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19960016897; 96N22505 Advisory Group for Aerospace Research and Development, Mission Systems Panel., Neuilly-Sur-Seine, France

Tactical Aerospace C3I in Coming Years Commandes, Pilotage, Communications, Renseignements Tactiques Aérospatiaux dans les Prochaines Années

Oct. 1995, 214; In English; In French; 3d Symposium, 15-18 May 1995, Lisbon, Portugal; Also announced as 1996008784 Report No.(s): AGARD-CP-557; ISBN-92-836-0019-3; Copyright Waived

This conference demonstrated that there are major C3I developments for the various international air forces underway, particularly in the USA (Theater Battle Management), in France (SCCOA), and at NATO (ACCS). These C3I systems (in effect, 'system systems') combine all the real time (surveillance, air mission control) and deferred functions (force planning and management) at a very high level of complexity. One of the problems has been how to organize, manage, and control data flow between the complex elements of these systems. Tools are now being developed with this in mind. Another problem is that, although it is cost effective to use off-the-shelf components in the systems design, this process in itself creates a number of trade-off problems with regard to the system's conformity to specifications. The discussions and presentations of this conference were concerned with the following main issues: Requirements and trends in architecture; situation assessment; decision aids for planning, tasking, and execution, and techniques and technologies.

CASI

Surveillance Radar; Systems Engineering; Conferences; Command And Control; Architecture (Computers); Computer Systems Design; Mission Planning; Technological

Forecasting; Systems Management; Decision Making; Computer Systems Programs; Radar Tracking; Military Operations

19960017677; 96N23209 Advisory Group for Aerospace Research and Development, Mission Systems Panel., Neuilly-Sur-Seine, France

Twenty-five Years of Contributions to Air Traffic Handling (Research, Development, Operations and History): A Bibliography Vingt-cinq années de contributions au contrôle du trafic aérien (recherches, développement, opérations et historique): Une bibliographie

Benoit, Andre, Editor, European Organization for the Safety of Air Navigation, Belgium; Feb. 1996, 168; In English Report No.(s): AGARD-R-811; ISBN-92-836-1029-6; Copyright Waived

Over 25 years, the Guidance and Control Panel of the Advisory Group for Aerospace Research and Development to the North Atlantic Treaty Organization has devoted part of its activities to the fascinating field known historically as Air Traffic Control, covering also Air Traffic Management, and more generally Air Traffic Handling. This Report provides a list of the summaries of the papers which were presented at the symposia and included in the AGARDographs devoted to this wide and most challenging subject, covering essentially, Air Traffic Control Systems (1972); A Survey of Modern Air Traffic Control, Vols. 1 and 2 (1975); Plans and Developments for Air Traffic Systems (1975); Air Traffic Management (1979); Air Traffic Control in Face of Users' Demand and Economy Constraints (1982); Efficient Conduct of Individual Flights and Air Traffic (1986); Aircraft Trajectories, Vols. 1, 2 and 3 (1990); Machine Intelligence in Air Traffic Management (1993); and On-Line Handling of Air Traffic

(1994). The Report is completed by two indexes, an extended subject Index, and an Authors and Contributors Index.

Author

Bibliographies; Air Traffic Control; Air Traffic; Management Methods; Control Systems Design

19960020341; 96N23936 Advisory Group for Aerospace Research and Development, Structures and Materials Panel., Neuilly-Sur-Seine, France

Advanced Polymeric & Metallic Composite Materials for Space and Aerospace Vehicle Structures and Strength Optimization of Composite Structures and their Certification *Les matériaux composites polymériques et métalliques avancés pour les structures des véhicules spatiaux et aérospatiaux, et l'optimisation de la résistance des structures composites et leur homologation*

DEC. 1995, 152; In English; The AGARD SMP Lecture Series, 11-12 Dec. 1995, Stuttgart, Germany, Chatillon, France, Ohio, USA, USA, USA, USA; Also announced as 1996008835

Report No.(s): AGARD-LS-204; ISBN-92-836-1027-X; Copyright Waived; Avail: CASI; A08 Hardcopy; A02 Microfiche

This lecture series presents and discusses the scientific problem of advanced polymer and metallic composite materials for aerospace structures, strength optimization of composite structures, and their certification. Some challenges of using composite structures, including airframe concept definition, are studied. Fiber orientation optimization principles for composite panels and shells are outlined. Procedures for certification of assemblies made out of composites are dealt with. Certification requirements, including requirements to estimate static and fatigue strengths, are formulated. Design conditions for composite structures are analyzed, including development.

