE MINIMUM PILOT RATING METHOD. IS DISCUSSED IN TERMS OF APPLICATIONS TO OTHER TASKS, FLYING QUALITIES SPECIFICATION. AND CONTROL SYSTEM DESIGN. (AUTHOR) (U)

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DUC REPORT BIBLIOGRAPHY SEARCH CUNTROL NO. /20M07 20/4 1/3 AD=711 665 1/1 ARNULD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN INVESTIGATION OF THE RECIRCULATION REGION OF A FLOW FIELD CAUSED BY A JET IN GROUND EFFECT WITH (U) CRUSSFLOW. DESCRIPTIVE NOTE: FINAL REPT. 19 MAR-30 APR 70. 5EP 70 3UP BINION.T. W. . JRI REPT. NO. AEDC-TK-70-192 CUNTRACT: F40600-71-C-0002 PROJ: AF-8219, AKO-PD0084 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH ARO. INC., TULLAHOMA, TENN. REPT. NO. ARO-PWT-TR-70-202. DESCRIPTORS: (+GROUND EFFECT, FLOW FIELDS), (+JETS, INTERACTIONS), (+VERTICAL TAKE-OFF (1) PLANES, HOVERING), VELOCITY IDENTIFIERS: CROSS FLOW (U) A WIND TUNNEL INVESTIGATION WAS CONDUCTED IN THE LOW SPEED WIND TUNNEL (V/STOL) TO DETERMINE THE VELOCITIES IN THE RECIRCULATION REGION OF THE FLOW FIELD PRODUCED BY THE INTERACTION OF A JET IMPINGING ON A GROUND PLANE WITH CRUSSFLOW.

AXIAL AND VERTICAL VELOCITY COMPONENT MEASUREMENTS

COMPONENT VELOCITY FIELDS AND INDICATE THAT THE JET-TU-FREE-STREAM VELOCITY RATIO IS MUCH MORE IMPORTANT IN DETERMINING THE FLOW FIELD THAN THE MAGNITUDE OF

WERE OBTAINED WITH A FORWARD-SCATTERING LASER DUPPLER VELOCIMETER. TEST RESULTS PROVIDE TWO-

THE INDIVIDUAL VELOCITIES. (AUTHOR)

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DDC REPORT BIBLIUGRAPHY SEARCH CUNTROL NU. /ZDM07

AU-712 645 1/3 BUEING CO PHILAUELPHIA PA VERTUL DIV

EVALUATION OF GLARED FLAP CONTROL SYSTEM FOR TILTWING VISTOL AIRCRAFT,

AUG 70 108P CHURCHILL+G+ B+ ; REPT+ NG+ 08-2076

UNCLASSIFIED REPORT

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, FLAPS), (+FLAPS, +FLIGHT CONTROL SYSTEMS), TILT WINGS, PITCH(MOTIUN), HUVERING, MOMENTS, ANGLE OF ATTACK, SERVOMECHANISMS, MODEL TESTS (U) IDENTIFIERS: GEARED FLAP CUNTROL SYSTEMS, TRANSITION FLIGHT, EVALUATION (U)

THE GEARED FLAP CONTROL SYSTEM PROVIDES A MEANS FOR CONTROLLING A TILTWING V/STOL AIRCRAFT IN HOVER AND TRANSITION FLIGHT WITHOUT THE USE OF AUXILIARY SYSTEMS SUCH AS CYCLIC PROPELLER PITCH OR TAIL JETS/ RUTURS. THE SYSTEM IS BASED ON USING THE FLAP AS AN AERODYNAMIC SERVO TO POSITION THE WING RELATIVE TO THE FUSELAGE. ALTHOUGH THE SYSTEM IS MECHANICALLY SIMPLE, THE CONTROL CHARACTERISTICS ARE DIFFICULT TO VISUALIZE BECAUSE OF THE COUPLED BODY DYNAMICS INVOLVED. THEREFORE, A COMPREHENSIVE ANALYTICAL AND MUDEL TESTING PROGRAM WAS PERFORMED TO EVALUATE THE SYSTEM. (AUTHOR)

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DUC REPORT BIBLINGRAPHY SEARCH CONTROL NO. /20M07 AU-713 587 1/4 ARHY AERONAUTICAL RESEARCH LAB MOFFETT FIELD CALIF

MASS FLOW, VELOCITY AND IN-FLIGHT THRUST MEASUREMENTS BY ION DEFLECTION.

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DESCRIPTORS: (+AIRSPEED INDICATORS, +VERTICAL TAKE-OFF PLANES) . VELOCITY, THRUST, MEASUREMENT, IONS (U) IDENTIFIERS: VAMS(VECTOR AIRSPEED MEASURING SYSTEMSI, VECTOR AIRSPEED MEASURING SYSTEMS (U)

AN INVESTIGATION WAS MADE OF THE USE OF GASEOUS (ION) DISCHARGE SENSORS TO ACHIEVE ADEQUATE MEASURE OF AIRCRAFT VELOCITY AND INSTALLED THRUST. (AUTHOR) (U)

UNCLASSIFIED UDC REPORT BIBLIUGRAPHY SEARCH CUNTROL NO. /40M07 AD-715 315 1/3 PENNSYLVANIA STATE UNIV UNIVERSITY PARK DEPT OF AEROSPACE ENGINEERING AN INVESTIGATION OF THE TRAILING VORTEX SYSTEM GENERATED BY A JET-FLAPPED WING **(U)** OPERATING AT HIGH WING LIFT COEFFICIENTS. DESCRIPTIVE NOTE: FINAL REPT .. 468 MCCORMICK+BARNES W. 1 JUN 70 SCHUMACHER, #ILLIAN J. : CUNIRACT: F33615-69-C-1165 PROJ: AF-1366 TASK: 136617 MUNITUR: AFFUL TR-70-90 UNCLASSIFIED REPORT DESCRIPTORS; (+VURTICES, TRAILING EDGE), (+JET FLAPS, VORTICES), (VERTICAL TAKE-OFF PLANES, LIFTI, WINGS, ANGLE OF ATTACK, ASPECT RATIO (U) (U) IDENTIFIERS: BLOWING THE PURPOSE OF THE INVESTIGATION WAS TO MEASURE THE GEOMETRY OF THE TRAILING VORTEX GENERATED BEHIND A JET-FLAPPED WING. SUCH VORTICES CAN POSE A SERIOUS HAZARD TO AIRCRAFT THAT PENETRATE THEM. PREVIOUS INVESTIGATIONS PERFURMED ON CONVENTIONAL WINGS INDICATE THAT THESE VORTICES PERSIST FOR SOME TIME AND HAVE MAXIMUM TANGENTIAL VELUCITIES WHICH INCREASE LINEARLY "ITH THE LIFT COEFFICIENT. AS FUTURE AIRLRAFT MAY EMPLOY HIGH LIFT DEVICES SUCH AS JET-FLAPPED WINGS. THE VORTICES GENERATED COULD BE EVEN STRONGER. THO SEMISFAN MODELS OF A JET-FLAPPED WING WERE RESTED IN A SUBSONIC WING TUNNEL. PARAMETERS VARIED DURING TESTING INCLUDED THE JET FLAP ANGLE. ANGLE OF ATTACK, ASPECT RATIO, AND JET MOMENTUM CUEFFICIENT. VORTEX MEASUREMENTS WERE OBTAINED USING A VORTEX METER WHICH MEASURED THE ROTATIONAL SPELD OF THE FLUID WITHIN THE VORTEX. VALUES OBTAINED WERE NUMERICALLY INTEGRATED TO YIELD THE TANGENTIAL VELOCITY AND CIRCULATION DISTRIBUTED THROUGH THE VORIEX. EXPERIMENTAL RESULTS INDICATE THAT THE MAXIMUM TANGENTIAL VELOCITY INCREASES TO A MAXIMUM AND THEN DECREASES WITH CONTINUALLY INCREASING JET BLOWING. AT HIGH VALUES OF JET BLOWING, THE VORTEX WAS FOUND TO DECAY RAPIDLY DOWNSTREAM. (AUTHOR) (U)

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UDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NO. /20M07 AU-715 626 . 21/5

CURFISS-WRIGHT CORP 400D-RIDGE N J

WIF-48 SINGLE ROTUR COMPRESSOR DEVELOPMENT.

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DESCRIPTIVE NOTE: FINAL TECHNICAL REPT., NOV 70 59P MULLER,CHARLES H. : REPT. NG. CW-WK-69-098F CONTRACT: NOUD19-69-C-0533

UNCLASSIFIED REPORT

DESCRIPTORS: (+CUMPRESSOR KOTORS, DESIGN), (+VERTICAL TAKE-OFF PLANES, TURBUFAN ENGINES), (+TURBUFAN ENGINES, COMPRESSUR ROTORS), AXIAL-FLUW COMPRESSORS, AXIAL-FLOW COMPRESSOR BLADES, INLET GUIDE VANES, EXHAUST DIFFUSERS, GAS SEALS, CONFIGURATION, TEST METHODS IDENTIFIERS: WTF-48 ENGINES, +LIFT FAN ENGINES (U)

DEVELOPMENT OF THE REDUCED SCALE WTF-48 LIFT FAN ENGINE WAS CONTINUED UNDER THIS PROGRAM. THE OBJECTIVE OF THE PROGRAM WAS IMPROVEMENT OF THE PRESSURE RATIO, EFFICIENCY AND DIFFUSION OF THE COMPRESSOR ROTOR. THIS PROGRAM INVESTIGATED THE EFFECTS OF DEBLUNTING AND SWEEP OF THE ROTOR TRAILING EDGE AND MODIFICATION OF THE PASSAGE AREA SCHEDULE AND WALL CONTOURS. THE MODIFICATIONS INVESTIGATED IN THIS PROGRAM DID NOT PRODUCE INCREASED ROTOR PRESSURE RATIO OR EFFICIENCY. AN INCREASE OF 11% IN ROTOR STATIC PRESSURE, ACCOMPANIED BY A 20% REDUCTION IN DIFFUSER LOSSES, WAS ACCOMPLISHED. THIS IMPROVEMENT PRODUCED A 5 POINT INCREASE IN STAGE EFFICIENCY OF THE COMPRESSOR. (AUTHOR) (U)

DDC REPORT BIBLIDGRAPHY SEARCH CONTROL NU. /20M07 AU-715 939 1/3 20/1 AIR FORCE FLIGHT UYNAMICS LAB WRIGHT-PATTERSON AFB OHIO THE ACOUSTIC ENVIRONMENT OF A DEFLECTED-JET VTOL AIRCHAFT. (U) DESCRIPTIVE NOTE: TECHNICAL MEMO.. SEP 70 43P SMITH, D. L. ;MCFARLAND, S. L. . JRI REPT. NO. AFFDL-TH-7U-1-FYA PROJ: AF-1471 TASK: 147102 UNCLASSIFIED REPORT

DESCRIPTORS: (*AIRPLANE ENGINE NUISE, *VERTICAL TAKE=OFF PLANES), JETS, AERODYNAMIC NOISE, HOVERING, NOZZLE GAS FLOA: EXHAUST NUZZLES, DEFLECTION (U) IDENTIFIERS; NOISE PULLUTION (U)

A NUISE SURVEY CONDUCTED UN A DEFLECTED-JET VTOL AIRCRAFT IS DESCRIBED. THE TEST AIRCRAFT WAS MOUNTED ON A VERTICAL THRUST STAND WITH THE NOZZLES OKILNTED IN THE 'HOVER-STOP' POSITION WHILE ENGINE RUNS WERE MADE AT DIFFERENT POWER SETTINGS. FORTY-ONE (41) MICROPHONES WERE LUCATED IN THE FIELD ON THE PORT SIDE OF THE AIRCRAFT AND SIX (6) MICHOPHONES WERE LOCATED AT POSITIONS NEAR THE AIRCRAFT SKIN. THE HEIGHT OF THE FIELD MICRUPHONES WAS VARIED (5 FT, 10 FT, AND 15 FT). ONE-THIRD OCTAVE BAND SPECTRA OBTAINED FROM ALL MICROPHONES AND FOR ALL ENGINE POWER SETTINGS WERE FLAT AND DID NOT EXHIBIT THE THAYSTACKT SHAPE WHICH IS CHARACTERISTIC OF A FREE JET. TYPICAL ONE-THIRD OCTAVE BAND SOUND PRESSURE LEVEL SPECTRA AND CONTOURS OF OVERALL SOUND PRESSURE LEVEL ARE PRESENTED. ESTIMATES OF JET TUTAL ACOUSTIC POWER ARE DEVELOPED FROM THE MEASUREMENTS AND RELATED TO ENGINE OPERATING PARAMETERS. EXPRESSIONS ARE DERIVED TO PREDICT THE ONE-THIRD OCTAVE BAND SPECTRA AT POSITIONS IN THE FIELD AND ON THE VEHICLE FROM SIMILARLY CONFIGURED AIRCRAFT FOR VARIOUS ENGINE OPERATING CONDITIONS. (AUTHOR) (U)

