

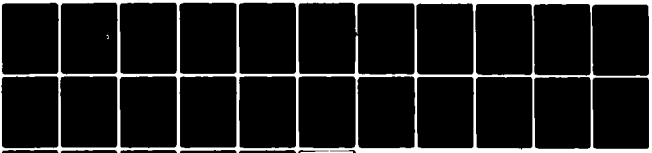
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# AGARD

ADVISORY GROUP FOR AEROSPACE RESEARCH & DEVELOPMENT

7 RUE ANCELLE 92200 NEUILLY SUR SEINE FRANCE

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## AGARD BULLETIN TECHNICAL PROGRAMME 1983

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## THE MISSION OF AGARD

The mission of AGARD is to bring together the leading personalities of the NATO nations in the fields of science and technology relating to aerospace for the following purposes:

- Exchanging of scientific and technical information;
- Continuously stimulating advances in the aerospace sciences relevant to strengthening the common defence posture;
- Improving the co-operation among member nations in aerospace research and development;
- Providing scientific and technical advice and assistance to the North Atlantic Military Committee in the field of aerospace research and development;
- Rendering scientific and technical assistance, as requested, to other NATO bodies and to member nations in connection with research and development problems in the aerospace field;
- Providing assistance to member nations for the purpose of increasing their scientific and technical potential;
- Recommending effective ways for the member nations to use their research and development capabilities for the common benefit of the NATO community.

The highest authority within AGARD is the National Delegates Board consisting of officially appointed senior representatives from each member nation. The mission of AGARD is carried out through the Panels which are composed of experts appointed by the National Delegates, the Consultant and Exchange Programme and the Aerospace Applications Studies Programme. The results of AGARD work are reported to the member nations and the NATO Authorities through the AGARD series of publications of which this is one.

Participation in AGARD activities is by invitation only and is normally limited to citizens of the NATO nations.

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PREFACE

This Bulletin presents the 1983 programme approved by the AGARD National Delegates Board. Section I includes a chronological listing of the meetings tentatively scheduled to take place during 1983 and Section II gives a detailed description of the individual Panel Programmes, the Consultant and Exchange Programme, and the Military Committee Studies Programme. The total budget required to support the Proposed 1983 AGARD Technical Programme is presented in Section III. The Publication Summary in Section IV identifies by activity the AGARD publications scheduled for publication in 1983.

Director

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I - CALENDAR OF PLANNED MEETINGS - 1983

