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19970005366 Advisory Group for Aerospace Research and Development, Aerospace Medical Panel, Working Group 21, Neuilly-Sur-Seine, France

Anthropomorphic Dummies for Crash and Escape System Testing

Jul. 1996; 118p; In English; In French

Report No.(s): AD-A313660; AGARD-AR-330; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

Anthropomorphic dummies are mechanical surrogates of the human body. Dummies are also called Anthropomorphic Test Devices (ATDs) and manikins. They are used as test devices by the automotive and aircraft industries and regulatory bodies, and the military to evaluate vehicle safety in crash and escape system environments. Dummies are designed to perform two basic functions. Earlier versions were used strictly for loading the vehicle dynamically, and required only weight and size in their design. The second type of dummy, used to assess type and severity of injury, is designed to mimic human dynamic impact response. These dummies require a sensor suite of instrumentation to measure impact loading of different body parts to assess injury risk.

DTIC

Human Factors Engineering; Ejection Seats; Injuries; Escape Systems

19970006808 Advisory Group for Aerospace Research and Development, Structures and Materials Panel, Neuilly-Sur-Seine, France

Tribology for Aerospace Systems ***La Tribologie pour les Systemes Aerospatiaux***

Tribology for Aerospace Systems; Oct. 1996; 128p; In English; In French; 82d, 6-7 May 1996, Sesimbra, Portugal; Sponsored by Advisory Group for Aerospace Research and Development, France; Also announced as 19970006809 through 19970006825

Report No.(s): AGARD-CP-589; ISBN-92-836-0029-0; Copyright Waived; Avail: CASI; A07, Hardcopy; A02, Microfiche

Fretting and wear of hinges, tracks, bearings, and gearboxes in airframes and engines is a constant problem for aircraft or other defense systems, as they induce failures and jamming, necessitating costly in-service inspections and replacement of parts. At the 82nd Meeting of the AGARD Structures and Materials Panel a Specialist's Meeting was held on Tribology for Aerospace Systems. The meeting was split into three sessions (18 papers): (1) new technologies such as coatings, new materials, lubrication and their behavior; (2) practical applications in airframes and their mechanical systems; and (3) practical applications to engines, both jet engines and reciprocal engines. The meeting was ended by a round table discussion.

Author

Aerospace Systems; Tribology; Lubrication; Airframes; Jet Engines; Wear Resistance; Engine Parts; Wear Inhibitors; Conferences

19970006887 Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

Remote Sensing: A Valuable Source of Information ***La Teledetection: Source Precieuse de Renseignements***

Oct. 1996; 433p; In English; In French; Sensor and Propagation Panel Symposium, 22-25 Apr. 1996, Toulouse, France; Sponsored by Advisory Group for Aerospace Research and Development, France; Also announced as 19970006888 through 19970006934; Original contains color illustrations

Report No.(s): AGARD-CP-582; ISBN-92-836-0032-0; Copyright Waived; Avail: CASI; A19, Hardcopy; A04, Microfiche

Remote sensing, either from satellites, airplanes, or remotely piloted vehicles (RPV's) can be used to obtain information from virtually all areas in the world. A wealth of information is relatively easily (and relatively cheaply) available from sensor systems in civil satellites, but this availability could decrease during times of increasing political tension. Cooperative programs must be encouraged to extract the required military information from unclassified civil sources. This symposium provides a platform for discussion between civil institutes, active in the area of remote sensing equipment, data handling, and processing on the one hand, and those who are involved in military applications on the other hand. The topics covered include: sensor systems; platforms; propagation effects; signal processing; military aspects; special civil applications; special techniques; and future developments. Derived from text

Military Technology; Remote Sensing; Remotely Piloted Vehicles; Military Operations; Commercial Spacecraft

19970009247 Advisory Group for Aerospace Research and Development, Fluid Dynamics Panel, Neuilly-Sur-Seine, France

Aerothermodynamics and Propulsion Integration for Hypersonic Vehicles ***l'Integration de la Propulsion et de l'Aerodynamique pour les Vehicules Hypersoniques***

Aerothermodynamics and Propulsion Integration for Hypersonic Vehicles; Oct. 1996; 422p; In English, 15-19 Apr. 1996, Rhode-Saint-Genese, Belgium; Also announced as 19970009248 through 19970009260

Report No.(s): AGARD-R-813; Copyright Waived; Avail: CASI; A18, Hardcopy; A04, Microfiche

Lecture for the AGARD Fluid Dynamics Panel (FDP) Special Course on 'Aerothermodynamics and Propulsion Integration for Hypersonic Vehicles' have been assembled in this report. The following topics are covered: Aerothermodynamics of radiation-cooled surfaces; real-gas and strong interaction phenomena; hypersonic laminar-turbulent transition and turbulence modeling; configurational aerothermodynamics of reentry vehicles (winged and capsule) as well as RAM and SCRAM propelled vehicles; RAM and SCRAM inlet and propulsion integration; hypersonic missile aerothermodynamics and stage separation for two-stage launch configurations. In addition, the Hypersonic Aerothermodynamic Program at VKI was presented as well as a Navier Stokes-solver for hypersonic applications. The material assembled in this report was prepared under the combined sponsorship of the AGARD Fluid Dynamics Panel, the Consultant and Exchange Program of AGARD, and the von Karman Institute (VKI) for Fluid Dynamics.