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DUC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M0/ AD-718 121 1/1 20/4 LUCKHEED-GEORGIA CO MARIETTA A THEORETICAL INVESTIGATION OF A CIRCULAR LIFTING JET IN A CRUSS-FLOWING MAINSTREAM. **(U)** DESCRIPTIVE NOTE: FINAL REPT. JUL 69-DEC 70. 6 Ú P HACKETT, JAMES E. IMILLER, JAN 71 H. RONALD : . REPT. NU. LGR-ER-10940 CUNTRACT: F33615-69-C-1753 PROJ: AF-61698T MUNITOR: AFFUL TR=70=170 UNCLASSIFIED REPORT DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, +LIFT), (+JETS, LIFT), MATHEMATICAL PREDICTION, THEORY, PRESSURE, VORTICES, POTENTIAL THEORY (U) IDENTIFIERS: CROSS FLOW (6-) FINITE-ELEMENT POTENTIAL-FLOW-MODELING THEORETICAL TECHNIQUES ARE DESCRIBED WHICH PREDICT, FROM FIRST PRINCIPLES, BOTH THE ROLLED-UP GEOMETRY AND THE PATH OF A ROUND LIFTING JET CONVERGENT INTO A CROSS-FLOWING MAINSTREAM, AS ON VTOL OR DIRECT LIFT-ASSISTED STOL AIRCRAFT. STARTING WITH A STRAIGHT-CYLINDER GEOMETRY, "POINT" VORTEX ELEMENTS ARE PERTURBED USING A PRE DICTOR-CORRECTOR STEPPING METHOD TO GIVE A FIRST ESTIMATE OF THE BENT-BACK SHAPE, USING ASSUMED CIRCULATION VALUES. A CULLOCATION SCHEME IS NEXT USED TO REVISE THE CIRCULATION VALUES, AND AFTER THREE ON FOUR ITERATIONS, A FINAL EXIT-PLANE PRESSURE DISTRIBUTION MAY BE CALCULATED. THE FAN-INDUCED TOTAL PRESSURE RISE 15 SIMULATED BY INJECTING VORTEX RINGS AT A CHOSEN POSITION IN TH DUCT WHICH FEEDS THE JET. SINCE THE SCOPE OF THE METHOD IS ENTIRELY NON-VISCOUS, SEPARATIONS TOWARD THE REAR OF REAL JETS AND THE ASSOCIATED PRESSURE CHANGES ARE NOT SIMULATED AND BASE-PRESSURE TYPE OF PRESSURES CANNOT BE EXPECTED. NEVERTHELESS, FUR FORWARD SPEED RATIOS OF 0.1, 0.2, 0.3 AND 0.4, THE LON-PRESSURE CUNTOURS AT EACH SIDE OF THE JET DO SHOW AN INCREASING REARWARD SHIFT, JUST AS IS FOUND EXPERIMENTALLY. SOMEWHAT SURPRISINGLY. THE SIMULATED PLUNES WERE MURE STABLE AT HIGHER VELUCITY RATIOS. AT LOWER FORWARD SPEEDS, THERE WAS A TENDENCY TO FLAP, RATHER LIKE A HOSE END WHEN FREED. IT IS ANTICIPATED THAT, IF VISCOUS EFFECTS WERE SIMULATED, THESE MOTIONS MIGHT DAMP OUT. (U) 161

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07
AD-718 122 20/4 1/1 1/3 Northrop Corp Hawthurne Calif. Aircraft Div
A WIND TUNNEL INVESTIGATION OF JETS
EXHAUSTING INTO A CROSSFLOW. VOLUME I. Test description and data analysis. (U)
DÉSCRIPTIVE NOTE: TÉCHNICAL REPT DEC 70 448p FRICKE,LYNN B. :#OOLER,
PETER T. ;ZIEGLER,HENRY I Contract: f33615-69-c-1602
PROJ: AF-698BT TASK: 698BT01 MONITUR: AFFDL
UNCLASSIFIED REPORT
DESCRIPTORS: (+JET MIXING FLOW, INTERFERENCE), (+EXHAUST GASES, JET MIXING FLOW); (+VERTICAL TAKE-OFF PLANES, NOZZLE GAS FLOW); FLAT PLATE
MODELS, WIND TUNNEL MODELS, FLOW FIELDS, CURVE Fitting, pressure, data prucessing systems, test
METHUDS, FLOW VISUALIZATION, INTERACTIONS, SIDESLIP (U)
IDENTIFIERS: TOTAL PRESSURE RAKES, *CROSS FLOW, GRAPHS(CHARTS), STATIC PRESSURE DISTRIBUTIONS, CIRCULAR PLATES (U)
CIRCULAR PLATES (U) A LUW SPEED WIND TUNNEL TEST CS A FOUR-FOOT
DIAMETER CIRCULAR PLATE ADDEL WITH UP TO THREE EXHAUSTING JETS WAS CONSUCTED TO DETERMINE SURFACE
STATIC PRESSURE DISTRIBUTIONS, JET PATHS, AND JET DECAY CHARACTERISTICS IN THE PRESENCE OF A CROSSFLOW.
DATA RERE OBTAINED FOR THE UNE-JET CONFIGURATION WITH THE JET EXITING AT A NUMBER OF ANGLES TO THE PLATE AND AT VARIOUS VELOCITY RATIOS AND SIDESLIP
ANGLES. TWO-JET ARRANGEMENTS WERE TESTED WITH THE JETS EXITING NORMAL TO THE PLATE FOR THREE DIFFERENT
SPACINGS BETHEEN THE TWO JETS AND AT A NUMBER OF Velocity ratios and sideslip Angles. Three-jet
CONFIGURATION DATA WERE OBTAINED WITH THE JETS Exiting Normal to the plate for a number of velocity Ratios and Sideslip Angles. As a result of this
INVESTIGATION, SEVERAL CONCLUSIONS ARE DEDUCED PERTAINING TO THE INTERACTION OF MULTIPLE JETS
EXHAUSTING INTO A CROSSFLOW. THE TEST MODEL, Instrumentation, test procedure, and reduction and
ACCURACY OF THE TEST DATA ARE DISCUSSED IN THIS Volume. A summary and discussion of the test Results are also presented. (Author) (U)
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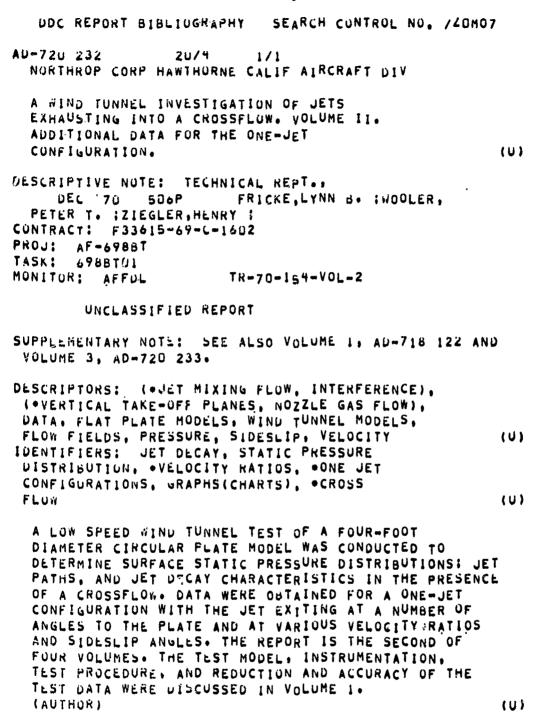
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UNCLASSIFIED UDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07 1/3 AU-718 123 20/4 1/1 NURTHROP CORP HAWTHURNE CALIF AIRCRAFT DIV A WIND TUNNEL INVESTIGATION OF JETS EXHAUSTING INTO A CROSSFLOW. VOLUME IV. AUDITIONAL DATA FUR THE THREE-JET CUNFIGURATION. (U) DESCRIPTIVE NOTE: TECHNICAL REPT., FRICKE LYNN B. INOOLER. υΕC 70 200P PETER T. ;ZIEGLER.HENRY I CONTRACT: F33615-69-C-16U2 PROJ: AF-6988T TASK: 6988T01 MUNITOR: AFFOL TR-70-154-VOL-4 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: SEE ALSO VOLUME 1, AD-718 122. REPORT ON VISTOL AIRCRAFT AERODYNAMIC PREDICTION METHODS INVESTIGATION. DESCRIPTORS: (+JET MIXING FLOW, INTERFERENCE). (•EXHAUST GASES, JET MIXING FLOW), (•VERTICAL TAKE-OFF PLANES, NUZZLE GAS FLOW), FLAT PLATE MODELS, WIND TUNNEL MODELS, INTERACTIONS, FLOW FILLDS, CURVE FITTING, PRESSURE, VELUCITY. (U) SIDESLIP IDENTIFIERS: + CRUSS FLOW, THREE JET CONFIGURATIONS, GRAPHS(CHARTS), CIRCULAR (U) PLATES, STATIC PRESSURE DISTRIBUTIONS A LOW SPEED WIND TUNNEL TEST OF A FOUR-FOOT DIAMETER CIRCULAR PLATE MODEL WITH UP TO THREE EXHAUSTING JETS WAS CONDUCTED TO DETERMINE SURFACE STATIC PRESSURE DISTRIBUTIONS, JET PATHS, AND JET DECAY CHARACTERISTICS IN THE PRESENCE OF A CROSSFLOW. THREE-JET CONFIGURATION DATA WERE OBTAINED WITH THE JETS EXITING NORMAL TO THE PLATE FOR A NUMBER OF VELOCITY RATIUS AND SIDESLIP ANGLES. AS A RESULT OF THIS INVESTIGATION, SEVERAL CONCLUSIONS ARE DEDUCED PERTAINING TO THE INTERACTION OF MULTIPLE JETS EXHAUSTING INTO A CROSSFLOW. (AUTHOR) (U)

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UDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07 20/4 AU-720 233 1/1 NORTHROP CORP HANTHORNE CALIF AIRCRAFT DIV A WIND TUNNEL INVESTIGATION OF JETS EXHAUSTING INTO A CROSSFLOW. VOLUME III. ADDITIONAL DATA FUR TWO-JET CONFIGURATIONS. (U) DESCRIPTIVE NOTE: TECHNICAL REPT., DEC 70 503P FRICKE, LYNN B. INOOLER, PETER T. IZIEGLER, HENRY I CUNTRACT: F33615-69-C-1602 PROJ: AF-6988T TASK: 6988T01 MUNITUR: AFFDL TR-70-154-VOL-3 UNCLASSIFIED REPORT SUPPLEMENTARY NUTE: SEE ALSO VOLUME 2, AD-720 232. DESCRIPTORS: (*JET MIXING FLOW, INTERFERENCE), (+VERTICAL TAKE-OFF PLANES, NOZZLE GAS FLOW), FLAT PLATE MODELS, MODEL TESTS, WIND TUNNEL MODELS, FLOW FIELDS, VELOCITY, DATA, PRESSURE (U) IDENTIFIERS: JET DECAY, . TWO JET CONFIGURATIONS. STATIC PRESSURE DISTRIBUTION, +VELOCITY RATIOS, GRAPHS(CHARTS), +CROSSFLOW (U) A LOW SPEED WIND TUNNEL TEST OF A FOUR-FOOT DIAMETER CIRCULAR PLATE MUDEL WITH UP TO THREE EXHAUSTING JETS WAS CONDUCTED TO DETERMINE SURFACE STATIC PRESSURE DISTRIBUTIONS, JET PATHS, AND JET DECAY CHARACTERISTICS IN THE PRESENCE OF A CROSSFLOW. THO-JET ARRANGEMENTS WERE TESTED WITH THE JETS EXITING NORMAL TO THE PLATE FOR THREE DIFFERENT SPACINGS BETWEEN THE TWO JETS AND AT A NUMBER OF VELOCITY RATIOS AND SIDESLIP ANGLES. THREE-JET CUNFIGURATION DATA HERE OBTAINED WITH THE JETS EXITING NORMAL TO THE PLATE FOR A NUMBER OF VELOCITY RATIOS AND SIDESLIP ANGLES. AS A RESULT OF THIS INVESTIGATION, SEVERAL CONCLUSIONS ARE DEDUCED PERTAINING TO THE INTERACTION OF MULTIPLE JETS EXHAUSTING INTO A CROSSFLOW. THE REPORT IS THE THIRD OF FOUR VOLUMES. THE TEST MODEL, INSTRUMENTATION, TEST PROCEDURE, AND REDUCTION AND ACCURACY OF THE TEST DATA WERE DISCUSSED IN VOLUME 1. THE PRESENT VOLUME CONTAINS ADDITIONAL DATA PERTAINING TO THE TWO-JET CUNFIGURATIONS. (AUTHOR) (U)

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DDC REPORT BIBLIUGRAPHY SEARCH CUNTROL NO. /20M07

AD-721 166 1/3 1/2 CIVIL AERONAUTICS BOARD WASHINGTON D C.

CIVIL AERONAUTICS BUARD PLANNING STUDY: STOL-VTOL AIR TRANSPORTATION SYSTEMS:

MAR 70 37P HINTZE, CARL, JR;

UNCLASSIFIED REPORT

DESCRIPTORS: (+SHORT TAKE=OFF PLANES, AIR TRANSPORTATION); (+VERTICAL TAKE=OFF PLANES; AIR TRANSPORTATION); (+AIR TRANSPORTATION; +CIVIL AVIATION); (+URBAN PLANNING; AIR TRANSPORTATION); DESIGN; ECONOMICS; SOCIOLOGY (U)

THE STUDY WAS PREPARED TO PROVIDE INFORMATION TO THE CIVIL AERONAUTICS BOARD MEMBERS AND STAFF ON THE CURRENT STATUS OF STUL AND VIOL AIRCRAFT. TERMINALS, AND ALLIED FACILITIES. THE STUDY IS A CUNSOLIDATION OF AVAILABLE INFORMATION ARRANGED TO INDICATE THE CONSENSUS OF OPINION OF THE VARIOUS AUTHORITIES IN THE FIELD. THE MAJOR DESIGN CONCEPTS OF STOL AND VTOL AIRCRAFT AND SUPPORT SYSTEMS ARE DESCRIBED IN RELATIVELY NON-TECHNICAL TERMS. INCLUDED IS A BRIEF DESCRIPTION OF THE CHANGING SUCIO-ECONOMIC ASPECTS OF THE MAJOR METROPOLITAN AREAS OF THE NATION AND THEIR ANTICIPATED EFFECTS ON URBAN TRANSPORTATION REQUIREMENTS. THE STUDY SUMMARIZES THE PROBABLE COURSE OF EVENTS IN THE EVULUTION OF STUL AND VTOL AIR TRANSPORTATION (U) SYSTEMS, AND FUTURE PROJECTIONS. (AUTHOR)

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UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07

AU-724 144 1/3 AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-PATTERSON AFB OHIO

THE 'PAPER-PILOT' -- A DIGITAL COMPUTER PROGRAM TO PREDICT FILOT RATING FOR THE HOVER TASK.

