

JULY 1998

NUMBER 98-02

April 1, 1998 through June 30, 1998

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**19980018672** Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

**Future Aerospace Technology in the Service of the Alliance, Volume 3, Sustained Hypersonic Flight** *Les Technologies Aeronautiques et Spatiales du Futur au Service de L'Alliance Atlantique, Volume 3, Le Vol en Croisiere Hypersonique*

Dec. 1997; 432p; In French; In English; AGARD Symposium on 'Future Aerospace Technology in the Service of the Alliance', 14-17 Apr. 1997, Palaiseau, France; Also announced as 19980018673 through 19980018705

Report No.(s): AGARD-CP-600-Vol-3; ISBN 92-836-0049-5; Copyright Waived; Avail: CASI; A19, Hardcopy; A04, Microfiche

Sustained Hypersonic Flight capability is envisioned for several future military and civilian applications, such as long range immediate reaction reconnaissance, high speed interception of air targets, long range precision strike against hardened or time critical targets, and access to space. The inherent reduction in time-to-target and low vulnerability will permit new operational tactics. The symposium outlined mission needs and operational scenarios for hypersonic vehicles. Addressed were: Technological issues and challenges in external hypersonic aerodynamics and design, propulsion and engine/airframe integration, military ramjet applications, overall system design including structures and materials development needs, and test facilities. Ground based test facilities cannot provide full simulation at Mach numbers above 5. Therefore, the use of Computational Fluid Dynamics design tools is essential. For routine use of the computational tools in analysis, design and optimization, it is necessary to reduce the time for the entire computational process by two orders of magnitude. Hypersonic boundary layer transition remains a critical design issue because of the important impact on engine drag and on heating, which can affect the choice of materials and thermal protection systems. In addition, reliable prediction of scramjet net thrust is an absolute must in resolving hypersonic air breathing vehicle design issues. Due to current facility and computational shortfalls, the development of future hypersonic flight systems requires research flight tests in the technology areas of boundary layer transition and air-breathing propulsion engine performance. For sustained hypersonic flight beyond Mach 6, the supersonic combustion ramjet (scramjet) engine is the only choice for the near future. Only this air-breathing concept offers a significant promise of large reductions in required propellant fractions, increased payload fractions, and reduced size vehicles, together with a foreseeable technological feasibility. Airframe/engine integration, combustor design and thermal management are the predominant engineering tasks. Fuels, hydrogen or hydrocarbon, must be matched to the operational needs of military or civil use. Experience in existing ramjet propelled missiles capable of speeds up to Mach 4 can support the development effort. The potential mission and cost benefits of sustained hypersonic flight to both military and civil applications are tremendous. From the budget point of view, the possibility of sharing development costs between military and civil programs offers a specific advantage.

Derived from text

*Aerodynamics; Hypersonic Flight; Systems Engineering; Software Development Tools; Military Operations; Military Technology; Engine Airframe Integration; Design Analysis; Air Breathing Engines; Boundary Layer Transition; Flight Tests*

**19980033517** Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

**Future Aerospace Technology in the Service of the Alliance, Volume 1, Affordable Combat Aircraft and Plenary Sessions**  
*Les Technologies Aeronautiques et Spatiales du Futur au Service de L'Alliance Atlantique, Volume 1, Le Cout de Possession des Avions de Combat*

Future Aerospace Technology in the Service of the Alliance; Dec. 1997; 310p; In French; In English; Future Aerospace Technology in the Service of the Alliance, 14-17 Apr. 1997, Palaiseau, France; Also announced as 19980033518 through 19980033540 Report No.(s): AGARD-CP-600-Vol-1; ISBN 92-836-0047-9; Copyright Waived; Avail: CASI; A14, Hardcopy; A03, Microfiche

One of three volumes containing the unclassified papers presented at a conference on "Future Aerospace Technology in the Service of the Alliance" organised by AGARD (NATO's Advisory Group for Aerospace Research and Development) at Palaiseau, near Paris, France, 14-17 April 1997. The conference took the form of three parallel symposia and three plenary sessions. This volume contains the papers from the three plenary sessions: Future Directions in Aerospace Systems Future NATO Trends and Mission Scenarios Human Machine Interaction in the Future and the symposium on "Affordable Combat Aircraft", which had sessions on: Affordability of Procurement, Combat Effectiveness, Affordability of Ownership, The Human Element. Volume 2 contains the papers on "Mission Systems Technologies". Volume 3 contains the papers on "Sustained Hypersonic Flight".