CALENDAR OF PLANNED MEETINGS -- 1983

CALENDRIER DES REUNIONS PREVUES EN 1983

Tentative Dates	Location	Panel	Type of Meeting/Subject
1- 2 March	UNITED STATES (Dayton, Ohio)	GCP*	Lecture Series No.122/Cycle de Conférences No 122 <b>Application of Digital Mapping Technology to Guidance and Control Systems (NATO Secret)</b> <i>Application de la Technologie de la Cartographie Numérique aux Systèmes de Guidage et Contrôle (OTAN Secret)</i>
7- 8 March	ITALY (Rome)		
10- 11 March	UNITED KINGDOM (London)		
21- 25 March	BELGIUM (VKI)	FDP	<b>Special Course on Aerodynamic Characteristics of Controls</b> <i>Cours spécial sur les caractéristiques aérodynamiques des commandes</i>
23- 25 March	FRANCE (Paris)	HQ	<b>54th National Delegates Board Meeting</b> <i>54ème Réunion du Conseil des Délégués Nationaux</i> <b>32nd Steering Committee Meeting</b> <i>32ème Réunion du Comité d'Orientation</i> <b>34th Panel Chairmen Meeting</b> <i>34ème Réunion des Présidents de Panels</i> <b>13th National Coordinators Meeting</b> <i>13ème Réunion des Coordonnateurs Nationaux</i>
10-15 April	UNITED KINGDOM (London)	SMP	<b>56th Panel Meeting/Specialists' Meetings on</b> <b>(a) Characterization, Analysis and Significance of Defects in Composite Materials</b> <b>(b) Aeroelastic Considerations in the Preliminary Design of Aircraft</b> <i>56ème Réunion de Panel/Réunions de Spécialistes sur:</i> <i>(a) La caractérisation, l'analyse et les implications des défauts des matériaux composites</i> <i>(b) Considérations relatives à l'aéroélasticité dans la conception préliminaire d'un avion</i>
11-15 April	BELGIUM	GCP	<b>36th Panel Meeting/Symposium on Integration of Fire Control, Flight Control and Propulsion Control Systems (NATO Secret)</b> <i>36ème Réunion de Panel/Symposium sur l'Intégration des Systèmes de Conduite du Tir, de Contrôle du Vol et de Contrôle de la Propulsion (OTAN Secret)</i>
18-22 April	CANADA (Ottawa)	AVP	<b>45th Panel Meeting/Symposium on Advanced Concepts for Avionics/Weapon System Design, Development and Integration</b> <i>45ème Réunion de Panel/Symposium sur les Concepts Avancés d'Etude, de Développement et d'Intégration des Systèmes Electroniques de Bord et des Systèmes d'Armes</i>
18-22 April	FRANCE (Paris)	AMP	<b>Specialists' Meeting on Sustained Intensive Air Operations: Physiological and Performance Aspects (NATO Secret)</b> <i>Réunion de Spécialistes sur Les Opérations Aériennes Intensives Soutenues considérées sous l'angle de la Physiologie et des Performances (OTAN Secret)</i>
25-29 April	NETHERLANDS (Leiden)	FDP	<b>52nd Panel Meeting/Symposium on Aerodynamics of Vortical-Type Flows in Three Dimensions</b> <i>52ème Réunion de Panel/Symposium sur L'Aérodynamique des Ecoulements Tri-dimensionnels de Type Tourbillonnaire</i>

\* The full Panel titles are listed at the end of this Calendar.

<i>Tentative Dates</i>	<i>Location</i>	<i>Panel</i>	<i>Type of Meeting/Subject</i>
2-6 May	BELGIUM (VKI)	FDP*	<b>Special Course on Subsonic/Transonic Aerodynamic Interference</b> (Will also be given, as a Short Course, in the USA, 16-20 May (Wright-Patterson AFB, Dayton, Ohio)) <i>Cours Spécial sur l'Interférence de l'Aérodynamique Subsonique avec l'Aérodynamique Transsonique</i> (Sera également présenté aux Etats-Unis (Base Aérienne de Wright-Patterson, Ohio) du 16 au 20 Mai, sous forme de cours de durée limitée)
9-20 May	UNITED KINGDOM (Cranfield)	FMP	<b>Special Course on Flight Test Instrumentation</b> <i>Cours Spécial sur les Instruments des Essais en Vol</i>
9-11 May	NORWAY (NDRE Kjeller)	MCS	24th Meeting of AASC (NATO Secret) <i>24ème Réunion de l'AASC (OTAN Secret)</i>
9-13 May	GREECE	FMP	62nd Panel Meeting/Symposium on <b>Flight Mechanics and System Design Lessons from Operational Experience</b> <i>62ème Réunion de Panel/Symposium sur les Leçons Tirées de l'Expérience Opérationnelle en matière de Mécanique du Vol et de Conception des Systèmes</i>
23-27 May	GERMANY (Garmisch)	EPP	32nd Panel Meeting/Symposium on <b>Propagation Factors Affecting Remote Sensing by Radio Waves (NATO Secret)</b> <i>32ème Réunion de Panel/Symposium sur les Facteurs de Propagation Affectant la Détection à Distance par Ondes Radio (OTAN Secret)</i>
30 May 3 June	DENMARK	PEP	61st Panel Meeting/Specialists' Meetings on (a) <b>Viscous Effects in Turbomachines</b> (b) <b>Auxiliary Power Systems</b> <i>61ème Réunion de Panel/Réunion de Spécialistes sur</i> (a) <i>Les Effets de la Viscosité dans les Turbomachines</i> (b) <i>Les Groupes Moteurs Auxiliaires</i>
30-31 May 2-3 June	GREECE ITALY (Rome)	EPP	Lecture Series No.127/Cycle de Conférences No 127 <b>Modern HF Communications</b> <i>Les Communications Modernes à Hautes Fréquences</i>
14-15 June	UNITED STATES (Fort Monmouth, NJ)		
6-7 June	UNITED KINGDOM (London)		
9-10 June	ITALY (Rome)	AVP	Lecture Series No.126/Cycle de Conférences No 126 <b>Modern Display Technologies for Airborne Applications</b> <i>Les Technologies Modernes d'Affichage pour Applications Aéroportées</i>
16-17 June	UNITED STATES		
20-21 June	NORWAY (Trondheim)		
23-24 June	DENMARK	AVP	Lecture Series No.129/Cycle de Conférences No 129 <b>Speech Processing</b> <i>Le Traitement de la Parole</i>
27-28 June	NETHERLANDS (Delft)		
5-6 September	GERMANY (Stuttgart)	GCP	Lecture Series No.128/Cycle de Conférences No 128 <b>Computer Aided Design and Analysis of Digital G &amp; C Systems</b> <i>L'Etude et l'Analyse Automatisées des Systèmes Numériques de Guidage et Contrôle</i>
8-9 September	FRANCE (Paris)		
12-13 September	GREECE (Athens)		