MAR 71 99P DILLOW, JAMES D. : RLPT. NO. AFFDL-TR-70-40 PROJ: AF-8219 TASK: 821909

UNCLASSIFIED REPORT

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, +HOVERING), MATHEMATICAL PREDICTION, COMPUTER PROGRAMS, PILOTS, EQUATIONS OF MOTION, GUSTS, COSTS: DIGITAL COMPUTERS

A MATHEMATICAL MODEL FOR PREDICTING THE PILOT RATING OF THE FLYING QUALITIES OF A VTOL AIRCRAFT IN THE PRECISION HOVER MODE IS DESCRIBED. THE MUDEL INCLUDES THE FOLLOWING ELEMENTS: THE LONGITUDINAL EQUATIONS OF MOTION FOR THE VTOL AIRCRAFT IN HOVER! A STOCHASTIC GUST MUDEL WHICH DESCRIBES DISTURBANCES TO THE AIRCRAFT; A FIXED FORM PILOT MODEL WHICH HAS FOUR FREE PARAMETERS; AND A COST FUNCTIONAL WHICH IS MADE UP OF MEASURES OF AIRCHAFT PERFORMANCE AND PILUT WORKLOAD. THE FOUR FREE PILOT PARAMETERS OF THE PILOT MODEL ARE SELECTED TO MINIMIZE THE COST FUNCTIONAL. THESE PARAMETERS ARE ADJUSTED TO ENSURE A 208 STABILITY MARGIN IN PILOT GAINS AND THEN USED TO COMPUTE A PAPER PILOT RATING OF THE FLYING QUALITIES OF THE VTUL AIRCRAFT IN THE PRECISION HOVER MODE. THE MATHEMATICAL EQUATIONS AND DIGITAL CUMPUTER PROGRAM USED TO EXERCISE THE MODEL ARE DESCRIBED. THE 'PAPER PILOT' RATING WAS COMPUTED FOR 79 AIRCRAFT CUNFIGURATION/GUST INTENSITY COMBINATIONS. THE AIRCRAFT CONFIGURATIONS CONSIDERED INCLUDE CASES WITH CONTROL LAG, STABILITY AUGMENTATION SYSTEM LAG, AND LIMITED PITCH RATE AUTHORITY IN THE STABILITY AUGMENTATION SYSTEM. THE *PAPER PILOT * RATINGS ARE COMPARED TO ACTUAL PILOT RATINGS OBTAINED IN FIXED BASE SIMULATION. THE DIFFERENCE BETWEEN THE ACTUAL PILOT RATINGS AND THE *PAPER PILOT * RATING HAS A MEAN OF .14 AND A STANDARD DEVIATION OF .63 OUT OF A 10 POINT RATING SCALE. (AUTHOR)

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DUC REPORT BIBLIUGRAPHY SEARCH CUNTROL NO. /20M07

AD-725 241 1/3 1/1 DEUTSCHE FORSCHUNGS- UND VERSUCHSANSTALT FUER LUFT- UND RAUMFAHRT E V BRUNSWICK (WEST GERMANY)

UNTERSUCHUNGEN JEBER DEN EINFLUSS EINES GENEIGTEN TRIEBWERKSTRAHLS AUF DIE AERODYNAMISCHEN EIGENSCHAFTEN EINES LEITWERKS (INVESTIGATIONS OF THE INFLUENCE OF AN INCLINE PROPULSIVE JET UN THE AERODYNAMIC PROPERTIES OF THE TAIL ASSEMBLY), (U)

APR 70 18P SEIDLL, MANFRED ; REPT. NO. UFVLR-SONDERDRUCK-104

UNCLASSIFIED REPORT AVAILABILITY: PJB. IN ZEITSCHRIFT FUER FLUGWISSENSCHAFIEN, V19 N1 P13-29 1971. NO COPIES FURNISHED BY DDC OR NTIS. SUPPLEMENTARY NOTE: TEXT IN GERMAN.

DESCRIPTORS: (•STABILIZERS(HURIZUNTAL TAIL SURFACE), AERODYNAMIC CHARACIERISTICS), LIFT, JETS, PITCH(MOTIUN), VERTICAL TAKE-OFF PLANES, MODEL TESTS, WEST GERMANY (U)

IN A BASIC EXPERIMENTAL STUDY THE CHANGE IN LIFT OF AN 'ISOLATED' TAILPLANE INDUCED BY A COLD CIRCULAR JET IS DETERMINED. WITH REGARD TO THE LONGITUDINAL STABILITY OF A VTUL AIRCRAFT IN THE TRANSITION SPEED RANGE, A DOMINANT PARAMETER IS THE ANGLE OF THE JET NOZZLE RELATIVE TO THE MAINSTREAM DIRECTION. AS FURTHER PARAMETERS THE JET-SPEED TO MAINSTREAM-SPEED RATIO, THE DIAMETER OF THE NOZZLE AND ITS PUSITION RELATIVE TO THE TAILPLANE, THE INCIDENCE, THE CHORD AND THE THICKNESS OF THE TAILPLANE ARE INVESTIGATED. SYSTEMATIC FORCE AND PRESSURE MEASUREMENTS WERE CARRIED OUT ON SEVERAL TAILPLANE MODELS (NACA UDIO SECTION AND FLAT PLATE WITH A ROUNDED NUSE) OF RECTANGULAR PLANFORMS AND WITH SIDEPLATES. THE RESULTS PROVIDE A SURVEY ON THE MAGNITUDE OF JET-INDUCED TAILPLANE CONTRIBUTIONS TO CHANGES IN STABILITY AND MAY ALLOW TO ESTIMATE ROUGHLY ENGINE~EFFLUX EFFECTS IN AN EARLY DESIGN STAGE OF AN AIRCRAFT. SUME FLUID-MECHANICAL ASPECTS OF THE SPREADING AND INTERFERENCE OF INCLINED JETS ARE DISCUSSED. THE TESTING INSTALLATION AND PERFORMANCE ARE BRIEFLY DESCRIBED. (AUTHOR) (U)

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SEARCH CUNTROL NO. /40M07 DOC REPORT BIBLIOGRAPHY AU-725 746 1/3 CORNELL AERUNAUTICAL LAS INC BUFFALO N Y THE GENERATION OF A MILITARY SPECIFICATION FOR FLYING QUALITIES OF PILOTED V/STOL (U) AIRCRAFT-MIL-F-83300. DESCRIPTIVE NOTE: FINAL REPT. APR 66-MAR 71. APK 71 41P KEY DAVID L. I CAL-88-2925-F-1 REPT. NG. AF 33(615)-3736, F33615-70-C-1322 CUNTRACT: PROJ: AF-698DC MUNITOR: AFFDL TR=71=23 UNCLASSIFIED REPORT DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, SPECIFICATIONS), (+SHORT TAKE-OFF PLANES, SPECIFICATIONS), PERFORMANCE(ENGINEERING). FLIGHT CUNTROL SYSTEMS, STABILITY ' (U) THE DUCUMENT DESCRIBES A FOUR YEAR EFFORT WHICH LED TO THE ADOPTION OF A NEW MILITARY SPECIFICATION MIL-F-83300, FLYING QUALITIES OF PILOTED V/STOL AIRCRAFT , AND THE PUBLICATION OF A SUPPORTING DOCUMENT, BACKGROUND INFORMATION AND USER GUIDE FOR MIL-F-83300, MILITARY SPECIFICATION - FLYING QUALITIES OF PILOTED V/STOL AIRCRAFT! (AFFDL-TR-70-88). INCLUDED IN THE REPURT IS AN ASSESSMENT OF THE STATUS OF VISTOL FLYING QUALITIES RESEARCH AND RECOMMENDATIONS FOR FUTURE WORK. (AUTHOR) (U)

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SEARCH CONTROL NO. /20M07 DDC REPORT BIBLIOGRAPHY 20/4 AU-726 103 1/3 NORTH AMERICAN ROCKWELL CORP LOS ANGELES CALIF LOS ANGELES DIV AERODYNAMIC STABILITY AND CONTRUL/WIND (U) TUNNEL DATA CORNELATION. DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 15 OCT 66-31 AUG 70, MAY 71 CASTLELIG. R. I 219P REPT. NO. NA-70-327-4 CONTRACT: AF 33(615)-5323 PROJ: AF-648BT MUNITUR: AFFOL TR-71-3 UNCLASSIFIED REPORT DESCRIPTORS: (VERTICAL TAKE-OFF PLANES, STABILITY), (*FLIGHT CONTROL SYSTEMS, VERTICAL TAKE-OFF PLANES), WIND TUNNEL MODELS, HOVERING, POWER, INTERFERENCE, AERODYNAMIC CHARACTERISTICS, (U) EXPERIMENTAL DATA IDENTIFIERS: V-4 AIRCRAFT, XV-4B AIRCRAFT, XV-5A AIRCRAFT, V-5 AIRCRAFT, V-6 AIRCRAFT, (U) KESTREL AIRCRAFT THE GENERAL OBJECTIVE WAS TO COLLECT AND ANALYZE AERODYNAMIC STABILITY AND CONTRUL DATA FOR THE XV-48. XV-5A. AND P-1127 VTOL CONFIGURATIONS. CORRELATION AND ANALYSIS OF EXISTING MODEL DATA WERE MADE TO INVESTIGATE HOVER AND TRANSITION CHARACTERISTICS. PARTICULAR EMPHASIS WAS PLACED ON THE AERODYNAMIC POWER EFFECTS, SOMETIMES REFERRED TU AS INTERFERENCE EFFECTS. UTHER AREAS OF INVESTIGATION WERE SOMETIMES REFERRED TO AS INTERFERENCE EFFECTS. OTHER AREAS OF INVESTIGATION WERE NONDIMENSIONAL COEFFICIENTS USED TO PRESENT VIOL DATA AND WIND TUNNEL TEST TECHNIQUES. WIND TUNNEL TESTS WERE CONDUCTED USING AN INLET ONLY MUDEL AND A JET ONLY MODEL TO INVESTIGATE SPECIAL TEST AND ANALYSIS PROBLEMS FOR THESE COMPONENTS. THE AGREEMENT BETWEEN DIFFERENT SETS OF XV-4B MODEL DATA WAS, IN GENERAL, FOUND TO BE POOR. HOWEVER. THE NONDIMENSIONAL COEFFICIENTS USED BY LOCKHEED TO REDUCE TO XV-48 MUDEL DATA APPEAR TO BE VALID PARAMETERS FOR THIS CATEGORY OF VTOL AIRPLANE. THE JET ENTRAINMENT FLOW WAS SHOWN BY EXPERIMENT TO BE THE PRIMARY CAUSE OF THE XV-4B POWER EFFECTS. AND THE XV-48 JET PATH WAS EXPERIMENTALLY AND THEORETICALLY DETERMINED. (AUTHOR) (U)

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UDC REPORT BIBLINGRAPHY SEARCH CONTROL NO. /20M07 AD-726 272 1/3 FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO PRINCIPLES OF DESIGN OF VERTICAL TAKEOFF AND LANUING AIRCRAFT. (U) FEB 71 45UP KUROCHKIN, F. P. : REPT. NO. FTD-MT-24-255-70 PROJ: AF-5362 TASK: DIA-T65-09-04 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: EDITED MACHINE THANS. OF MONO. USNOVY PROEKTIROVANIYA SAMULETOV S VERTIKALNYM VZLETOM I POSADKUI, MOSCOW, 1970 PL-352, BY LEE U. THOMPSON. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, DESIGN), AIRPLANE NOISE, MATHEMATICAL ANALYSIS, WEIGHT, HOVERING, AIRCRAFT ENGINES, LANDING GEAR, USSR (0) IDENTIFIERS: TRANSLATIONS (U) THE BOOK IS DEDICATED TO THE DRAFT DESIGNING OF A COMPARATIVELY NEW TYPE OF AIRCRAFT POSSESSING THE TAKEOFF AND LANDING PROPERTIES OF HELICOPTERS AND OTHER FLIGHT CHARACTERISTICS, PECULIAR TO AIRCRAFT. THE CHARACTERISTICS OF THEIR AERODYNAMIC CONFIGUATIONS BASIC PARAMETERS, GRAVIMETRIC CHARACTERISTICS, AND DESIGNS WITH VARIOUS POWER PLANT COMPOSITIONS ARE EXAMINED. TURBOPROP (TP) AND TURBOJET ENGINES (TJ) (ORDINARY AND SPECIAL) WERE USED IN THE COMPOSITION OF THE LATTER BOTH AS SUSTAINER AND HUISTING, AND AS COMPOSITE ENGINES ACCOMPLISHING IN ONE UNIT THE ROLE OF THE FIRST AND THE SECOND. METHODS ARE GIVEN FOR CALCULATING THE SPECIFIC VERTICAL TAKEOFF AND LANGING AIRCRAFT (VTOL) PROCESSES OF FLIGHT, FOR EXAMPLE THE TRANSFER FROM VERTICAL FLIGHT TO HORIZONTAL FLIGHT AND CONVERSELY. (AUTHOR) (U)् १ ٩.