Author

*Fighter Aircraft; North Atlantic Treaty Organization (NATO); Combat; Hypersonic Flight; Aerospace Systems*

**19980035004** Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

**Advances in Flight Testing** *Les Avancees Dans le Domaine des essais en vol*

Dec. 1997; 400p; In French; Flight Vehicle Integration Panel Symposium, 23-26 Sep. 1996, Lisbon, Portugal; Also announced as 19980035005 through 19980035034

Report No.(s): AGARD-CP-593; ISBN 92-836-0050-9; Copyright Waived; Avail: CASI; A17, Hardcopy; A04, Microfiche

The Symposium comprised six sessions, each being devoted to a particular field, with one session on Systems Evaluation, including avionics, navigation, propulsion and weapons aspects, two sessions on Technological Advances covering all technical fields such as avionics software, simulation, instrumentation, aerodynamics, test methods etc., one session devoted to an Overview of Current Programmes, one session on Flight Dynamics, incorporating handling qualities, performance and flight controls, and one session addressing Management Problems in Testing. The symposium closed with a discussion between government representatives and manufacturers on "The role of governments in development testing in the 21st century".

Author

*Conferences; Computerized Simulation; Aerodynamics; Avionics*

**19980021248** Advisory Group for Aerospace Research and Development, Aerospace Medical Panel, Neuilly-Sur-Seine, France

**The Prevention of Aircraft Accidents Through the Collection and Analysis of Human Factor/Aeromedical Aircraft Accident Data**  
*La Prevention des Accidents d'Avion par la Collecte et l'Analyse de Donnees d'Accidents Facteurs Humains/Aeromedicaux*

Tejada, F., Editor, Centro de Instruccion de Medicina Aeroespacial, Spain; Magnusson, Kent E., Editor, Air Force Systems Command, USA; Cugley, Jennifer, Editor, Royal Air Force, UK; Courchesne, Cyd E., Editor, Canadian Air Command Headquarters, Canada; Alnaes, A., Editor, Oslo Military Clinic, Norway; Knoefel, H. J., Editor, Institute of Aviation Medicine, Germany; Grau, Jean Yves, Editor, Institut de Medicine Aero spatiale Armee, France; Lyons, Terence J., Editor, Air Force Systems Command, USA; Guadalupi, Francesco, Editor, Commissione Sanitaria di Appello A.M., Italy; Feb. 1998; 124p; In English

Report No.(s): AGARD-AR-361; ISBN 92-836-0052-5; Copyright Waived; Avail: CASI; A06, Hardcopy; A02, Microfiche

The overall goal of Working Group 23 was to improve the application of human factors analysis to operational enhancement and mishap prevention programs. Through different chapters, a variety of related topics were discussed in relation to the current status and approaches to aircraft accident/incident investigation, taking into account the human factors involved, procedures, categorization, tabulation and analysis. In addition, following a questionnaire which was widely distributed among all NATO countries, current data concerning the number of accidents, human factors studies, organizational aspects and the data collection were compiled and discussed. Also the possible approaches to conceptual models were described as a potential framework for the support and organisation of the principles and topics to be included in human factors/aeromedical data base. The Working Group reviewed current training programmes and discussed a common approach, in which human factors play a definite role. Examples of data bases currently in use are enclosed.

Author

*Aircraft Accidents; Prevention; Human Factors Engineering; Data Acquisition; Education; Aerospace Medicine*

**19980019003** Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

**Structural Assessment of Solid Propellant Grains** *l'Evaluation structurale des blocs de poudre a propergol solide*

Dec. 1997; 208p; In English

Report No.(s): AGARD-AR-350; ISBN 92-836-1063-6; Copyright Waived; Avail: CASI; A10, Hardcopy; A03, Microfiche

Solid propellant rocket motors and gas generators are used in military and civil devices. Missiles, boosters, space propulsion, pyrotechnic actuators are examples. The structural capability of the grain over time and under varying temperature, humidity, and mechanical loads, is of prime concern for the reliability, safety and service life of the device. From 1994 to 1996 an AGARD working group has collected, reviewed and evaluated the methods used for structural analysis of solid propellant grains within the NATO nations and has issued an advisory report consisting of 8 chapters: (1) Overview of Solid Propellant Rocket Motor Design; (2) Application of Structural Integrity Assessment; (3) Structural Analysis; (4) Material Characterization; (5) Failure Criteria; (6) Margin of Safety Determination; (7) Verification; and (8) Recommendations and Conclusions. Standardization and preferable approaches are recommended.

Author

*Propellant Grains; Solid Propellants; Structural Analysis; Standardization*

**19980137412** Advisory Group for Aerospace Research and Development, Neuilly-Sur-Seine, France

**Aluminum Alloy Forgings Property/Performance Attributes Focus: Fatigue and Durability Service Capabilities** *Les Pieces Forgees en Alliage d'Aluminium les Attributs de Performance/Caracteristiques Themes: Fatigue et Durabilite Capacites en Service*

May 1998; 64p; In English

Report No.(s): AGARD-AR-353; ISBN 92-836-1074-1; Copyright Waived; Avail: CASI; A04, Hardcopy; A01, Microfiche

Historically, many aluminum aircraft components have been made from forgings. However, to reduce airframe manufacturing cost aircraft manufacturers are converting to parts machined from thick plate. The results of recent research indicates that forgings often offer significant advantages over components machined from plate. The purpose of this report is to present this information.