Author (revised)

Composite Structures; Polymer Matrix Composites; Metal Matrix Composites; Fatigue Life; Aircraft Structures; Fiber Composites; Structural Design; Aircraft Construction Materials; Spacecraft Construction Materials

19960020398; 96N23976 Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

AGARD Flight Test Techniques Series., Volume 14, Introduction to Flight Test En *Introduction a la technique des vols*

Stoliker, F. N., Stoliker (F. N.), USA; Sep. 1995, 458; In English

Report No.(s): AGARD-AG-300-VOL-14; ISBN-92-836-1020-2; Copyright Waived; Avail: CASI; A20 Hardcopy; A04 Microfiche

This is the Introductory Volume to the Flight Test Techniques Series. It is a general introduction to the various activities and aspects of Flight Test Engineering that must be

considered when planning, conducting, and reporting a flight test program. Its main intent is to provide a broad overview to the novice engineer or to other people who have a need to interface with specialists within the flight test community. The first two Sections provide some insight into the question of why flight test and give a short history of flight test engineering. Sections 3 through 10 deal with the preparation for flight testing. They provide guidance on the preliminary factors that must be considered; the composition of the test team; the logistic support requirements; the instrumentation and data processing requirements; the flight test plan; the associated preliminary ground tests; and last, but by no means least, discuss safety aspects. Sections 11 through 27 describe the various types of flight tests that are usually conducted during the development and certification of a new or modified aircraft type. Each Section offers a brief introduction to the topic under consideration, and the nature and the objectives of the tests to be conducted. It lists the test instrumentation (and, where appropriate, other test equipment and facilities) required, describes the test maneuvers to be executed, and indicates the way in which the test data is selected, analyzed, and presented. The various activities that should take place between test flights are presented next. Items that are covered are: who to debrief; what type of reports to send where: types of data analysis required for next flight; review of test data to make a comparison to predicted data and some courses of action if there is not good agreement; and comments on selecting the next test flight. The activities that must take place upon completion of the test program are presented. The types of reports and briefings that should take place and a discussion of some of the uses of the flight test data are covered. A brief forecast is presented of where present trends may be leading.

Author

Flight Tests; Flight Safety; Test Equipment; Project Management

19960020525; 96N24074 Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

Advanced Oxygen Systems for Aircraft *Systemes d'Oxygene Avances*

Ernsting, John, Editor, Royal Air Force, UK; Miller, Richard L., Editor, Armstrong Lab., USA; Apr. 1996, 112; In English Report No.(s): AGARD-AG-286; ISBN-92-836-1033-4; Copyright Waived; Avail: CASI; A06 Hardcopy; A02 Microfiche

Many of the oxygen systems fitted to present NATO aircraft are unsatisfactory as they employ liquid oxygen which requires a complex and expensive supply chain, they impose undesirable physiological loads on the aircrew, particularly high resistance to breathing, and they do not provide pressure breathing with +Gz or effective protection to the respiratory tract and eyes against NBC agents. Advanced Oxygen Systems (AOS), which provide on board generation of breathing gas, impose a low physiological load on the aircrew and pro-

vide pressure breathing with G and at high altitude and protection against NBC agents, are required in the new generation of very agile high performance combat aircraft now under development by the NATO nations. This monograph provides a comprehensive review of the present state of development of AOS for combat aircraft and provides practical guidelines for the future development of these systems. The monograph comprises an introduction; conventional US and UK oxygen systems and their deficiencies; the history of development of on-board oxygen generating systems, OBOGS; operational requirements and design of AOS; physiological requirements for AOS; molecular sieves, pressure swing adsorption and oxygen concentrators; breathing gas regulators and masks for AOS; current molecular sieve oxygen generation systems; sensors, indicators and controls for AOS; practical aspects of design of AOS; and effects of contaminants, including chemical warfare agents, on molecular sieve oxygen generators; and an index. This monograph will be of value to all those concerned with the design, procurement and operational use of Advanced Oxygen Systems to be fitted to future high performance combat aircraft.