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SEARCH CONTROL NO. /20M07 DDC REPORT BIBLIDGRAPHY AD-728 112 12/1 1/3 SOUTHERN METHODIST UNIV DALLAS TEX INFORMATION AND CONTROL SCIENCES CENTER OPTIMAL AND SUBOPTIMAL CONTROL SYNTHESIS FOR MINIMUM TIME VTOL TRANSITION. (U) JUN 70 16P NARDIZZI,LOUIS R. ITARNG. MING Y. IPARKER, RUBERT J. 1 CUNTRACT: F44620-68-C-0023, NSF-GK-5608 PROJ: AF-9559 MUNITUR: AFOSR TR=71=2211 UNCLASSIFIED REPORT AVAILABILITY: PUB. IN IEEE TRANSACTIONS ON AEROSPACE AND ELECTRONIC SYSTEMS VAES-7 N3 P506-520 MAY 71. SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH LTV AEROSPACE CORP., DALLAS, TEX. DESCRIPTORS: (+ADAPTIVE CONTROL SYSTEMS, MATHEMATICAL MODELS), (+VERTICAL TAKE-OFF PLANES, ADAPTIVE CONTROL SYSTEMS), PARTIAL DIFFERENTIAL EQUATIONS, INTEGRALS, MATRIX ALGEBRA, FLIGHT CONTROL SYSTEMS, NUMERICAL ANALYSIS, FEEDBACK, UPTIMIZATION (U) IDENTIFIERS: +CONTROL THEORY, AUTOMATIC CONTROL, (U) FEEDBACK CONTROL OPTIMAL OPEN-LOUP AND SUBOPTIMAL CLOSED-LOOP CUNTROLS FOR VTUL AIRCRAFT IN A MINIMUM, CLIMB-TO-CRUISE TIME TRANSITION ARE PRESENTED IN THIS PAPER. THE OPTIMAL OPEN-LOOP CONTROLS ARE SYNTHESIZED BY A PROPOSED GRADIENT TECHNIQUE WHICH PROVIDES FOR THE SELECTION OF DESIRED CHANGES IN PHYSICALLY MEANINGFUL PARAMETERS DURING EACH ITERATION STEP. THE SUBOPTIMAL CLOSED-LUOP CONTROLS OVER THE MINIMUM TIME-TO-CLIMB INTERVAL. PIECEWISE-CONSTANT FEEDBACK GAINS AND SWITCHING TIMES ARE SYNTHESIZED FOR MULTIDIMENSIONAL CONTROL VECTORS WHICH ARE LINEAR COMBINATIONS OF OBSERVABLE STATES. SEVERAL CUMPUTATIONAL RESULTS ARE PRESENTED FOR OPTIMAL AND SUBOPTIMAL MINIMUM TIME CONTROLS WITH CONSTRAINED AND UNCUNSTRAINED TERMINAL FLIGHT-PATH ANGLES. (AUTHOR) (U)

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INSTITUTE OF AERONAUTICS A	ND ASTRONAUTICS, 1290
AVE. OF THE AMERICAS, NEW	YORK: N. Y. 10010
\$2.00/MFS1.00. NO CUPIES F	URNISHED BY DDC OR
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SUPPLEMENTARY NOTE: PUB. IN	AIAA FLUID AND PLASHA
DYNAMICS CONFERENCE (4TH) H	ELD AT PALO ALTO,
CALIF. 21-23 JUN 71, AS PAP	ER 71-576.
DESCRIPTORS: (+SUBSONIC NOZ	71 FS. 67401154
AUGMENTATION), (+VERTICAL T	AKE-OFE DI ANES
LIFT), SHORT TAKE-OFF PLANE	S. SECONDARY FLOW
VELOCITY, STATISTICAL DISTR	SPUTIONS, MATHEMATICAL
MODELS, NOZZLES	
IDENTIFIERS: +THRUST AUGMEN	TING EJECTORS. (U)
ENTRAINMENT, VELUCITY PROFI	
THE THRUST AUGMENTATION. L	IFT AUGMENTATION AND
NUISE REDUCTION CHARACTERI	STICS OF COMPLET FUELTOPS
- MAKE THEM POTENTIALLY ATTR	ACTIVE FOR PROPULSION LIFT
SYSTEMS, ALTHOUGH IN THE P	AST POOR THRUST
AUGMENTATION RESULTS HAVE I	NEGATED THE OTHER BENEFITS.
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DEVELOPED IN THIS PAPER IN	DICATES THAT IN ROVED
MIXING AND DIFFUSION CAN S	UNIFICANTLY INVREASE
THRUTT AUGMENTATION & COM	ANION EJECTOR
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AGREENENT WITH ATTACK	TIONS AND SHOWS REASONABLE
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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07 AU-728. 965 20/4 1/1 AIR VEHICLE CORP SAN DIEGO CALIF A SLANTED ROUND JET AT LOW FORWARD SPEED. (U) 9EC 70 5P STRAND T. : CUNTRACT: DA-31-124-ARO(D)-311 PROJ: DA-2-0-061102-8-33-6 MUNITOR: AROU 5274:7-E UNCLASSIFIED REPORT AVAILABILITY: PUB. IN JNL. OF AIRCRAFT. VB N4 P278-279 APR 71. SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 29 JAN 70. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, +JET MIXING FLUR), FLOW FIELDS, THEORY, WIND TUNNEL MODELS, MODEL TESTS, ANGLE OF ATTACK, VORTICES, ANALYSIS OF VARIANCE, VERTICAL TAKE-OFF PLANES (U)IDENTIFIERS: +SLANTED ROUND JETS (U) A NEW THEURY WHICH MAY BE USED FOR ESTIMATES OF THE VARIATION OF THE LIFT OF A SLANTED ROUND JET WITH FURWARD SPEED IS EVALUATED. (U)

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UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NU. /20M07 AD-730 121 1/3 20/4 CORNELL AERONAUTICAL LAB INC BUFFALO N Y DEVELOPMENT OF ADVANCED TECHNIQUES FOR THE IDENTIFICATION OF V/STOL AINCRAFT STABILITY AND CONTRUL PARAMETERS.

DESCRIPTIVE NOTE: FINAL REPT. MAY 69-DEC 70, AUG 71 359P CHEN,ROBERT T. N.; EULRICH,BERNARD J. ILEBACQZ,J. VICTOR; REPT. NU. CAL-BM-2820-F-1 CONTRACT: NOD019-69-C-0534

UNCLASSIFIED REPORT

DESCHIPTORS: (*VERTICAL TAKE-OFF PLANES, AERODYNAMIC CHARACTERISTICS), (*SHORT TAKE-OFF PLANES, MATHEMATICAL MODELS), FLIGHT CONTROL SYSTEMS, EQUATIONS OF MOTION, FLIGHT PATHS, STABILITY, HOVERING, ALGORITHMS (U) IDENTIFIERS: *TRANSITION FLIGHT, KALMAN FILTERS, X-22 AIRCRAFT (U)

CONTEMPORARY ANALYSES OF TRANSITION FLIGHT OF V/ STOL AIRCRAFT ARE BASED ON AERODYNAMIC DATA MEASURED IN A WIND TUNNEL OR ON ANALYTICAL PREDICTION USING METHODS DEVELOPED FOR CONVENTIONAL AIRCRAFT. THE VALIDITY AND ACCURACY OF THESE TECHNIQUES FOR V/STOL AIRCRAFT HAS NOT YET BEEN ESTABLISHED, AND IT IS ESSENTIAL THAT THEY BE CORRELATED WITH FLIGHT TEST DATA THROUGH PARAMETER IDENTIFICATION. IN SPITE OF THE COMPLICATED NATURE OF V/STOL DYNAMICS IN TRANSITION, SOME METHOD OF IDENTIFYING THESE CHARACTERISTICS IS REAUIRED. THIS REPORT DOCUMENTS THE DEVELOPMENT OF IDENTIFICATION TECHNIQUES TO MEET THIS REQUIREMENT. THE REPORT FIRST PRESENTS THE SELECTION OF A MATHEMATICAL MODEL TO REPRESENT A VISTUL AIRCRAFT (THE X-22A). THIS IS FOLLOWED BY A DISCUSSION OF AVAILABLE IDENTIFICATION TECHNIQUES. BASED UPON A THOROUGH KNOWLEDGE OF THE REQUIREMENTS OF THIS PROGRAM AND THE LIMITATIONS OF THE AVAILABLE TECHNIQUES, ADVANCED TECHNIQUES SUITABLE FOR IDENTIFICATION OF V/STOL AIRCRAFT STABILITY AND CONTROL PARAMETERS ARE DEVELUPED. (AUTHOR) (U)

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UDC REPORT BIBLIUGRAPHY - SEARCH CUNTROL NU. /20M07 AU-732 736 20/4 1/3 GEORGIA INST OF TECH ATLANTA VORIEX SHEDDING FROM A TURBULENT JET IN A CROSS-WIND, FEB 71 15P NCHAHON . H. HESTER . D. D. IPALFERY.J. G. ; CUNTRACT: DAHCU4-68-C-DOU4 MUNITOR: AKOD T-2:18-E UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN JNL. OF FLUID MECHANICS, V48 PT1 P73-80 1971. SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 20 AUG 70.

DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, +JET MIXING FLUW), WAKE, TURBULENCE, BLUNT BODIES, NOZZLE GAS FLOW, FLAT PLATE MODELS, MODEL TESTS (U) IDENTIFIERS: +VORTEX SHEDDING, EXHAUST PLUMES, +CROSS WIND PROPERTIES, STROUMAL NUMBER (U)

MEASUREMENTS IN THE WAKE BEHIND TURBULENT JETS EXHAUSTING FROM A SOLID SURFACE INTO A CROSS-WIND INDICATE THAT VORTEX SHEDDING OCCURS AS IN THE CASE OF FLOW PAST SOLID BLUFF BODIES. THE STROUHAL NUMBERS FOR FLOW PAST A CIRCULAR AND A BLUNT JET ARE IN QUALITATIVE AGREEMENT WITH THOSE FOR CORRESPONDING SOLID BODIES. PROVIDED THAT THE WIDTH OF THE SPREADING JET SOME DISTANCE FROM THE SURFACE IS USED RATHER THAN THE JET EXIT PLANE DIMENSION. (U)

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /ZOMO7 AD-732 841 20/4 1/3 ARNULD ENGINEERING DEVELOPMENT CENTER ARNOLD AIR FORCE STATION TENN FLOW FIELD MEASUREMENTS OF A JET IN CROSSFLUE WITH A LASER VELOLIMETER. (U) DESCRIPTIVE NOTE: FINAL REPT., "BINIUN.T. W. . JR; NOV 71 31P REPT. NO. AEDC-TR-71-192 CUNTRACT: F4U600-72-6-0003 PROJ: AF-8219, ANO-PUU141 TASK: 621907 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH ARO. INC., TULLAHOMA, TENN., REPT. NO. ARU-PWT-TR-71-159. DESCRIPTORS: (+NUZZLE GAS FLUW, VELOCITY), (VERTICAL TAKE-OFF PLANES, JET MIXING FLOW), LASERS, WIND TUNNEL MODELS, FLAT PLATE HODELS. JETS, INSTRUMENTATION, SUBSONIC CHARACTERISTICS. FLOW VISUALIZATION (U) IVENTIFIERS: CROSS FLOW, LASER VELOCIMETERS (U) TESTS WERE CONDUCTED IN A LUW SPEED WIND TUNNEL (V/STOL) TO MEASURE THE VELUCITY FIELD OF A JET ISSUING FROM A FLAT PLATE WITH CROSSFLOW. VELOCITY CUMPONENTS WERE MEASURED WITH A DUAL-SCATTER LASER VELOCIMETER AT EFFECTIVE VELOCITY RATIOS OF 0.125 AND 0.250. THE DATA YIELDED VELOCITY VECTORS ALONG

LINES NORMAL TO THE JET CENTERLINE IN THREE PLANES PARALLEL TO THE PLANE OF SYMMETRY. INDICATIONS OF THE FLOW FIELD TURBULENCE WERE ALSO MEASURED.