Author

*Airframes; Aluminum Alloys; Loads (Forces); Fatigue (Materials); Durability; Forging; Aircraft Reliability*

**19980020532** Advisory Group for Aerospace Research and Development, Fluid Dynamics Panel, Neuilly-Sur-Seine, France

**High Speed Body Motion in Water** *Le mouvement des corps evoluant a grande vitesse dans l'eau*

High Speed Body Motion in Water; Feb. 1998; 352p; In English; Fluid Dynamics Panel Workshop: High Speed Body Motion in Water, 1-3 Sep. 1997, Kiev, Ukraine; Sponsored by Advisory Group for Aerospace Research and Development, France; Also announced as 19980020533 through 19980020565; Original contains color illustrations

Report No.(s): AGARD-R-827; ISBN 92-836-1071-7; Copyright Waived; Avail: CASI; A16, Hardcopy; A03, Microfiche

This report is a compilation of the edited proceedings of a Workshop on "High Speed Body Motion in Water" held at the National Academy of Sciences in Kiev, Ukraine, 1-3 September 1997. Technical topics covered during the workshop included Hydrobionics, Boundary Layer Flows, Supercavitating Flows, Air-water Penetration and Control of Cavitation.

Author

*Boundary Layer Flow; Conferences; Supercavitating Flow; Hydrodynamics; Hydromechanics; Underwater Propulsion; Air Water Interactions*

**19980048994** Advisory Group for Aerospace Research and Development, Aerospace Medical Panel, Neuilly-Sur-Seine, France

**Injury Prevention in Aircraft Crashes: Investigative Techniques and Applications** *La Prevention des Lesions Lor des Accidents d'Avions: Les Techniques d'Investigation et Leurs Applications*

Feb. 1998; 100p; In English, 24-25 Nov. 1997, Farnborough, Madrid, UK, Spain; Also announced as 19980048995 through 19980049001

Report No.(s): AGARD-LS-208; ISBN 92-836-1068-7; Copyright Waived; Avail: CASI; A05, Hardcopy; A02, Microfiche

This Lecture Series addresses a critical aspect of the investigations related to the factors implied in the prevention of potential injuries among aircraft occupants as a consequence of impact and post-crash fires, heat and toxic fumes. It comprises a review of the critical aspects of injury prevention. The topics covered included a description of the acceleration vectors involved, how they may have an influence on the aircraft, and how the acceleration forces might be tolerated by the aviator. In addition, the physical analysis of impact and crash survivability is discussed, focusing on what happens during a mishap. Furthermore a review is made on how to evaluate the tolerable deceleration forces and occupiable space required to sustain life. A part of this LS is devoted to answering questions such as, when did the injury occur, the nature of the forces that produced the injury, and their relationship

to a mishap. Injury types related to the thermal and intrusive impact of the deceleration forces are also discussed, as are aspects related to the collection of medical information that would help identify the potential causes and the effects of an individual; in particular, the way in which the occupant moves in response to the forces applied. These forces may have a profound effect upon the nature and severity of the injury. This Lecture Series, sponsored by the Aerospace Medicine Panel of AGARD, has been implemented by the Consultant and Exchange Program.

Author

*Aircraft Accidents; Aircraft Accident Investigation; Crashworthiness; Design Analysis; Escape Systems; Injuries; Prevention; Human Tolerances*

**19980019877** Advisory Group for Aerospace Research and Development, Technical Information Committee Working Group, Neuilly-Sur-Seine, France

**An International Aerospace Information Network: IAIN Final Report**

Feb. 1998; 30p; In English

Report No.(s): AGARD-AR-366; ISBN 92-836-1070-9; Copyright Waived; Avail: CASI; A03, Hardcopy; A01, Microfiche

Reports the outcome of the deliberations of a Working Group set up by the Technical Information Committee of AGARD to examine the models of existing cooperative international databases and make recommendations for the establishment of such a database to serve the aerospace sector. The report recommends the Internet as the most suitable vehicle for this and describes a prototype International Aerospace Information Network (IAK Homepage which was developed by the Group for use as a Proof of Concept. In this prototype Homepage, which is intended to be a limited version of the finished network, several connections have been made to information sources as a demonstration of the concept and the capability that would be inherent in the final stage. It is stated that in order to deliver the desired data and information and needed services to the user, the network should include: the ability to search for aerospace and aerospace-related data and information across heterogeneous systems aerospace and aerospace-related data directory information the facility to order data products through a simplified 'one-stop shopping' procedure the delivery of data to users on a variety of standard media, including electronic delivery where appropriate.

Author

*Information Systems; Internets; Data Bases*