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19980197432 Advisory Group for Aerospace Research and Development, Structures and Materials Panel, Neuilly-Sur-Seine, France

Thermal Barrier Coatings ***Les Revetements Anti-Mur de Chaleur***

Apr. 1998; 1188p; In English; 85th, 15-16 Oct. 1997, Aalborg, Denmark; Also announced as 19980197433 through 19980197449

Report No.(s): AGARD-R-823; ISBN 92-836-1073-3; Copyright Waived; Avail: CASI; A99, Hardcopy; A10, Microfiche

Thermal barrier coatings are an emerging technology which will allow either increasing the inlet turbine temperatures or on the other hand decreasing the working temperature of the metal of the blades and consequently increasing their life-time. The Workshop allowed a survey of the state of the art, a description of the existing technologies or of the technologies under development, a review of the present knowledge of damage mechanisms, including microstructural, mechanical and thermal aspects, and an account of the advantages and drawbacks of the various families as perceived by engine manufacturers and users. A final discussion was held to identify the needs for further R & D.

Author

Thermal Control Coatings; Engine Parts; Protective Coatings; Ceramic Coatings; Temperature Gradients; Aircraft Engines; Plasma Spraying; Vapor Deposition; Engine Inlets; Inlet Temperature; Temperature Control

19980201044 Advisory Group for Aerospace Research and Development, Fluid Dynamics Panel, Neuilly-Sur-Seine, France

A Selection of Test Cases for the Validation of Large-Eddy Simulations of Turbulent Flows ***Quelques cas d'Essai pour la Validation de la Simulation des Gros Tourbillons dans les Ecoulements Turbulents***

Apr. 1998; 211p; In English; CD-ROM conforms to the ISO 9660 standard

Report No.(s): AGARD-AR-345; ISBN 92-836-1072-5; Copyright Waived; Avail: CASI; A10, Hardcopy; A03, Microfiche

The results of the AGARD FDP Working Group 21 on "A Selection of Test Cases for the Validation of Large Eddy Simulations of Turbulent Flows" are presented in this report. The data contained in the report consist of building-block experiments documented in as much detail as possible. They are useful for the validation of Reynolds Averaged modeling and for the preliminary evaluation of experiments or turbulence theories. They include both laboratory experiments and direct numerical simulations. The introductory chapters are complemented by data sheets which describe in detail each data set, the experimental or numerical procedures, the expected errors, and the initial and boundary conditions. The data are given in machine-readable form in the CD-ROM that accompanies the report.

Author

Large Eddy Simulation; Turbulent Flow; Computational Fluid Dynamics; Turbulence Models; Direct Numerical Simulation; Reynolds Averaging; Homogeneous Turbulence; Shock Wave Interaction; Shear Layers; Pipe Flow; Computerized Simulation; Mathematical Models; Flow Distribution

19980201657 Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

Air Traffic Management: Support for Decision Making Optimisation - Automation ***La Gestion du Traffic Aerien Aide a la Decision Optimisation - Automation***

Benoit, Andre, Editor, European Organization for the Safety of Air Navigation, Belgium; Air Traffic Management: Support for Decision Making Optimization - Automation; Dec. 1997; 284p; In English; The Mission Systems Panel Workshop on ATM, 27-29 May 1997, Budapest, Hungary; Also announced as 19980201658 through 19980201677

Report No.(s): AGARD-R-825; ISBN 92-836-1064-4; Copyright Waived; Avail: CASI; A13, Hardcopy; A03, Microfiche