Author

Life Support Systems; Breathing Apparatus; Fighter Aircraft; Pressure Breathing; Supersonic Aircraft; Oxygen Masks; High Altitude Breathing; Acceleration Protection

19960020736; 96N24259 Advisory Group for Aerospace Research and Development, Structures and Materials Panel., Neuilly-Sur-Seine, France

Widespread Fatigue Damage in Military Aircraft *LEndommagement en Fatigue des Avions Militaires*

Dec. 1995, 224; In English; 80th Meeting of the AGARD Structures and Materials Panel, 10-11 May 1995, Rotterdam, Netherlands; Also announced as 1996008430; Original contains 2 color illustrations

Report No.(s): AGARD-CP-568; ISBN-92-836-1021-0; Copyright Waived; Avail: CASI; A10 Hardcopy; A03 Microfiche

Several countries have been experiencing aging aircraft related problems in their military fleets, particularly among their military transport aircraft. The most troubling aging aircraft structure-related issue is widespread fatigue damage (WFD), sometimes termed as multiple site damage, whose onset due to fatigue causes a dramatic structural strength reduction. Invariably, when WFD occurs, the affected model in the fleet is subjected to an extensive modification program which is almost always expensive and time-consuming. A Specialists' Meeting on the subject was held in order to explore ways and means to quantitatively predict structural degradation on account of WFD as a function of usage and when WFD is likely to occur.

Author

Fatigue (Materials); Degradation; Structural Analysis;

Aircraft Structures; Aircraft Maintenance; Fatigue Life; Conferences

19960020814; 96N24337 Advisory Group for Aerospace Research and Development, Structures and Materials Panel., Neuilly-Sur-Seine, France

Advanced aeroservoelastic testing and data analysis *Les essais aeroservoelastiques et l'analyse des donnees*

Nov. 1995, 282; In English; In French; 80th Meeting, 8-10 May 1995, Rotterdam, Rotterdam, Netherlands, Netherlands; Also announced as 1996008813

Report No.(s): AGARD-CP-566; ISBN-92-836-0017-17; Copyright Waived; Avail: CASI; A13 Hardcopy; A03 Microfiche

The papers presented at the AGARD Structures and Materials Panel's Specialists' Meeting on Aeroservoelastic Testing and Data Analysis, held in Rotterdam in May 1995 are included. Flutter is a potentially catastrophic aeroelastic dynamic instability. Flight flutter tests are conducted to demonstrate freedom from flutter for critical aircraft conditions and to derive data to validate the flutter analysis. Active control systems (ride control, gust load alleviation, flutter stabilization, etc.) add to the scope and complexity of these tests in that control system instability due to aeroservoelastic interactions must also be considered. The conclusions of the meeting are that most of the tests need improvements, some tests should be better exploited, and at least one test, the in-flight measurement of unsteady air loads, should become standard practice to close a gap in the logic of flutter certification.

Author

Flight Control; Aeroservoelasticity; Flutter; Flutter Analysis; Flight Tests; Wind Tunnel Tests; Dynamic Response; Aerodynamic Stability; Structural Vibration; Conferences

19960021124; 96N24598 Advisory Group for Aerospace Research and Development, Structures and Materials Panel., Neuilly-Sur-Seine, France

Thermal Mechanical Fatigue of Aircraft Engine Materials *La Fatigue Thermomecanique des Materiaux Constitutifs des Moteurs D'Avion*

Mar. 1996, 236; In English; 81st Meeting of the AGARD Structures and Materials Panel, 2-4 Oct. 1995, Banff, Canada; Also announced as 1996039301

Report No.(s): AGARD-CP-569; ISBN-92-836-1031-8; Copyright Waived; Avail: CASI; A11 Hardcopy; A03 Microfiche

Aircraft engine components experience severe operating conditions, often involving complex combinations of cyclic mechanical stress, cyclic temperature and varying environmental conditions. At the 81st meeting of the AGARD Structures and Materials Panel, the SMP held a Specialists' Meeting on Thermal Mechanical Fatigue of Aircraft Engine Materials to review the state-of-the-art experience in experimental methods as well as approaches to analytical modelling

of damage accumulation and growth in metallic gas turbine engine materials under TMF conditions.