\* The full Panel titles are listed at the end of this Calendar.

<i>Tentative Dates</i>	<i>Location</i>	<i>Panel</i>	<i>Type of Meeting/Subject</i>
12-16 September	CANADA (Ottawa)	TIP*	36th Panel Meeting/Specialists' Meeting on <b>The Application of new Technologies to Improve the Delivery of Aerospace and Defence Information</b> <i>36ème Réunion de Panel/Réunion de Spécialistes sur La Mise en Oeuvre de Technologies Nouvelles en vue d'améliorer la Diffusion des Informations relatives au Domaine Aérospatial et à la Defense</i>
21-23 September	GERMANY (Munich)	HQ	55th National Delegates Board Meeting <i>55ème Réunion du Conseil des Délégués Nationaux</i> 19th Annual Meeting <i>19ème Réunion Annuelle</i> 35th Panel Chairmen Meeting <i>35ème Réunion des Présidents de Panels</i>
25-30 September	PORTUGAL	SMP	57th Panel Meeting/Specialists' Meeting on <b>Materials Recycling and Substitution</b> <i>57ème Réunion de Panel/Réunion de Spécialistes sur Le Recyclage et le Remplacement des Matériaux</i>
25-29 September	ITALY	GCP	37th Panel Meeting/Symposium on <b>Guidance and Control Techniques for Advanced Space Vehicles (NATO Secret)</b> <i>37ème Réunion de Panel/Symposium sur les Techniques de Guidage et Contrôle pour Véhicules Spatiaux de Conception Avancée (OTAN Secret)</i>
26-30 September	TURKEY (Çesme)	FDP	53rd Panel Meeting/Symposium on <b>Wind Tunnels and Testing Techniques</b> <i>53ème Réunion de Panel/Symposium sur les Techniques d'Essais et de Souffleries</i>
3-6 October	UNITED KINGDOM (London)	AMP	40th Panel Meeting <i>40ème Réunion de Panel</i>
3-7 October	TURKEY (Çesme)	PEP	62nd Panel Meeting/Symposium on <b>Combustion Problems in Turbine Engines</b> <i>62ème Réunion de Panel/Symposium sur les Problèmes de Combustion des Turbomoteurs</i>
5-6 October	UNITED STATES (Gaithersburg, Maryland)	} TIP	Lecture Series No.130/Cycle de Conférences No 130 <b>Development and Use of Numerical and Factual Data Bases</b> <i>Développement et Utilisation des Bases de Données Concernant Nombres et Faits</i>
10-11 October	UNITED KINGDOM (London)		
13-14 October	PORTUGAL (Lisbon)		
10-14 October	BELGIUM (Brussels)	FMP	63rd Panel Meeting/Symposium on <b>Technology for Sustained Supersonic Cruise and Manoeuvre (NATO Secret)</b> <i>63ème Réunion de Panel/Symposium sur la Technologie des Croisières et Manoeuvres Prolongées en Régime Supersonique (OTAN Secret)</i>
17-21 October	UNITED STATES (NASA Langley)	AVP	46th Panel Meeting/Symposium on <b>Space Systems Applications to Tactical Operations (NATO Secret)</b> <i>46ème Réunion de Panel/Symposium sur les Applications des Systèmes Spatiaux aux Opérations Tactiques (OTAN Secret)</i>

\* The full Panel titles are listed at the end of this Calendar.