As a contribution to the increasing cooperation between NATO and former Warsaw Pact countries, the Mission Systems Panel of AGARD organized a Workshop on Air Traffic Management, held in Budapest, Hungary on 27-29 May 1997. Emphasis was placed on the fundamentals of air traffic handling and an effort was made to establish a fruitful dialogue between experienced experts and young mathematicians, physicists and engineers, offering a fresh approach to the on-line conduct of traffic management. The main characteristics of Air Traffic Handling were outlined; it is a large-scale, international, multidisciplinary and complex system. The aircraft, the basic element of air traffic, was given considerable consideration: the manner in which it is flown and its dynamics, the potential role of the on-board flight management system, the current and expected level of automation, and the advent of unmanned military aircraft. Could Air Traffic Handling become a discipline in itself as part of the academic subject of aerospace? What assistance could be made available to the human controller in the present types of operation? Finally, if it was intended to make major improvements to the management of all flights, what optimization techniques were suitable for on-line operations? These important questions were debated in a session devoted to the fundamentals of air traffic management. An attempt was then made to illustrate some trends in the optimization and automation processes: arrivals management in the PHARE programme; application of genetic algorithms to mid-air collision avoidance; the detection and resolution of conflicts using coupled force field techniques and a broad look at global traffic optimization. Plans and prospectives were presented: human-machine interface in the Hungarian MATIAS project; a US view of the situation as seen by the FAA; the CNS/ATM concept as an ICAO prospective and the EATCHIP-EATMS concept offered as a European perspective. The Round Table which ended the meeting offered strong encouragement to the academic and scientific communities to inform their members of the nature, complexity and interest of the problems - numerous and varied - raised by the need to improve the presently critical air traffic situation. Examples of outstanding doctoral dissertations were included in this Workshop programme.

Author

Flight Management Systems; Air Traffic Control; Flight Plans; Flight Optimization; Automatic Flight Control; Dynamic Control

19980202235 Advisory Group for Aerospace Research and Development, Structures and Materials Panel, Neuilly-Sur-Seine, France

Virtual Manufacturing ***La Fabrication Virtuelle***

Virtual Manufacturing; May 1998; 154p; In English; In French; 85th; AGARD Structures and Materials Panel, 13-14 Oct. 1997, Aalborg, Denmark; Also announced as 19980202236 through 19980202248; Original contains color illustrations

Report No.(s): AGARD-R-821; ISBN-92-836-0053-3; Copyright Waived; Avail: CASI; A08, Hardcopy; A02, Microfiche

Virtual Manufacturing (VM)is an integrated, synthetic manufacturing environment exercised to enhance all levels of decision and control. This process uses product, process and resource models to evaluate the producibility and affordability of new product concepts prior to commitment to the final product design. Design processes are captured in a single geometric database and integrated with the planned manufacturing processes resulting in a simulation of the manufacturing environment. The critical questions of manufacturing cycle time, people resource requirements and physical resource requirements for various scenarios are quantified by simulation. Thus, Virtual Manufacturing is a tool to achieve more affordable aircraft designs, reduced cycle times and improved quality.

Author

Virtual Reality; Manufacturing; Computer Aided Manufacturing; Computer Aided Design; Production Planning; Concurrent Engineering

19980202469 Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

Numerical Unsteady Aerodynamic and Aeroelastic Simulation ***L'Aerodynamique instationnaire numerique et la simulation de l'aeroelasticite***

Numerical Unsteady Aerodynamic and Aeroelastic Simulation; Mar. 1998; 198p; In English; In French; Meeting of the AGARD Structures and Materials Panel, 14-15 Oct. 1997, Aalborg, Denmark; Sponsored by Advisory Group for Aerospace Research and Development, France; Also announced as 19980202470 through 19980202483

Report No.(s): AGARD-R-822; ISBN 92-836-0054-1; Copyright Waived; Avail: CASI; A09, Hardcopy; A03, Microfiche