Author

Thermal Fatigue; Aircraft Engines; Engine Parts; Damage; Cracking (Fracturing); Thermal Stresses

19960022102; 96N25147 Advisory Group for Aerospace Research and Development, Structures and Materials Panel., Neuilly-Sur-Seine, France

The Design, Qualification and Maintenance of Vibration-Free Landing Gear *La Conception, la Qualification et la Maintenance des Trains d'Atterrissage sans Vibration*

Mar. 1996, 136; In English; In French; 81st Meeting of the AGARD Structures and Materials Panel, 4-5 Oct. 1995, Banff, Canada; Also announced as 1996038181

Report No.(s): AGARD-R-800; ISBN-92-836-1032-6; Copyright Waived; Avail: CASI; A07 Hardcopy; A02 Microfiche

The Structures and Materials Panel of AGARD sponsored a Workshop focusing on the various vibrational and stability problems (e.g. shimmy, antiskid induced vibrations) that must be considered in the early design phase of landing gear systems, especially problems which are related to vibrations of the combined structural system formed by the landing gear, its tires and the flexible aircraft structure. The intention was to indicate the impact of (combined) landing gear/aircraft vibration problems on aircraft design and to discuss the state-of-the-art technology in this area and to define possible future steps of development.

Author

Landing Gear; Structural Vibration; Aircraft Structures; Aircraft Design; Damage Assessment; Aircraft Landing

19960022241; 96N25274 Advisory Group for Aerospace Research and Development, Sensor and Propagation Panel., Neuilly-Sur-Seine, France

Environmental Factors in Electronic Warfare Related to Aerospace Systems *Les Facteurs d'Environnement en Guerre Electronique Relatifs aux Systemes Aeronautiques*

Jan. 1996, 150; In English; Sensor and Propagation Panel Symposium, 8-11 May 1995, Pratica di Mare AFB, Rome, Italy; Also announced as 1996039526

Report No.(s): AGARD-CP-573; ISBN-92-836-1028-8; Copyright Waived; Avail: CASI; A07 Hardcopy; A02 Microfiche

An in-depth knowledge of the characteristics of the propagation medium and how they should/could be modified is essential in order to obtain more efficient sensors for aerospace systems. During the symposium the effects of environmental factors on the different disciplines relating to EW were widely analyzed, and all relevant aspects were considered including among others: the effect of interference in the ionosphere on various satellite systems, and the propagation mechanisms affecting countermeasures against EO and laser

systems; the layering of appropriate paints as a means of protecting airbase structures in more than one band, as well as camouflage as a measure against radar sensors; and the disruptive potential of high-power microwaves, and the exploitation of SMART munitions. Considering the problem of reduction of aircraft signature, evidence was provided that it is not possible to achieve this by an accurate definition of the mission profile. Finally, several solutions were offered to protect aircraft during peace-keeping operations, i.e. an active self protection laser system against optical seeker head missiles.

Author

Aerospace Systems; Electronic Warfare; Microwaves; Laser Applications

19960022326; 96N25347 Advisory Group for Aerospace Research and Development, Fluid Dynamics Panel., Neuilly-Sur-Seine, France

Aerodynamics of Store Integration and Separation *L'Aerodynamique de l'Integration et du Largage des Charges Externes*

Feb. 1996, 274; In English; In French; 76th Fluid Dynamics Panel Symposium, 24-27 Apr. 1995, Ankara, Turkey; Also announced as 1996039525; Original contains color illustrations

Report No.(s): AGARD-CP-570; ISBN-92-836-0022-3; Copyright Waived; Avail: CASI; A12 Hardcopy; A03 Microfiche

The papers prepared for the AGARD Fluid Dynamics Panel (FDP) Symposium on 'Aerodynamics of Store Integration and Separation', which was held 24-27 April 1995 in Ankara, Turkey are contained in this report. In addition, a Technical Evaluator's Report aimed at assessing the success of the symposium in meeting its objectives, and an edited transcript of the General Discussion held at the end of the symposium are also included. The aim of this symposium was to bring together engineers in the fields of theoretical and experimental aerodynamics, as applied to the store integration problem, to review and discuss the state of the art in the prediction, methodology and experimental techniques currently being developed and applied to the aerodynamics of store carriage and release and to assess new design concepts.

Author

Aerodynamics; Conferences; External Stores; Prediction Analysis Techniques; Design Analysis; External Store Separation