Author

Aerothermodynamics; Hypersonic Flow; Stage Separation; Turbulence Models; Computational Fluid Dynamics; Navier-Stokes Equation; Boundary Layer Transition; Supersonic Combustion Ramjet Engines; Flow Distribution

19970009362 Advisory Group for Aerospace Research and Development, Fluid Dynamics Panel, Neuilly-Sur-Seine, France

Cooperative Programme on Dynamic Wind Tunnel Experiments for Manoeuvring Aircraft ***Programme en cooperation sur l experimentation dynamique en soufflerie pour la manoeuvrabilite de l avion***

Oct. 1996; 250p; In English

Report No.(s): AGARD- AR-305; ISBN-92-836-1043-1; Copyright Waived; Avail: CASI; A11, Hardcopy; A03, Microfiche

This report describes a multinational cooperative program set up by the AGARD Fluid Dynamics Panel in response to the continuing interest among the NATO countries in dynamic wind tunnel testing. Such testing is essential for obtaining the aerodynamic information required to predict the behavior of an aircraft performing angular motions. At low angles of attack this occurs primarily when the aircraft performs a small-amplitude oscillatory motion resulting from a disturbance or a control deflection. The dynamic stability can then be predicted by solving linear equations of motion in which the aerodynamic reactions are represented by the so called stability derivatives, obtainable from oscillatory experiments. At high angles of attack this occurs when the aircraft is involved in a spin, in which case rotary-balance data are required, or performs a rapid maneuver, in which case both rotary-balance and large amplitude oscillatory data are needed. Such data are often non-linear and time dependent, compounding the complexity of the prediction and analysis.

Derived from text

Aircraft Maneuvers; Flight Characteristics; Angle of Attack; Angular Velocity; Dynamic Tests; Equations of Motion; Linear Equations; Stability Derivatives

19970010277 Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

Progress and Challenges in CFD Methods and Algorithms ***Progres Realises et Defis en Methodes et Algorithmes CFD***

Apr. 1996; 473p; In English; 77th; Fluid Dynamics Panel Symposium, 2 - 5 Oct. 1995, Seville, Spain

Report No.(s): AD-A310874; AGARD-CP-578; No Copyright; Avail: CASI; A20, Hardcopy; A04, Microfiche

Partial contents include: (1) CFD Research in the Changing U.S. Aeronautical Industry; (2) Parallel Computing in Computational Fluid Dynamics; (3) Portable Parallelization of a 3D Euler/Navier-Stokes Solver for Complex Flows; (4) Spectral Multi-Domain Solver Suitable for DNS and LES Numerical Simulation of Incompressible Flows; (5) On Improving Parallelism in the Transonic Unsteady Rotor Navier Stokes (TURNS) Code; (6) Development of a Parallel Implicit Algorithm for CFD Calculations; (7) Experiments with Unstructured Grid Computations; (8) A Second-Order Finite-Volume Scheme Solving Euler and Navier-Stokes Equations on Unstructured Adaptive Grids with an Implicit Acceleration Procedure; (9) Numerical Simulation of Internal and External Gas Dynamic Flows on Structured and Unstructured Adaptive Grids; (10) An Investigation of the Effects of the Artificial Dissipation Terms in a Modern TVD Scheme on the Solution of a Viscous Flow Problem; (11) A Flux Filter Scheme Applied to the Euler and Navier Stokes Equations; (12) Implicit Multidimensional Upwind Residual Distribution Schemes on Adaptive Meshes; (13) Multidimension al Upwind Dissipation for 2D/3D Euler/Navier-Stokes Applications; (14) Iteration for High Order and Fast Solution of 3-D Navier-Stokes Equations; (15) Convergence Acceleration of the Navier-Stokes Equations through Time-Derivative Preconditioning; (16) Parallel Algorithms for DNS of Compressible Flow; (17) A Straightforward 3D Multi-Block Unsteady Navier-Stokes Solver for Direct and Large- Eddy Simulations of Transitional and Turbulent Compressible Flows; (18) Applications of Lattice Boltzmann Methods to Fluid Dynamics; (19) Transition in the Case of Low Free Stream Turbulence; and (20) Multiblock Structured Grid Algorithms for Euler Solvers in a Parallel Computing Framework. DTIC

Parallel Processing (Computers); Computational Fluid Dynamics; Aerodynamic Drag; Mathematical Models

19970010309 Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

Structures and Materials Panel Working Group 27 on Evaluation of Loads from Operational Flight Maneuvers. Final Working Group Report (l'Evaluation des Charges Resultant des Manoeuvres en vol)

Apr. 1996; 123p; In English

Report No.(s): AD-A310890; AGARD-AR-340; ISBN-92-836-1030-X; No Copyright; Avail: CASI; A06, Hardcopy; A02, Microfiche