<i>Tentative Dates</i>	<i>Location</i>	<i>Panel</i>	<i>Type of Meeting/Subject</i>
20-21 October	TURKEY (Ankara)	EPP*	Lecture Series No.131/Cycle de Conférences No 131 <b>The Performance of Antennas in their Operating Environment</b> <i>Fonctionnement des Antennes dans leur Environnement Opérationnel</i>
24-25 October	GREECE		
27-28 October	PORTUGAL**		
7-11 November	NORWAY	EPP	33rd Panel Meeting/Symposium on <b>Characteristics of the Lower Atmosphere Influencing Radio Wave Propagation</b> <i>33ème Réunion de Panel/Symposium sur les Caractéristiques de la basse atmosphère exerçant une influence sur la propagation des ondes radio</i>
14-16 November	NETHERLANDS (The Hague)	MCS	25th Meeting of AASC (NATO Secret) <i>25ème Réunion de l'AASC (OTAN Secret)</i>
14-18 November	NORWAY	AMP	<b>Special Course: 7th Advanced Operational Aviation Medicine Course</b> <i>Cours spécial: 7ème Cours Avancé de Médecine Aéronautique Opérationnelle</i>

\* AMP Aerospace Medical Panel  
 AVP Avionics Panel  
 EPP Electromagnetic Wave Propagation Panel  
 FMP Flight Mechanics Panel  
 FDP Fluid Dynamics Panel  
 GCP Guidance and Control Panel

PEP Propulsion and Energetics Panel  
 SMP Structures and Materials Panel  
 TIP Technical Information Panel  
 MCS Military Committee Studies  
 HQ Headquarters

\*\* May be cancelled/Susceptible d'être annulé.

## II – PROGRAMME DESCRIPTIONS

### PANELS

#### CONSULTANT & EXCHANGE PROGRAMME

- INDIVIDUAL CONSULTANTS
- LECTURE SERIES

#### MILITARY COMMITTEE STUDIES

#### HEADQUARTERS

## AEROSPACE MEDICAL PANEL

*Chairman:* Médecin Colonel J.BANDE, Belgium  
*Deputy Chairman:* Air Commodore P.HOWARD, UK  
*Executive:* Sqn Ldr J.M.MULLANEY, UK

### PROGRAMME

The 1983 Aerospace Medical Panel programme will include a Symposium, the 7th Advanced Operational Aviation Medicine Course, the initiation of two AGARDographs and Working Group activities.

The Symposium will be entitled 'Sustained Intensive Air Operations: Physiological and Performance Aspects'. The ability of men, both aircrew and ground personnel, to perform their duties in spite of the physical and mental stresses imposed upon them is a vital factor in determining the ability of the NATO air forces to operate effectively in war. The need to generate high sortie rates over several days requires special efforts to minimise the effects of the stresses to which aircrew are exposed in flight and on the ground. Similar considerations apply to command and control staff and to ground support personnel carrying out, for example, aircraft servicing and runway repair. The adoption by NATO air forces of measures to protect personnel against the effects of bacteriological and chemical warfare (BCW) agents has added greatly to the stresses imposed upon all personnel involved in air operations. NATO air forces are currently developing and exercising equipment and procedures with a view to minimising the deleterious effects of these changes in the nature and the magnitude of the stresses placed upon personnel. Considerable aviation medicine research is being devoted to these areas both in laboratory studies and in the field. Contributions to the Symposium will be presented in four topic areas: The Operational Scenario, Field Studies of Sustained Operations, Laboratory Studies of the Effects of Sustained Operations, and Methods of Improving Effectiveness in Sustained Intensive Operations. The meeting will be classified Secret.

The 7th Advanced Operational Aviation Medicine Course will be held in Norway from 14-18 November. The course is aimed at experienced Flight Medical Officers/Surgeons and will include lectures on NBC warfare protection, High-G protection, Oxygen systems, Survival, Tropical medicine and Hearing conservation.