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SEARCH CUNTROL NG. /20M07 DDC REPORT BIBLIUGRAPHY AU-733 987 1/3 6/7 NAVAL AIR DEVELOPMENT CENTER WARMINSTER PA AERO MECHANICS DEPT AN EVALUATION OF SEARCH AND RESCUE MISSION CHARACTERISTICS. (U) DESCRIPTIVE NOTE: FINAL REPT., 6JP BRENNAN, THOMAS J. : NOV 71 REPT. NO. NADC-AM-7136 PROJ: A330-3300/202-6/2045660000 UNCLASSIFIED REPORT DESCRIPTORS: (+RESCUES, VERTICAL TAKE-OFF PLANES). (VERTICAL TAKE-UFF PLANES, DESIGN), AIRFRAMES, AIRCRAFT ENGINES, PRUPULSION, MISSION PROFILES, HOVERING (U) IDENTIFIERS: SAR(SEARCH AND RESCUE), SEARCH AND RESCUE (U) THE REPORT PROVIDES AN OVERVIEW OF THE GENERAL REQUIREMENTS FOR AN AIRBORNE RESCUE SYSTEM TO FULFILL A MILITARY SAR ISEARCH AND RESCUES MISSION. PROJECTED MISSION AND AIRFRAME/PROPULSION SYSTEM REQUIREMENTS ARE PRESENTED TO PROVIDE A BASELINE FOR INITIAL DEVELOPMENT ANALYSES. A STANDARD METHODOLOGY FOR THE CONDUCT OF DETAILED PERFORMANCE EVALUATION AND OVERALL MISSION ANALYSES ARE PROPOSED TO DEFINE CRITICAL AREAS IN SAR AIRCRAFT DESIGNS. AN AIRCRAFT/PROPULSION SYSTEM IS DESIGNED TO ILLUSTRATE THE APPLICATIONS. (AUTHOR) (U)

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DDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. //OMO7 AD-734 068 1/3 BOEING CO PHILADELPHIA PA VERTOL DIV CYCLIC PITCH CONTROL ON A V/STOL TILT WING AIRCRAFT. (U) DESCRIPTIVE NOTE: FINAL REPT. MAR 70-MAY 71. UCT 71 114P KOLESAR + CHARLES E. ; REPT. NO. 0210-10353-1 CONTRACT: F33615-70-C-1000 PROJ: AF-6988T MONITOR: AFFUL TR=71=91 UNCLASSIFIED REPORT DESCRIPTORS: INVERTICAL TAKE-OFF PLANES, FLIGHT CONTROL SYSTEMS), (OFLIGHT CONTRUL SYSTEMS, *PITCH(MOTION)), TILT WINGS. PROPELLERS(AERIAL), PROPELLER BLADES, AERODYNAMIC CONTROL SURFACES, WIND TUNNEL MODELS, HARMUNIC ANALYSIS, HOVERING, STABILITY, TRANSPORT PLANES (U) IDENTIFIERS: CYCLIC PITCH CONTROL. +TRANSITION FLIGHT (U) THE REPORT PRESENTS THE KEY RESULTS OF A MODEL WING TUNNEL TEST PROGRAM THAT WAS DIRECTED TOWARDS INVESTIGATING THE USE OF CYCLIC PITCH PROPELLERS AS THE LOW SPEED LUNGITUDINAL CONTROL SYSTEM OF A FOUR PROPELLER VISTOL TILT WING TRANSPORT-TYPE AIRCRAFT. THE ALMOST LINEAR PITCH CONTROL EFFECTIVENESS OF THIS SYSTEM THROUGH TRANSITIONAL FLIGHT AND IN-GROUND EFFECT ALONG WITH THE CORRELATION WITH THEORY IS DISCUSSED, AND THE MODERATE POWER INCREASE ASSUCIATED WITH ITS USE IS SHOWN. (AUTHOR)

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UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M0/ AU-734 237 1/3 BOEING CO PHILADELPHIA PA VERTOL DIV 1/3 SCALE V/STOL CYCLIC PITCH PROPELLERS: RESULTS OF WIND TUNNEL TESTS. (U) DESCRIPTIVE NOTE: CONTRACTOR TEST REPT. NOV-DEC 70,, FEB 71 157P WIDMAYER, EDWARD ; TOMASSONI. J. ; REPT. NO. 0170-10040-1 CUNTRACT: F33615-70-C-1000 PROJ: AF-4988T MUNITOR: TR=71=91=REF=5 AFFUL UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: SEE ALSO REPT. NU. D170-10039-1. AD-734 236. DESCRIPTORS: (*PROPELLERS (AERIAL) . *PITCH(MOTION)), WIND TUNNEL MODELS, MODEL TESTS, TILT WINGS, VERTICAL TAKE-OFF PLANES, FLIGHT CONTROL SYSTEMS, EFFECTIVENESS, POWER, PROPELLER BLADES, PROPELLER HUBS, HOVERING. DESIGN (U) IDENTIFIERS: *CYCLIC PITCH PROPELLERS, TRANSITION FLIGHT (U) THE REPORT PRESENTS THE RESULTS OF A WIND TUNNEL TEST PERFORMED IN THE BOEING-VENTOL WIND TUNNEL ON A 1/3 SCALE V/STOL 4-BLADED CYCLIC PITCH PROPELLER. HAVING A TOTAL ACTIVITY FACTOR OF 640. THE PROPELLER WAS TESTED AS BOTH AN ISOLATED PROPELLER AND AS AN INSTALLED PROPELLER. THE PRIMARY OBJECTIVES OF THE TEST WERE TO DETERMINE: THE EFFECTIVENESS OF CYCLIC PITCH CONTROL FOR LUNGITUDINAL CONTROL DURING HOVER AND TRANSITION, THE CHANGE IN POWER REQUIRED FOR CYCLIC PITCH CONTROL AND SLADE AND HUB LUADS FOR USE IN DESIGN AND FOR VERIFICATION OF ANALYTICAL METHODS. (AUTHOR) **(U)**

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UDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /ZOMO7 AU-734 702 1/2 1/3 HUNLYWELL INC ST PAUL MINN SYSTEMS AND RESEARCH CENTER IRF STEEP-ANGLE APPROACH: EFFECTS OF WINU. SYSTEM DATA-RATE, AND CONTINGENCY-EVENT VARIABLES. (0) DESCRIPTIVE NOTE: FINAL REPT. JUL 70-AUG 71, DEC 71 262P WOLF, JAMES D. IBARRETT, MIKE F. ; REPT. NO. 12571-FR3 CONTRACT: NOUD14-60-C-0191 PROJ: NR-213-061 MUNITUR: JANAIR 711105

UNCLASSIFIED REPORT

DESCRIPTORS: (+INSTRUMENT LANDINGS, +VERTICAL TAKE+ OFF PLANES), (+HELICUPTERS, TACTICAL AIR SUPPORT), APPROACH, APPROACH INDICATORS, DISPLAY SYSTEMS, SIMULATION, WIND, MAN-MACHINE SYSTEMS, DATA, GLIDE PATH SYSTEMS IDENTIFIERS: UH-1 AIRCRAFT, MAN IN THE LOOP CONTROL SYSTEMS, H-1 AIRCRAFT, STEEP ANGLE APPROACHES, STEEP ANGLE LANDINGS

THE PRIMARY OBJECTIVE OF THE STUDY WAS TO INVESTIGATE, BY MEANS OF REAL-TIME MANNIN-THE-LOOP SIMULATION TECHNIQUES, PILOTING PERFORMANCE AS INFLUENCED BY WIND, SYSTEM DATA-RATE; AND CONTINGENCY-EVENT VARIABLES DURING IFR STEEP APPROACHES WITH VERTICAL-LIFT AIRCRAFT. BY ALSO SIMULTANEOUSLY EVALUATING EFFECTS OF DISPLAY-FORMAT; APPROACH-ANGLE AND MEASUREMENT-NOISE VARIABLES TO THE EXTENT POSSIBLE WITHIN THE SCOPE OF EACH STUDY TASK; AN INCREASED DEGREE OF GENERALITY OF STUDY RESULTS WAS OBTAINED. A VARIABLE-VELOCITY SIMULATION OF THE BELL UH-I HELICOPTER SERVED AS THE TEST VEHICLE IN ALL STUDY TASKS. (AUTHOR)

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DDC REPORT BIBLIOGRAPHY - SEARCH CONTROL NU. //OM07 AD-735 420 1/3 NATIONAL AERONAUTICAL ESTABLISHMENT OTTAWA (ONTARIO) A FLIGHT INVESTIGATION OF LATERAL-DIRECTIONAL HANDLING QUALITIES FOR VISTOL AIRCRAFT IN LOW SPEED MANUEUVRING FLIGHT. (U) UCT 71 151P UDETSCH+K-H+ + JR+ GOULD+ D. G. IMCGREGOR.D. M. ; REPT. NO. NAE-LR-549 MONITOR: NRC 12285 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH CORNELL AERONAUTICAL LAB., INC.. BUFFALO, N. Y. SUPERSEDES AD-707 631. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, HANDLING), ROLL, MANEUVERABILITY, FLIGHT SIMULATORS, FLIGHT TESTING, FLIGHT SPEEDS, APPRUACH (U) AN INVESTIGATION TO DETERMINE THE RANGES OF VARIOUS LATERAL-DIRECTIONAL CHARACTERISTICS REQUIRED TO PRUVIDE ADEQUATE FLYING QUALITIES FOR TURNING MANGEUVRES AT LUW SPEED WAS UNDERTAKEN USING AN AIRBORNE VISTOL AIRCRAFT SIMULATOR. FIVE PARAMETERS WERE VARIED IN A SYSTEMATIC MANNER: THE DAMPING RATIO, THE FREQUENCY AND THE RATIO OF THE RULL-ANGLE TO THE SIDESLIP-ANGLE IN THE DUTCH RULL MODE, TOGETHER WITH THE DAMPING RATIO AND FREQUENCY OF THE NUMERATOR WUADRATIC OF THE RULL-ANGLE TO AILERUN-CONTROL-INPUT TRANSFER FUNCTION. THE PILOTS PERFORMED A LOW SPEED, VISUAL MANDEUVRING TASK AND DOCUMENTED THEIR ASSESSMENT OF THE CHARACTERISTICS THROUGH EXTENSIVE CUMMENTS AND A NUMERICAL RATING. (AUTHOR) (U)

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UDC REPORT BIBLINGRAPHY SEARCH CUNTROL NO. /ZOMO/ AU-735 633 1/3 BUEING CO PHILADELPHIA PA VERTOL DIV WIND TUNNEL TEST OF A POWERED TILT-ROTOR DYNAMIC MODEL ON A SIMULATED FREE FLIGHT SUSPENSION SYSTEM. VOLUME VI. (U) DESCRIPTIVE NOTE: FINAL REPT. JAN-JUL 71. UCT 71 209P TOMASSONI JOHN E. TAYLOR. ROBERT B. ; DELARMALEON N. ; SCHAGRIN, EDWARD B. ; REPT. Nú. 0213-10000-6 CUNTRACT: F33615-69-C-1577 MUNITOR: AFFUL TR-71-26-VOL-6 UNCLASSIFIED REPORT SUPPLEMENTARY NOTE: SEE ALSO VOLUME 4. PART 2. AD-735 733. DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, MODEL TESTS), ROTARY WINGS, WIND TUNNEL MODELS, FLIGHT TESTING, FREQUENCY, LOADING(MECHANICS), GROUND LFFECT (U) IDENTIFIERS: +TILT RUTOR AIRLRAFT (U) THE REPORT PRESENTS THE RESULTS OF A WIND TUNNEL TEST ON A POWERED DYNAMIC MODEL OF THE BOEING M-160 TILT ROTOR AIRCRAFT WITH 5.5 FOOT DIAMETER ROTORS. THE MODEL WAS TESTED IN THE BOEING V/ STOL 20 X 20 FOCT WIND TUNNEL DURING JANUARY-FEBRUARY 1971 AND WAS SUPPORTED TO SIMULATE FREE FLIGHT CONDITIONS WITH MOUNT FREQUENCIES MUCH LOWER THAN THE DYNAMIC AIRCRAFT FREQUENCIES. BLADE LOADS. WING LOADS, FLYING WUALITIES AND SKITTISHNESS IN GROUND EFFECT DATA WERE OBTAINED. (AUTHOR) (U)

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UDC REPORT BIBLIOGRAPHY SEARCH CUNTRUL NO. /20M0/ 1/4 AU-736 247 HUNEYNELL INC ST PAUL MINN SYSTEMS AND RESEARCH CENTER DISPLAY AND RELATED SYSTEM REQUIREMENTS FUR IFR STEEP APPROACH. (U) DESCRIPTIVE NOTE: FINAL REPT. NOV 67-AUG 71, JAN 72 176P WOLF, JAMES D. : REPT. NO. 12571-FR4 CUNTRACT: NOU014-68-C-0191 PROJ: NR-213-061 MUNITUR: JANAIR 711106 UNCLASSIFIED REPORT DESCRIPTORS: (*DISPLAY SYSTEMS, *INSTRUMENT FLIGHT), (+FLIGHT INSTRUMENTS, +VERTICAL TAKE=OFF PLANES), INSTRUMENT LANDINGS, APPROACH INDICATORS, APPRUALH, HELICOPTERS, SIMULATION (U) IDENTIFIERS: UH-1 AIRCRAFT, XV-5 AIRCRAFT, H-1 AIKCRAFT (U) THE OBJECTIVE WAS TO ESTABLISH DISPLAY INFORMATION AND SUBSYSTEM REQUIREMENTS FOR MANUA LY CONTROLLED STEPP-ANGLE APPROACH AND LANDING UNDER IFR FLIGHT CONDITIONS WITH VERTICAL-LIFT AIRCRAFT. INVESTIGATIONS WERE CONDUCTED AS A SERIES OF ITERATIVE ANALYSES AND THE REAL-TIME MAN-IN-THE-LOOP SIMULATIONS TO EVALUATE SELECTED DISPLAY FORMATS. THEMSELVES, AS WELL AS THE EFFECTS WHICH RELEVANT SYSTEM AND ENVIRONMENTAL VARIABLES HAVE UPON PILOTING TASK PERFORMANCE. ALTERNATIVE DISPLAY FORMATS WERE INITIALLY TESTED UNDER IDEALIZED FLIGHT CONDITIONS. THE TESTING OF SELECTED FURMATS WAS THEN CONTINUED IN A SERIES OF SIMULATION STUDIES IN WHICH SYSTEM AND

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ENVIRUMMENTAL CHARACTERISTICS WERE SYSTEMATICALLY INTRODUCED TO DETERMINE THEIR INDIVIDUAL AND INTERACTIVE EFFECTS UPON PILOTING PERFORMANCE.

UDC REPORT BIBLIUGHAPHY SEARCH CUNTROL NO. /20M0/

AU-736 537 1/3 Naval Postgraduate School Munterey Calif

PROGRAMMED PILOTAGE AS A MEANS OF IMPROVING Ruturcraft Performance in Level Flight.