This AGARD Advisory Report describes an evaluation of a method to derive loads from operational flight maneuvers. The basic assumption of this method is that all operational maneuvers performed in service can be verified as a set of Standard Maneuvers (normalized parameter time histories for each independent maneuver type). The normalization procedure has been developed and applied to the data base for 3 GAF-aircraft in operation and one aircraft in development. The verification of Standard Maneuvers is based on recordings of relevant maneuver parameters in service and for new tactics/missions on special flights or simulations. For the verification process, data from the USAF and CF maneuver types have been identified and normalized. The comparison of the normalized maneuvers for several aircraft types leads to similar parameter time histories for the same maneuver type. The study has demonstrated for two Standard Maneuver types that load relevant parameters can be derived with sufficient accuracy for load calculations. Standard maneuvers derived from F- 16 data were reconstituted using F-18 control parameters. An F-18 loads calculation process has been verified against flight test data. A comparison of the input parameters and the resulting loads was carried out which showed reasonable correlation. The initial evaluation of the concept done by WG27 has demonstrated the feasibility of determining loads from operational flight maneuvers. Further work is necessary to expand the scope of the WG27 investigation and to confirm the WG27 conclusion.

DTIC

Flight Tests; Aircraft Design; Tactics

19970010338 Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

Digital Communications Systems: Propagation Effects, Technical Solutions, Systems Design ***Systemes de Propagation Numeriques: Effets de la Propagation, solutions Techniques, Conception des Systemes***

Apr. 1996; 463p; In English; In French; Sensor and Propagation Panel Symposium, 18-21 Sep. 1995, Athens, Greece

Report No.(s): AD-A310824; AGARD-CP-574; ISBN 92-836-0023-1; No Copyright; Avail: CASI; A20, Hardcopy; A04, Microfiche

Digital communications systems are important elements in military systems because of the security and discretion which they provide in the transmission of information. In addition to the great many advances which have been made in the last decade, this symposium showed that very considerable progress will be achieved in the near future. The studies being carried out on transmission media in all the frequency ranges, from decametric waves (HF waves) to submillimetric waves (EHF waves) enable us to

model them better, to simulate them better and then to use them better. The spin-off for transmission systems is immediate. New advances have been made, using more complex signal processing, data encoding and processing procedures, which now appear as the vectors of future progress. The symposium showed that we can expect considerable improvements in the future: (1) in the quality of data transmission by the use of more complex techniques and better matching to transmission channels; (2) in the security and discretion of communications, in particular by the use of more powerful encoding; and (3) in the adaptivity of systems to transmission channels by the use of new methods, such as the real time evaluation of these channels and the use of new methods such as passive evaluation, which introduces a new argument into the debate about the discretion of communication links. In conclusion, it would appear that digital data links are still in full progress, driven by major technical developments.
DTIC
Pulse Communication; Communication Networks; Data Transmission; Digital Data; Data Processing

19970010464 Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France
Introduction to Avionics Flight Test ***Introduction aux essais des systemes d'armes***
Clifton, James M., Naval Air Warfare Center, USA; Nov. 1996; 346p; In English
Report No.(s): AGARD-AG-300-Vol-15; ISBN-92-836-1045-8; Copyright Waived; Avail: CASI; A15, Hardcopy; A03, Microfiche

Modern military aircraft rely heavily on highly complex electronic systems to make them effective. These systems can compromise up to 80% of the cost of the aircraft. As new systems are developed, numerous tests are needed to provide feedback in the iterative design process and to ensure that the design parameters are met. This AGARDograph is an attempt to present the rudimentary knowledge necessary for a test pilot or engineer to develop and execute a cost effective, quick test of a modern avionics system.
Author
Avionics; Flight Tests; Airborne Radar; Cost Effectiveness; Military Aircraft; Complex Systems; Air Navigation; Electro-Optics

19970010666 Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France
Integrated Airframe Design Technology ***Les Technologies de la conception integree des cellules***
Integrated Airframe Design Technology; Oct. 1996; 174p; In English; In French; 82nd; Structures and Materials Panel, 8-9 May 1996, Sesimbra, Portugal; Also announced as 19970010667 through 19970010680
Report No.(s): AGARD-R-814; ISBN-92-836-0030-4; Copyright Waived; Avail: CASI; A08, Hardcopy; A02, Microfiche

Integrated airframe design embraces the concept of bringing together all of the aspects of airframe design, including various disciplines such as structures, materials, aerodynamics, propulsion, systems, controls, and manufacturing from conceptual design all the way through to the final product and its repair and maintenance. The results of this AGARD Workshop on Integrated Airframe Design emphasized that the recent and future advances in high-performance computer hardware and software systems provide the opportunity to create a process that will allow these disciplines to rapidly interact with one another.
Author
Multidisciplinary Design Optimization; Airframes; Computer Aided Design; Design Analysis; Concurrent Engineering; Finite Element Method; Structural Design; Structural Analysis; Conferences; Computer Programs