Two components are required for analysis of dynamic aeroelastic phenomena, a structural finite element model of the vehicle, and an unsteady aerodynamics model; in current practice linear approximations are used for both models. Although structural nonlinearities possibly play a part in some cases of Limit Cycle Oscillation (LCO), the analysis community is generally content with existing structural modeling methods. The need for accurate and user-friendly advanced aerodynamic methods, however, is generally recognized. Control surface buzz, a one degree of freedom aeroelastic phenomenon involving shock oscillation, is an example of a problem not susceptible to analysis using linear aerodynamics. The current practice in industry is to use very conservative rules of thumb in hopes of preventing buzz, or simply to ignore the possibility. Obviously, conservatism introduces unnecessary weight and the discovery of a buzz problem during the test program causes delay and an expensive redesign effort. As computer hardware increases in capability, CFD methods are maturing and becoming available for at least limited use in industry. These methods hold much hope for future improvements in unsteady aerodynamics predictions. More accurate analysis of ordinary flutter in the sub- and supersonic flight regimes as well as the development of transonic analysis methods can result in a reduction of aircraft weight and development cost by reducing the need for conservatism and possibly by eliminating the expense of flutter model testing. Up to the present time, extreme difficulty of use, computational cost and lack of verification against suitable test cases have severely limited use of CFD procedures in industry; codes suitable for analysis of complete aircraft have not been shown to exist. The papers at this Workshop dealt with methods at the leading edge of current technology as applied in industry, and with more advanced methods which are in the development and checkout process. These papers contribute to the expectation that the time is not far removed when industry will be able to make much increased use of advanced unsteady aerodynamics methods.
Author
Unsteady Aerodynamics; Mathematical Models; Finite Element Method; Aeroelasticity; Computational Fluid Dynamics; Navier-Stokes Equation; Three Dimensional Flow; Computerized Simulation; Flutter

19980203345 Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France
Thermal Barrier Coatings ***les Revetements anti-mur de chaleur***
Apr. 1998; 177p; In English; In French; 85th; AGARD Structures and Materials Panel, 15-16 Oct. 1997, Aalborg, Denmark; Sponsored by Advisory Group for Aerospace Research and Development, France
Report No.(s): AD-A344715; AGARD-R-823; No Copyright; Avail: CASI; A09, Hardcopy; A02, Microfiche
No Abstract
Author
Thermal Control Coatings; Aircraft Engines; Ceramic Coatings; Thermal Conductivity; Inlet Temperature; Barriers; Turbines; Yttria-Stabilized Zirconia; Jet Engines

19980203585 Advisory Group for Aerospace Research and Development, Propulsion and Energetics Panel, Neuilly-Sur-Seine, France
CFD Validation for Propulsion System Components ***La Validation CFD des Organes des Propulseurs***
May 1998; 96p; In English; Original contains color illustrations
Report No.(s): AGARD-AR-355; ISBN 92-836-1075-X; Copyright Waived; Avail: CASI; A05, Hardcopy; A01, Microfiche
Computer codes which solve the Reynolds-averaged Navier-Stokes equations are now used by manufacturers to design turbomachines, but there is no consensus about which grids and which turbulence models are good enough to provide a reliable basis for design decisions. The AGARD Propulsion and Energetics Panel set up Working Group 26 to help to clarify these issues, by analysing predictions (using as wide a range of codes as possible) of two representative but difficult single blade row test cases: NASA Rotor 37 and an annular turbine cascade tested by DLR. This report presents the Group's results and conclusions. Recommendations are made about the type and density of grid, which depend on many factors. Mixing-length turbulence models are unsuitable for turbomachines with their complex endwall flows; some kind of turbulent transport model is essential. No turbulence model was found which always gave good loss predictions.
Author
Computational Fluid Dynamics; Computer Programs; Turbulence Models; Mixing Length Flow Theory; Annular Flow

19980203985 Advisory Group for Aerospace Research and Development, Fluid Dynamics Panel, Neuilly-Sur-Seine, France
Advanced Aerodynamic Measurement Technology ***Technologies Avancees de Mesure Aerodynamique***
Advanced Aerodynamic Measurement Technology; May 1998; 420p; In English; In French; 81st; Fluid Dynamics Panel Symposium, 22-25 Sep. 1997, Seattle, WA, USA; Also announced as 19980203986 through 19980204020; Original contains color illustrations
Report No.(s): AGARD-CP-601; ISBN 92-836-0056-8; Copyright Waived; Avail: CASI; A18, Hardcopy; A04, Microfiche
The papers prepared for the AGARD Fluid Dynamics Panel (FDP) Symposium, "Advanced Aerodynamic Measurement Technology" are contained in this report. In addition, a Technical Evaluator's Report aimed at assessing the success of the Sympo-

sium in meeting its objectives, and an edited transcript of the General Discussion held at the end of the Symposium are also included. Measurement techniques were presented for flows from subsonic to hypersonic Mach numbers and environments from cryogenic to high-enthalpy reacting flows. Papers presented during the sessions addressed the following subjects: Particle Image Velocimetry; Doppler Global Velocimetry; Molecular Diagnostic Techniques; Holographic Interferometry; Skin Friction Measurements; Pressure Sensitive Paints; and Balance and Model Deformation Measurements.
Author
Aerodynamics; Particle Image Velocimetry; Skin Friction; Mechanical Measurement; Flow Visualization; Conferences; Measuring Instruments; Wind Velocity Measurement; Flow Measurement; Wind Tunnels; Flow Characteristics