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DESCRIPTIVE NOTE: MASTER'S THESIS: SEP 71 49P WILDMAN, ROBERT ALAN ;

UNCLASSIFIED REPORT

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DESCRIPTORS: (*VERTICAL TAKE-OFF PLANES, *FLIGHT CONTROL SYSTEMS), FLIGHT SPEEDS, OPTIMIZATION, FOLDING HELICOPTER ROTORS, HELICOPTERS, TILT WINGS, HOVERING, AIRSPEED (U) IDENTIFIERS: TRANSITIONAL FLIGHT, DESIGN CRITERIA, *PROGRAMMED PILOTAGE (U)

AIRFRAME DRAG REDUCTION AND ENGINE DUCT DESIGN. WHILE NECESSARY TO THE IMPROVEMENT OF PERFORMANCE. CANNOT ALONE OFFSET THE AERODYNAMIC LIMITATIONS INHERENT IN ROTARY WING FLIGHT. THE LATTER, WHICH HAVE BECOME PREDOMINANT WITH THE ADVENT OF HIGH OUTPUT TURBOSHAFT ENGINES MUST THEN BE OVERCOME BY OTHER MEANS DISCUSSED IN THIS PAPER. PROGRAMMED PILOTAGE TECHNIQUES WHICH UTILIZE REAL-TIME FLIGHT DATA TO VARY AERODYNAMIC PARAMETERS ARE INVESTIGATED AND INCORPORATED IN THE PRELIMINARY DESIGN OF A HIGH-SPEED ROTORCRAFT. THE RUTOR SPEED AND THE CONTRIBUTION OF LIFT FROM A FIXED WING ARE THUS OPTIMIZED THROUGHOUT THE FLIGHT ENVELOPE, THEREBY GREATLY ENHANCING LEVEL FLIGHT SPEED CHARACTERISTICS. (AUTHOR) (U)

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AU-736 825 1/3	
BOEING CO PHILADELPHIA PA VERTOL DIV	
WIND TUNNEL TEST OF THE AERODYNAMICS AND	
DYNAMICS OF ROTUR SPINUP, STOPPING AND	
FOLDING ON A SEMISPAN FOLDING TILT-ROTOR	
MODEL, VOLUME VII.	(U)
DESCRIPTIVE NOTE: FINAL REPT. JAN-JUL 71,	
OCT 71 402P VAN WAGENSVELD, DIRK IMCHUGH	8
FRANK J. ; DELARM, LEUN N. ; LAPINSKI, WALTER	
L. ; MAGEE, JOHN P. ;	
REPT. NO. U213-10000-7	
CUNTRACT: F33615-69-C-1577	
MUNITOR: AFFOL TR-7:-62=VOL-7	
UNCLASSIFIED REPORT	
SUPPLEMENTARY NOTE: REPORT ON DESIGN STUDIES AND	
MODEL TESTS OF THE STOWED TILT ROTOR CONCEPT.	
5EE ALSO VULUME 6, AU=735 6330	
DESCRIPTORS: (*ROTARY WINGS, MODEL TESTS),	
(+VERTICAL TAKE-OFF PLANES, MODEL TESTS), WIND	
TUNNEL MODELS, SCALE, STRUCTURAL PROPERTIES,	
AERODYNAMIC CHARACTERISTICS,	
LOADING (MECHANICS)	(U)
IDENTIFIERS: +TILT RUTOR AIRCRAFT	(U)
WING THANGE TOOT WATA OUTAINED WITH A LOOPECALE	
WIND TUNNEL TEST DATA OBTAINED WITH A 1/9-SCALE	

SEMISPAN, UNPOWERED, DYNAMICALLY-SCALED MODEL 213 STOWED/TILT ROTOR ARE REPORTED. THE OBJECTIVES OF THE TESTS WERE TO OBTAIN AERODYNAMIC, STRUCTURAL, AND DYNAMICS DATA DURING THE SPINUP, FEATHER AND BLADE FOLD CYCLES OF THIS VEHICLE. (AUTHOR)

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DDC REPORT BIBLIUGRAPHY SEARCH CUNTROL NO. /20M07 AU-002 730 1/3 LING-TEMCO-VOUGHT INC DALLAS TEX LTV VOUGHT AERUNAUTICS DIV XC-142A VTOL TRANSPURT PROGRAM. (U) DESCRIPTIVE NOTE: MONTHLY PRUGRESS REPT. NO. 54 FOR JUN 66. JUN 66 19P CUNTRACT: AF 33(657)-7868 UNCLASSIFIED REPORT DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, +TRANSPORT PLANES), SCHEDULING, RESEARCH PROGRAM ADMINISTRATION, HAINTENANCE, ACCEPTABILITY, PERFURMANCE(ENGINEERING), DESIGN, GRUUND SUPPORT EQUIPMENT, SPARE PARTS, TRAINING DEVICES, FLIGHT **TESTING** (U) IDENTIFIERS: C-142 AIRCRAFT (U) CONTENTS: DEVELOPMENT OF XC-142A AND FABRICATION OF FIVE PHOTOTYPE MUELS: FABRICATION OF MOCKUP; GROUND TESTS; ENGINEERING DATA; DESIGN DATA; FLIGHT TESTI REPORTS; SPARE PARTS FOR FIVE PROTUTYPE AIRPLANEST DEVELOPMENT AND FABRICATION OF AGE! SPARE PARTS FOR AGE: TRAINING AND TRAINING EQUIPMENT; AND CONTRACTOR SUPPORT OF FLIGHT TEST PROGRAM. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CUNTROL NO. /LOMO7 AU-822 178 1/1 1/3 PRINCETON UNIV N J THE PRINCETON PENNSYLVANIA ARMY AVIONICS RESEARCH PROGRAM. (U) DESCRIPTIVE NOTE: ANNUAL REPT. NO. 1, 1 JUN 66-30 MAY 67. UCT 67 47P UUKES, THEODOR A. ; DURBIN, ENOCH J. ; GRAHAM, FRANK D. : SCHMITZ, FREDRIC H.ISHARKOFF, EUGENE 5. ; CUNTRACT: DA-28-043-AMC-02412(E) PROJ: CA-1H1-20601-A219 TASK: 1H1-20601-A219-07 MUNITOR: ECOM 02412-1 UNCLASSIFIED REPORT DESCRIPTORS: (.HELICUPTERS, .FORMATION FLIGHT), (VERTICAL TAKE-OFF PLANES, AAERODYNAMICS). (INSTRUMENT LANDINGS, HELICOPTERS), (*AERONAUTICS, VERTICAL TAKE-OFF PLANES), CONTROL, THEORY, DYNAMICS, DECELERATION, TAKE-UFF, EWUATIONS OF MOTION, VISIBILITY, FLIGHT PATHS (U) IDENTIFIERS: +AVIONICS (U) THE EFFECT OF HELICUPTER DYNAMICS AND CONTROL CHARACTERISTICS ON FORMATION FLIGHT IS A THEORETICAL STUDY OF THE TRAJECTORY LAWS WHICH ARE USED TO DEFINE A FOLLOWER'S NOMINAL POINT AND THE CONTROL LAWS WHICH DETERMINE THE FOLLOWER'S REQUIRED ACTION. EFFECT OF MANEUVERS IS INCLUDED IN THIS EFFURT TO PROVIDE FUNDAMENTAL INFORMATION ON WHICH TO BASE THE DEVELOPMENT OF IFR FORMATION FLIGHT EWUIPMENT FUR THE ARMY. LANDING CONTROL THEORY FOR DECELERATING VIOL AIRCRAFT IS AN ATTEMPT TO OBTAIN OPTIMAL TRAJECTORIES FOR DECELERATING LANDING AND ACCELERATING TAKE-OFF MANEUVERS. THE EFFECT OF ACCELERATION, AERODYNAMIC CUNSTRAINTS, AND TERMINAL CONSTRAINTS ARE INCLUDED IN THE PROBLEM FORMULATION. SIMPLIFIED EQUATIONS OF MOTION ARE DEVELOPED AND POSSIBLE SCHEMES FOR THEIR SULUTION ARE INVESTIGATED IN THIS START TOWARD PROVIDING INFORMATION ON WHICH DEVELOPMENT OF GUIDANCE LQUIPMENT CAN BE BASED. A SYSTEM STUDY OF LOW VISIBILITY APPROACE AND LANDING IS AN EFFORT TO COMBINE THE CONTROL CHARACTERISTICS OF HELICOPTERS WITH THE PERFORMANCE CHARACTERISTICS OF THE PILOT TO DETERMINE GUIDANCE PARAMETERS NEEDED FUR LUW VISIBILITY APPROACHES. (U)

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UDC REPORT SIBLIUGRAPHY SEARCH CONTROL NO. /20M0/

AU=833 270 1/3 20/4 AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

SIMPLIFIED APPRUXIMATIONS OF INTERFERENCE EFFECTS ON JET V/STOL AIRCRAFT. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS, MAR 68 96P ARCHINO, DAVID THOMAS : REPT. NO. GAM/AE/68-2

UNCLASSIFIED REPORT

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DESCRIPTORS: I + VERTICAL TAKE-OFF PLANES, GROUND EFFECT), STABILITY, SHORT TAKE-OFF PLANES; LIFT, HOVERING, PITCH(MOTION), COMPRESSIBLE FLOW, MATHEMATICAL PREDICTION, TEMPERATURE, AERODYNAMIC CONFIGURATIONS, APPRUXIMATION(MATHEMATICS), CORRECTIONS, COMPUTER PROGRAMS, THESES (U) IDENTIFIERS: • JET INTERFERENCE EFFECTS, TRANSITION FLIGHT (U)

A SEMI-EMPIRICAL APPROACH IS USED TO PREDICT PERFORMANCE LOSSES AND PITCHING MOMENTS CAUSED BY INTERFERENCE EFFECTS ON DIFFERENT AIRCRAFT PLANFORMS IN HOVER AND TRANSIIION. DIFFERENT AIRCHAFT PLANFURMS, AND VARIATION OF THE JET EXHAUST COMBINATIONS MAKE THE PROBLEM OF PREDICTING INTERFERENCE EFFECTS DIFFICULT. THE INDUCED FLOW THAT CAUSES THE PERFORMANCE LOSSES IN HOVER IS SUPERIMPOSED ON THE FREE STREAM FLOW TO DETERMINE THE INTERFERENCE EFFECTS ON PERFORMANCE AND PITCH DURING TRANSNISSION. AN EMPIRICAL FACTOR IS USED TO CORRECT FOR THE COMPRESSIBILITY AND TEMPERATURE EFFECTS OF THE JET EXHAUST ON THE INDUCED FLOW. RESULTS ARE COMPUTED ON THE IBM 7094 COMPUTER. (AUTHOR)

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SEARCH CONTROL NO. /20H07 DOC REPORT BIBLINGRAPHY 20/4 12/1 AD-833 396 1/3 AIR FORCE INST OF TECH WRIGHT_PATTERSON AFB OHIO SCHOOL OF ENGINEERING THE APPROXYMATE LONGITUDINAL STABALITY DERIVATIVES OF (U) A VECTORED THRUST VTOL. DESCRIPTIVE NOTE: MASTER'S THEST AN WINTERS ... TARLES P. : 153P 11AR 68 REPT. NG. GAM/AE/68-11 UNCLASSIFIED REPORT DESCRIPTORS: INVERTICAL TAKE-UPP PLANES, AERODYNAMIC CHARACTERISTICS), (+JET FIGHTERS, STABILITY), SUPERSONIC PLANES, PITCH(MU: 1), THRUST, PERFORMANCE (ENGINEERING), LIST, ACCELERATION, HOVERING, EQUATIONS OF MOTIONS DRAG, COMPUTER PRUGRAMS, NONLINEAR SYSTEMS, DOWNWASH, THRUST, WEIGHT, ANGLE OF ATTACK, THESES, HATHEMATICAL (U) ANALYSIS IDENTIFIERS: P-1127 AIRCRAF 1: TRANSITION FLIGHT. (U) PRESSURE GRADIENTS, COMPUTER ANALYSIS THE OBJECTIVE OF THIS STUDY WAS TO INVESTIGATE THE STABILITY DERIVATIVES AND THE STABILITY OF THE VECTORED THRUST P-1127 ACROLANE. EXPRESSIONS WERE DERIVED FOR THE DESIVATIVES. THE PERFORMANCE. DERIVATIVES AND STABILITY WERE FOUND FOR BOTH AN ACCELERATING AND NONACCELERATING TRANSITION FROM HOVER TO CONVENTIONAL FLIGHT. THE RESULTS OF THE ACCELERATING TRANSITION WERE COMPARED TO VALUES AVAILABLE FROM HAWKER SIDDELEY: BOTH TRANSITIONS WERE UNSTABLE FOR MANY AIRSPEEDS BUT THE

TIMES TO DOUBLE AMPLITUDE WERE SUCH THAT A PILOT

COULD CONTROL THE AIRPLANE. (AUTHOR)

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DDL REPORT BIBLIUGRAPHY SEARCH CUNTROL NO. /20MO	7
AU-867 306 1/3 Systems technology inc haw?horne calif	
ANALYSIS OF VIOL HANDLING QUALITIES Requirements. Part II. Latekal- Directional Hover and Transition.	(U)
DESCRIPTIVE NOTE: FINAL REPT. JUL 68-JAN 70, FEB 70 234P CRAIG,SAMUEL J. ;CAMPBELL, ANTHONY ; REPT. NO. STI-TR-181-1	
CUNTRACT: AF 33(615)-3736 Proj: AF-698DC TASK: 698DLUU	
MONITUR: AFFDL TR-67-179-PT-2 Unclassified Report	
SUPPLEMENTARY NOTE: SEE ALSO PART 1, AD-045 165.	
DESCRIPTORS: (+VERTICAL TAKE-OFF PLANES, HANDLING), HOVERING, PITCH(MUTIUN), PILOTS, PERFORMANCE(HUMAN), FLIGHT CONTROL SYSTEMS, MATHEMATICAL ANALYSIS IDENTIFIERS: TRANSITION FLIGHT, CLOSED LOOP CONTROL SYSTEMS	(U) (U)
ANALYSES OF AVAILABLE HANDLING QUALITIES DATA WERE PERFORMED TO DETERMINE LATERAL/DIRECTIONAL DYNAMIC REQUIREMENTS FOR VTOL AIRCRAFT IN HOVER AND LOW SPEED FLIGHT. THE BASIS FOR THIS TREATMENT IS AN EXAMINATION OF THE PILOI/VENICLE AS A CLOSED-LOOP SERVO SYSTEM. THE QUASI-LINEAR PILOT DESCRIBING FUNCTION IS APPLIED. THE RESULTS OF THE STUDIES SUGGEST THAT THE PRIMARY FACTORS IDENTIFYING SATISFACTORY AND UNACCEPTABLE HUVER MODE DYNAMIC FEATURES ARE RELATED TO THE CLOSED-LOOP DEFICIENCIE DETAILED CONSIDERATION IS MADE OF THE CONTROL TASK AND PILOTING FUNCTIONS IN TRANSITION FLIGHT. THE RESULTS OF THIS GENERIC APPRAISAL ARE EVOKED TO CONFIRM AND JUSTIFY PRELIMINARY LATERAL/DIRECTIONAL	
REQUIREMENT FOR CUNIROL IN TRANSITION. (AUTHOR)	(U)

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DUC REPORT BIBLIUGRAPHY SEARCH CUNIRUL NO. /20M07

AU-871 154 1/3 14/2 NURTHROP LORP HANTHURNE CALIF AIRCRAFT DIV

A STUDY OF VISTUL GROUND-DASED SINULATION TECHNIQUES.

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DESCRIPTIVE NUTE: FINAL REFT. 1 FEB 68-1 JAN 70, APR 76 43P SIDACORI, JOHN B.; REPT. NO. NOR-69-168 CUNTRACT: DAAJU2-66-C-0619

PROJ: DA-1-F-162204-A-142 TASN: 1-F-162204-A-14233 MUNITUR: USAAVLADS TK-70-16

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DESCRIPTURS: (+VERIICAL TAKE-OFF PLANES, +FLIGHT SIMULATORS), (+HELICUPTERS, FLIGHT SIMULATORS), SIMULATION, MOTION, PERCEPITON(PSYCHOLOGY), UISPLAY SYSTEMS, PILOTS, SHORT TAKE+OFF PLANES

THE PURPOSE OF THE STUDY IS TO DEFINE THE SIMULATION CHARACIERISTICS REQUIRED TO ESTABLISH THE SINULATOR AS A RELIABLE AND VALID TOOL IN THE DEVELOPMENT OF VISTOL AIRCRAFT AND HELICOPTERS. A FLIGHT SIMULATOR EMPLOYING THE POINT LIGHT SOURCE PRINCIPLE TU GENERATE A VISUAL UISPLAY WAS USED IN THESE STUDIES. PREVIOUS STUDIES OF A JET-LIFT V/ STOL AIRCRAFT IN THIS SIMULATOR UNCOVERED A PILUT-VEHICLE PERFORMANCE DEFICIENCY DURING LATERAL MAHEUVERS, RESULTING IN A NAUSEA REACTION WHICH LIMITED PILOT PARTICIPATION. IN THE PRESENT INVESTIGATION, HUMAN MOTION PERCEPTION WAS STUDIED. AND SULUTIONS TO THIS PILUT-VEHICLE PERFORMANCE DEFICIENCY WERE EVOLVED BY THE USE OF A MOVING BASE. THE RESULTS DEMUNSTRATED THAT EFFECTIVE SIMULATION IS POSSIBLE 4HEN CERTAIN CONSTRAINTS ARE OBSERVED. THE BEST CONSTRAINTS OF THE DRIVE MECHANISM WERE DETERMINED EXPERIMENTALLY AND WERE COMPARED WITH THOSE IMPLIED FROM PHYSIOLOGICAL CONCEPTS OF HUMAN NUTION PERCEPTION. A SIMULATION VALIDATION RATIONALE WAS ALSO DEVELOPED TO ASSIST THE PILOT IN HIS EVALUATIONS. AN EXAMPLE OF THIS IS DESCRIBED TUGETHER WITH A DISCUSSION OF SUME LIMITAIONS. (AUTHOR)

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SEARCH CONTROL NO. /20M07 UDC REPORT BIBLIUGRAPHY AU-871 424 1/3 PRINCETON UNIV N J DEPT OF AEROSPACE AND MECHANICAL SCIENCES FEEDBACK CONTROL OF VIOL AIRCRAFT. (U) DESCRIPTIVE NOTE: FINAL REPT., 64P APR 70 DUKES THEODOR A. : CUNTRACT: UA-44-177-6MC-47(T) Pr0j: DA-1-F-162204-A-142 TASK: 1-F-162204-A-14233 MUNITUR: USAAVLABS TK=69=96 UNCLASSIFIED REPORT DESCRIPTORS ((VERTICAL TAKE-OFF PLANES, FLIGHT CONTROL SYSTEMS), (+FLIGHT CONTROL SYSTEMS, FEEDBACK), TRANSPORT PLANES, TILY WINGS, AERODYNAMIC CHARACTERISTICS, STABILITY, AIRPLANE MODELS, SCALE (U) IVENTIFIERS: XC+142A AIRCRAFT, C-142 AIRCRAFT, •TRANSITION FLIGHT, *FEEDBACK CONTROL (U) AN APPROXIMATIVE ANALYSIS AND DISCUSSION IS GIVEN OF THE BEHAVIOR OF POLES AND ZEROS CHARACTERIZING THE LUNGITUDINAL DYNAMICS OF VTUL AIRCRAFT IN TRANSITION. IN FEEDBACK DESIGN, IT IS A DESIRABLE GUAL TO CREATE A DOMINANT ATTITUDE RESPONSE MODE WHICH IS SEPARATED IN FREQUENCY AND VARIES LITTLE THROUGHOUT THE TRANSITION. THE INVESTIGATION DEMONSTRATED THAT THIS GOAL CAN BE ACHIEVED AT FIXED OPERATING POINTS IN TRANSITION WITHOUT ACCURATE PRIOR KNOWLEDGE ABOUT THE BEHAVIOR OF THE STABILITY AND CONTROL DERIVATIVES DURING TRANSITION. IN THE LUNGITUDINAL DEGREES OF FREEDOM, PIICH ATTITUDE AND PITCH RATE FEEDBACK NERE USED. IN THE LATERAL-DIRECTIONAL DEGREES OF FREEDOME THE SAME GOAL WAS ACHIEVED BY USING YAW RATE, ROLL ANGLE, AND ROLL RATE FLEUBACK. THE GAINS WERE DETERMINED BY AN APPROXIMATE PROCEDURE. LONGITUD/NAL AND LATERAL-DIRECTIONAL EXPERIMENTS WERE PERFORMED WITH A D.I SCALE MODEL OF THE XC-1424 TILT-WING VTOL AIRCRAFT, PULSE RESPONSES OF THE FREE-FLYING MODEL ARE PRESENTED. (AUTHOR) (U)

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SEARCH CUNTRUL NO. /20M07 DUC REPORT BIBLINGRAPHY 1/3 AD-873 J37 NURTHROP CORP HAWTHURNE CALIF AIRCRAFT DIV APPLICATION OF THE NORTHRUP ROTATIONAL SIMULATOR TO HELICOPTERS AND VISTOL (U) AIRCRAFT (USER'S GUIDE). DESCRIPTIVE NOTE: FINAL REPT. 1 FEB 68-1 JAN 70, 918 SINGLORI, JOHN B. + MAY 7U REPT. NO. NOR-70-6 CONTRACT: 0AAJ02-68-C-0019 PROJ: UA-1-F-162204-A-142 TASK: 1-F-162204-A-14233 MONITOR: USAAVLABS TR-70-26 UNCLASSIFIED REPORT DESCRIPTORS: (+FLIGHT SIMULATORS, OPERATION), (+HELICOPTERS, FLIGHT SIMULATORS); (+VER'(CAL TAKE-OFF PLANES, FLIGHT SIMULATORS), EXPERIMENTAL DESIGN, VISUAL SIGNALS, MATHEMATICAL MODELS, (U) INTERFACES THE PURPOSE OF THE UDCUMENT IS TO SUGGEST GUIDELINES TO BE USED IN DEVELOPING SOFTWARE INTERFACE COMPUTATIONS SO AS TO EFFECTIVELY INTEGRATE THE PILOT AND MATHEMATICAL VEHICULAR REPRESENTATION TO THE NORTHROP ROTATIONAL SIMULATOR. A DESCRIPTION OF ALL KEY ELEMENTS AND THEIR PERFORMANCE AND OPERATING CHARACTERISTICS IS INCLUDED, PAST USES AND PROJECTED FUTURE USES ARE ALSO GIVEN. SUME VALIDATION METHODS ARE DESCRIBED WITH SUGGESTIONS FOR THEIR USE. SUGGESTED INTERFACE NECHANIZATIONS ARE GIVEN WHICH PROVIDE EFFECTIVE VISUAL AND MOTION STIMULI CUMPATIBLE WITH SENSORY CHARACTERISTICS. A KATIUNALE FOR THE USE OF NOTION 15 INCLUDED. A METHOD IS UUTLINED WHICH ASSISTS THE USER IN ASSESSING THE PROBABILITY OF SUCCESS IN ANY DESIRED SIMULATION AND PREPARATION OF AN EFFECTIVE EXPERIMENTAL DESIGN. (AUTHOR) (U)

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DUC REPORT BIBLIGGRAPHY SEARCH CONTROL NO. /20M07

AD-873 821 14/2 20/4 1/3 ARMY AVIATION MATERIEL LABS FORT EUSTIS VA

SUITABILITY OF A DRAG SPHERE ANEMOMETER FOR MEASUREMENT OF VTOL AIRCRAFT DOWNWASH.

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DESCRIPTIVE NOTE: TECHNICAL NOTE, JUN 70 27P STANTON,RUSSELL 0.; REPT. NO. USAAVLABS-TN-4

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DESCRIPTORS, (*ANEMOMETERS, PERFORMANCE(ENGINEERING)); (*VERTICAL TAKE-OFF PLANES, *DUWNWASH), WIND, DRAG, SPHERES, MEASUREMENT; HELICOPTERS, MOVERING

TESTS WERE CONDUCTED ON A SIMPLE, LOW-COST DRAG SPHERE ANEMOMETER TO DETERMINE ITS SUITABILITY FOR MEASURING WIND VELOCITIES IN THE VICINITY OF VTOL AIRCRAFT AND HELICOPTERS. A DRAG SPHERE ANEMOMETER IS A DEVICE FOR DETERMINING WIND VELOCITY BY MEASURING THE DRAG FORCE ACTING ON A SPHERICAL BODY OF KNOWN DRAG COEFFICIENT. THE DRAG SPHERE ANEMOMETER, AS TESTED, WAS FOUND TO BE CAPABLE OF MEASURING WIND VELOCITIES AND DIRECTION IN ONE PLANE OVER A SPEED RANGE OF 10 TO 110 MPH. INSTRUMENTATION ACCURACY WAS FOUND TO BE PLUS OK MINUS 2.5 MPH IN THE SPEED RANGE OF 10 TO 50 MPH AND PLUS OR MINUS 7% IN THE SPEED RANGE OF 50 TO 110 MPH. DIRECTIONAL ACCURACY WAS FOUND TO BE APPROXIMATELY PLUS OR MINUS 30 DEG. AT LOW WIND SPEEDS, PLUS OR MINUS 10 DEC. FOR SPEEDS FROM 30 TO 60 MPH, AND PLUS OR MINUS 5 DEG. ABOVE 60 MPH. ON THE BASIS OF THE RELATIVELY UNSUPHISTICATED TESTS PERFORMED. THE DRAG SPHERE ANEMOMETER IS CONSIDERED TO BE SUITABLE FOR MEASUREMENT OF DOWNWASH VELOCITIES IN CLOSE PROXIMITY TO HOVERING VTOL AIRCRAFT. IF REQUINED. THE UPPER END OF THE USABLE SPEED RANGE COULD BE EXTENDED THROUGH ADDITIONAL WIND-TUNNEL (U) CALIBRATION. (AUTHOR)

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UDC REPORT BIBLIUGRAPHY SEARCH CUNTROL NO. /20M07	
AD-874 U29 1/3 13/7 20/4 FRANKLIN INST RESEARCH LAUS PHILADELPHIA PA	
FLUIDIC VURTEX ANGULAR RATE SENSOR CONCEPT INVESTIGATION FOR HELICUPTERS AND V/ STOL AIRCRAFT.	U)
DESCRIPTIVE NOTE: FINAL REPT APR 70 46P WACHTELL.G. P. I CONTRACT: UAAJ02=69=C=0010 PROJ: DA=1=F=162203=A=141 TASK: 1=F=162203=A=14186 MONITOR: USAAVLABS TR=70=25	
UNCLASSIFIED REPORT	
IDENTIFIERS: VAJARS(VORTEX AXIS JET ANGULAR RATE SENSORS): +VOPTEX AXIS JET ANGULAR RATE	U)
AN EXPERIMENTAL INVESTIGATION WAS UNDERTAKEN TO ESTABLISH THE FLASIGILITY OF SENSOR CONCEPTS FOR APPLICATION IN HELICOPTER AND V/STOL AIRCRAFT STAGILITY AUGMENTATION SYSTEMS. THEORIES OF VARIOUS POSSIBLE RATE SENSING DEVICES BASED ON RAPIY VORTEX FLOWS ARE PRESENTED, WITH EXPERIMENTAL DEMUNSTRATION OF THE PRINCIPLE OF ONE IN WHICH THE SWIRE FLOW AXIS LAGS BEHIND THE CHAMBER AXIS WHEN THE CHANBER IS ROTATED ABOUT A LINE PERPENDICULAR TO ITS AAIS. TWO MODIFICATIONS YIELDED SENSITIVITIES LESS THAN ULTIMATELY DESIRED, BY FACTORS ON THE ORDER OF 2000 AND 200. OBSERVATIONS ON THE FLOW PATTERN IN JETS EMERGING FROM A PAIR OF CONCENTRIC VORTEX CHAMBERS SHOWED THAT THE CONCEPT OF THE VORTEX AXIS JET ANGULAR RATE SENSGR (VAJARS) DISCUSSED THEORETICALLY IN A PREVIOUS FEASIBILITY STUDY WOULD HAVE TO OVERCOME PROBLEMS CHEATED BY TURBULENCE AND FLOW REVERSAL ALONG THE AXIS. AN ATTEMPT WAS MADE TO DEMUNSTRATE A DEVICE OF HIGH THEORETICAL SENSITIVITY, IN WHICH A CYLINDRICAL CORE SUPPORTED UN AN AXIS PERPENDICULAR TO THE CORE AXIS ID SUBJECTED TO A TORQUE DUE TO THE PRESSURE GRADIENT GENERATED IN AN ANNULAR PASSAGE BY CURIOLIS FORCES. THEURETICAL DISCUSSIONS ARE ALSO GIVEN OF A GYROSCOPE IN WHICH THE FLUID STREAM IS THE ROTOR, 196	4