19980206002 Advisory Group for Aerospace Research and Development, Propulsion and Energetics Panel, Neuilly-Sur-Seine, France
Advanced Non-Intrusive Instrumentation for Propulsion Engines ***L'Instrumentation Non-Invasive Avancee pour les Propulseurs***
Advanced Non-Intrusive Instrumentation for Propulsion Engines; May 1998; 550p; In English; In French; 90th, 20-24 Oct. 1997, Brussels, Belgium; Also announced as 19980206003 through 19980206050; Original contains color illustrations
Report No.(s): AGARD-CP-598; ISBN 92-836-0055-X; Copyright Waived; Avail: CASI; A23, Hardcopy; A04, Microfiche

Changes in engine technology such as higher temperatures, higher tip speeds, new metal/composite/ceramic materials together with radical changes in design philosophy will require amongst other prerequisites the ability to measure and to monitor key internal gas and structural characteristics. The symposium papers presented non-intrusive measurement and analysis technologies in the following categories: Laser Point Measurements (11); Absorption and Infrared Techniques (4); Paints - Surface Sensors (6); Laser Induced Fluorescence (6); Mechanical (7); Films (5); Laser Planar Measurement (9); and a Keynote Address
Author
Nonintrusive Measurement; Propulsion; Engine Parts; Gas Turbine Engines; Optical Measurement; Laser Applications; Combustion

19980210650 Advisory Group for Aerospace Research and Development, Sensor and Propagation Panel, Neuilly-Sur-Seine, France
Multi-Sensor Systems and Data Fusion for Telecommunications, Remote Sensing and Radar ***Les Systemes Multi-Senseurs et le Fusionnement des Donnees pour les Telecommunications, la Teledetection et les Radars***
Apr. 1998; 416p; In English; In French, 29 Sep. - 2 Oct. 1997, Lisbon, Portugal; Also announced as 19980210651 through 19980210690; Original contains color illustrations
Report No.(s): AGARD-CP-595; ISBN 92-836-0051-7; Copyright Waived; Avail: CASI; A18, Hardcopy; A04, Microfiche

This publication reports the unclassified papers presented at a specialists' meeting held by the Sensor and Propagation Panel at its Fall 1997 meeting. The topics covered included: - Applications of multiple sensors and data fusion - Data fusion techniques and methods - Sensor data networks and management techniques - Validation studies, experiments, technologies.
Author
Telecommunication; Remote Sensing; Communication Networks; Data Transmission; Management Methods; Multisensor Fusion

19980218247 Advisory Group for Aerospace Research and Development, Propulsion and Energetics Panel, Neuilly-Sur-Seine, France
Advanced Non-Intrusive Instrumentation for Propulsion Engines ***L'Instrumentation Non-Invasive Avancee pour les Propulseurs***
May 1998; 528p; In English; 90th, 20-24 Oct. 1997, Brussels, Belgium
Report No.(s): AD-A348957; AGARD-CP-598; ISBN 92-836-0055-X; No Copyright; Avail: CASI; A23, Hardcopy; A04, Microfiche

Changes in engine technology such as higher temperatures, higher tip speeds, new metal/composite/ceramic materials together with radical changes in design philosophy will require amongst other prerequisites the ability to measure and to monitor key internal gas and structural characteristics. The symposium papers presented non-intrusive measurement and analysis technologies in the following categories: (1) Laser Point Measurements (11); (2) Absorption and Infrared Techniques (4); (3) Paints; (4) Surface Sensors (6); (4) Laser Induced Fluorescence (6); (5) Mechanical (7); (6) Films (5); and (7) Laser Planar Measurement (9) and a Keynote Address.
DTIC
Structural Design; Nonintrusive Measurement; Propulsion