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M07 AD-875 238 1/3 GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF EFFECTS OF HIGH-LIFT DEVICES ON V/STOL AIRCRAFT PERFORMANCE. VOLUME II. (U) BIBLIDGRAPHY. DESCRIPTIVE NOTE: FINAL REPT., JUL 70 220P HEBERT, JUSEPH , JR. ; PEDERSON, 5. K. I CONTRACT: DAAJ02-69-6-0079 PROJ: UA-1-F-162204-F +142 TASK: 1-F-162204-A-14231 MONITOR: USAAVLABS TR-70-33B UNCLASSIFIED REPORT DESCRIPTORS: (+VERTICAL TAKE=OFF PLANES, +LIFT), SHURT TAKE-OFF PLANES, TILT WINGS, FLAPS, BOUNDARY LAYER CONTRUL, DOWNWASH, GROUND EFFECT, HANDLING, BIBLIOGRAPHIES, PERFORMANCE (ENGINEERING) (U)

ALL TYPES OF HIGH-LIFT DEVICES ARE COVERED. BOTH EXPERIMENTAL AND THEOREFICAL TOPICS ARE REVIEWED, AND THE SELECTED REPORTS ARE LISTED BY A SUBJECT AND AN AUTHOR INDEX. (AUTHOR) (U)

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UDC REPORT BIBLIUGRAPHY SEARCH CONTROL NO. /20M07 AU-878 075 1/3 GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF EFFECTS OF HIGH-LIFT DEVICES ON V/STOL AIRCRAFT PERFORMANCE. VULUME I. (U) DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 69-31 MAY 70, 0CT 7U 1850 HEBERT, J. IPEDERSON, S. ; CARROLL, J. ILAUDEMAN, E. IWHITNEY, C. I CUNTRACT: DAAJ02-69-C-0079 PROJ: 0A-1-8-162204-A-142 TASK: 1-F-162204-A-14231 MUNITUR: USAAVLABS TK-70-33A UNCLASSIFIED REPORT SUPPLEMENTARY NUTE: SEE ALSO VOLUME 2, AD-875 238. DESCRIPTORS: (+VERTICAL TAKE=OFF PLANES, +LIFT), SHURT TAKE-OFF PLANES, TWO-DIMENSIONAL FLOW, FLAPS, AIRFOILS, PROPELLERS(AERIAL), LOADING (MECHANICS), DOWNWASH, TILT WINGS, PERFORMANCE (ENGINEERING) (U) THE PURPOSE OF THE STUDY WAS TO DEVELOP A UNIFIED ANALYTICAL PROCEDURE TO EVALUATE THE EFFECTS OF PASSIVE HIGH-LIFT DEVICES ON DEFLECTED-SLIPSTREAM OR TILT-WING VISTOL CONFIGURATIONS. METHODS WERE DEVELOPED TO PREDICT THE TWO-DIMENSIONAL FLAPPED AIRFOIL CHARACTERISTICS TO BE USED IN A SPAN LOAD PROGRAM. THE SPAN LOAD RESULTS ARE USED IN PROCEDURES FOR ESTIMATING THE COEFFICIENTS OF LIFT, LUNGITUDINAL FORCE, AND MUMENT FOR A WING PARTIALLY IMMERSED IN A PROPELLER SLIPSTREAM. THESE CHARACTERISTICS CAN THEN BE USED IN A PERFORMANCE PROWRAM DEVELOPED TO CALCULATE THE TAKEOFF, LANDING, AND TRANSITION MANEUVERS. IN ADDITION TO THESE TASKS, INVESTIGATIONS WERE MADE INTO DOWNWASH CHARACTERISTICS, WIND TUNNEL WALL CORRECTIONS, AND CURRELATIONS OF FLIGHT TEST DATA WITH THEORY. AN ANALYSIS OF THE EFFECTS OF HIGH-LIFT DEVICES ON THE PERFORMANCE OF A TILT-WING VISTOL CONFIGURATION IS INCLUDED IN THE APPENDIX. (AUTHOR) (U)

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AD-884 439 1/3		
CURNELL ALRONAUTICA	. LAB INC BUFFALO N Y FLIGHT RESEARC	H
DEPT		
BACKGROUND INFORMAT.	ON AND USER GUIDE FOR	
MIL-F-83300-MILITAR	SPECIFICATION	
FLYING QUALITIES OF	PILOTED V/STOL	
AIRCRAFT.	(U)	ł
DESCRIPTIV' NOTE: FI	AL REPT.,	
MAR /1 469P	CHALR, CHARLES R. ;KEY,	
DAVID L. KROLL, JOH	JR. INASSERMAN, RICHARD	
RADFURD, ROBERT C.		
CUNTRACT: AF 33(615)	•3736, F33615-70-C-1322	
PROJ: AF-698DC		
MONITOR: AFFDL	TR-70-88	
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DESCRIPTORS: (*VERTICAL TAKE=OFF PLANES, PERFORMANCE(ENGINEERING)), (*SHORT TAKE=OFF PLANES, SPECIFICATIONS), MILITARY REQUIREMENTS, STATE=OF=THE=ART REVIEWS, FLIGHT TESTING, HOVERING (U)

THE SPECIFICATION WAS COMPILED AFTER AN EXTENSIVE LITERATURE REVIEW AND MANY MEETINGS AND DISCUSSIONS WITH PERSONNEL FROM ESSENTIALLY ALL CONCERNED CIVILIAN AND GOVERNMENTAL ORGANIZATIONS. THE REPORT ATTEMPTS TO EXPLAIN THE CUNCEPT AND PHILOSOPHY UNDERLYING THE V/STUL SPECIFICATION AND TO PRESENT SOME OF THE DATA AND ARGUMENTS UPON WHICH THE REQUIREMENTS WERE BASED. THE DOCUMENT SHOULD ALSO SERVE AS A SUMMARY OF THE STATE OF THE V/STOL FLYING QUALITIES ART AS DETERMINED FROM FLIGHT TEST, SIMULATION, ANALYSIS, AND THEORY. (AUTHOR) (U)

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. . . , **,** *ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPHENT PARIS (FRANCE) ALARD-CP-22 FLUID DYNAMICS OF ROTOR AND FAN SUPPORTED AIRCRAFT AT SUBSUNIC SPEEDS. AD-64 226 **PAEROHAUTICAL SYSTEMS DIV WRIGHT-**PATTERSON AFB UHIO . ASD~YX=47=18 WUANTITATIVE TERRAIN STUDY OF VTUL LANDING SITE DISTRIBUTIONS AND OF EFFECTS ON PENETRATION. AU-661 592 • • • ASD-TR-69-15-PT-2 PROPELLER STATIC PERFORMANCE TESTS FOR VISTUL AIRCRAFT. PART 11. TEST DATA (APPENDIX 111). from le copy AD-708 742 roduced f available **AEROSPACE RESEARCH LABS WRIGHT** . PATTERSON AFB OHIO . . . ÅRL-71-0113 Repr LOW AREA RATIO THRUST. AUGHENTING EJECTURS: AU-728 546 *AIR FORCE AERO PROPULSION LAB WRIGHT-PATTERSON AFB UHIO TOR64 104 TEST RESULTS OF RESEARCH FUR RAPID SITE PREPARATION FOR VIOL AIRCRAFT. AD-455 562 **AIR FORCE FLIGHT DYNAMICS LAB WRIGHT-**PATTERSON AFE UHIO . . . AFFOL-TH-70-1-Pia THE ACOUSTIC ENVERONMENT OF A DEFLECTED-JET VTOL AIRCRAFT. AU-715 939 . . .

AFFOL-TH-65-200 Application of pilot-controller

INTEGRATION TECHNIQUES TO A REPRESENTATIVE VISTOL AIRCRAFT. AD-633 269 AFFULTTR-67=37 EXTERNAL VISIBILITY CRITERIA FOR VTOL AIRCRAFT. AU-655 072 AFFDL-TR-67-93 EFFECT'S OF GUST VELOCITY SPATIAL DISTRIBUTIONS ON LATERAL-DIRECTIONAL RESPONSE OF A VTOL AIRCHAFT. A0-457 321 . . . AFF0L+TR-67-179-FT-2 ANALYSIS OF VTOL HANDLING QUALITIES REQUIRCHENTS. PART JI. LATENAL-DIRECTIONAL HOVER AND TRANSITION. AD-867 306 • • • AFFDL-TR-67-107 AN OPTIMAL CONTROL METHOD FOR PREDICTING CONTROL CHARACTERISTICS AND UISPLAY REQUIREMENTS OF MANNED_ VEHICLE SYSTEMS. AD-672 272 . . . AFFDL-TR-69-41 A FLIGHT INVESTIGATION OF LATERAL-DIRECTIONAL HANDLING QUALITIES FOR VISTOL AIRCRAFT IN LOW SPEED HANEUVERING FLIGHT. AD=707 631 . . . AFFDL=TR=49=81 APPLICATION OF OPTIMAL CONTROL THEORY TO THE PREDICTION OF HUMAN PERFORMANCE IN A COMPLEX TASK. AD-704 542 . . . AFFDL-TR-69-120 A NEA APPROACH TO THE SPECIFICATION AND EVALUATION OF FLYING QUALITIES. AD-710 590 . . . AFFDL-TR-69-133-V0L-2 . A STABILITY AND CONTROL

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PREDICTION METHOD FOR HELICOPTERS AND STOPPABLE ROTOR AIRCRAFT. VOLUME 11: USER'S MANUAL. AU-706 918

AFFDL-TK-69-123-VOL-3 A STABILITY AND CONTROL PREDICTION METHOD FOR HELICOPTERS AND STOFPABLE KOTOR MINCRAFT. VOLUME III: PROGRAMMER'S MANUAL. AU-706 374

AFFDL-TR-69-123-VOL-4 A STABILITY AND CONTROL PREDICTION HETHOD'FOR HELICOPTERS AND STOPPABLE ROTOR AIRCHAFT. VOLUME IV: APPENDICES. AD-706 919

AFFDL-TR-70-88 BACKGRUUND INFUMMATION AND USER GUIDE FOR HIL-F-83JOD-HILITARY SPECIFICATION -- FLYING QUALITIES OF PILOTED V/STOL AIRCHAFT, AD-884 439

AFFDL-TR-70-90 AN INVESTIGATION OF THE TRAILING VORTEA SYSTEM GENERATED BY A JET-FLAPPED HING OPENATING AF HIGH WING LIFT COEFFICIENTS. AU-715 315

AFFDL-TH-70-154-VOL-1 A WIND TUNHEL INVESTIGATION OF JETS EXHAUSTING INTO A CROSSFLUW. VOLUME 1. TEST DESCRIPTION AND DATA ANALYSIS. AU-718 122

AFFUL-TR-70-154-VOL-2 A WIND TUNNEL INVESTIGATION OF JETS EXHAUSTING INTO A CROSSFLUW. VOLUME 11. ADDITIONAL DATA FOR THE ONE-JET CONFIGURATION.

> 0-2 Unclassified

AD-720 232 AFFDL-TR-70-154-V0L-3. A WIND TURNEL LIVESTIGATION OF JETS EXHAUSTING INTO A CROSSFLOW. VOLUME III. AUDITIONAL DATA FOR THO-JET CONFIGURATIONS. AD-720 233 . . . AFF0L-TR-70-154-V0L-4. A WIND TUNNEL INVESTIGATION OF JETS EXHAUSTING INTO A CROSSFLOW. VOLUHE IV. ADDITIONAL DATA FOR THE THREE-JET CONFIGURATION. AD-718 123 . . . - AFFOL-TR-70-170 A THEORETICAL INVESTIGATION OF A CIRCULAR LIFTING JET IN A CRUSS-FLOWING MAINSTREAM. AU-710 121 AFFDL-TH-71-3 AERODYNAHIC STABILITY AND CONTROLIAIND TUNNEL DATA CORRELATION. AD-726 103 • • • AFFDL-TH-71-23 THE GENERATION OF A MILITARY SPECIFICATION FOR FLYING QUALITIES OF FILOTED VISTOL AIRCRAFT-HIL_F-83300. AD-725 746 . . . AFFDL-TR-71-26-VOL-6 WIND TUNNEL TEST OF A POWERED TILT-ROTOR DYNAHIC HODEL ON A SIMULATED FREE FLIGHT SUSPENSION SYSTEN. VOLUHE VI. AU-735 633 . . . AFFDL-TR-71-62-VOL-7 WIND TUNNEL TEST OF THE

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AERODYNAMICS AND DYNAMICS OF ROTOR SPINUP, STOPPING AND FOLUING ON A SEMISPAN FOLUING TILT-ROTOR MODEL. VOLUME VII.

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