### MEETINGS

Symposium	- Sustained Intensive Air Operations: Physiological and Performance Aspects (NATO-Secret)	18-22 April 1983 France
40th Panel Meeting	-	3-6 October 1983 UK

### PUBLICATIONS

<i>Subject</i>	<i>Projected Publication Date</i>
<b>Visual Function in High Altitude and Space</b> AGARDograph (French and English versions)	March 1983
<b>Sustained Intensive Air Operations: Physiological and Performance Aspects</b> Conference Proceedings	July 1983
<b>The Medical Aspects of Survival Training for Aircrew</b> AGARDograph (English and French versions)	February 1983
<b>Aircrew Helmets - A Historical Compilation of the Design, Development, Specifications, and Protective Performance Aspects</b> AGARDograph	September 1983

## AVIONICS PANEL

*Chairman* Mr Y. BRAULT, France  
*Deputy Chairman:* Dr F. DIAMOND, US  
*Executive:* Lt Col J.B. CATILLER, US

### PROGRAMME

The 1983 Avionics Panel programme will consist of two Symposia and sponsorship of two Lecture Series.

The Spring Symposium will be entitled 'Advanced Concepts for Avionics, Weapon System Design, Development & Integration Concepts'. This will involve coordination and cooperation with three other AGARD Panels, FMP, GCP, and FDP. Modern military aircraft take full advantage of the rapid developments in the computer and electronic industry to achieve the design aims. The result is that as each new design leans more heavily on avionics, the overall systems become more complex and more complicated. To date, overall Weapon Systems are structured to interdependent sub systems. In order to maintain reasonable timescales throughout the development and test phase, intelligent design concepts and proper coordination of the development programme is essential.

Due to both the technical aspects of the highly advanced avionic systems under discussion, and the overall timescale for weapon system development it is required that fully operational integrated systems, particularly the avionics system, be installed into the aircraft subsequent to airframe completion. Such a development concept must be based upon fundamental proceedings, such as, start of design in terms of overall systems aspects, timely parallel activities in all relevant disciplines, retention of design and application flexibility and growth potential, by means of appropriate data processing, and comprehensive ground testing prior to airborne demonstration of the weapon system.

It is expected that new ideas will be brought out and exchanged in this symposium, as a result of the expertise gained during recent projects. These should benefit Integrated System Development for future defence programmes.

The symposium will not be limited to Avionics Specialists but should contribute significantly to a mutual understanding of all disciplines involved in military aircraft engineering.

The Fall AVP Specialists' Meeting will be entitled 'Space Systems Applications to Tactical Operations' and classified NATO-Secret. The advances in space technology and systems during the past decade hold promise for important applications to tactical military operations. Military communications satellites such as the NATO series and the US FLEETSATCOM are already essential elements in military command and control systems. The various civil and military weather satellites permit more accurate and more timely weather forecasting and have become of critical importance to all military operations. The 18-satellite Global Positioning System which is currently under development may revolutionize weapon system navigation and guidance over the next decade.

The likely impact of these combined space assets as well as of other advanced systems currently under study on tactical military operations is hardly appreciated by the leaders of the R & D community in all of the NATO Nations. The proposed symposium would include a discussion of tactical requirements in command and control, weather, navigation, and related areas that could benefit from space-borne sensors and communications. A description of current and planned space assets will be coupled with a discussion of ground and mobile equipment requirements and operational usage.

This symposium should enhance the ability of the NATO R & D Community to contribute to future space related developments and to aid in the use of space assets for tactical applications.

The two Lecture Series proposed are on 'Modern Display Technology' an outgrowth of a Panel Working Group just being completed with the same title, and one on 'Speech Processing'.

### MEETINGS

45th Panel Meeting/ Symposium	<b>Advanced Concepts for Avionics/Weapon System Design, Development &amp; Integration</b>	18-22 April 1983 Canada
46th Panel Meeting/ Symposium	<b>Space Systems Applications to Tactical Operations (NATO-Secret)</b>	17-21 October 1983 US

## PUBLICATIONS

<i>Subject</i>	<i>Projected Publication Date</i>
<b>Software for Avionics</b> Conference Proceedings	March 1983
<b>Advanced Concepts for Avionics Weapon System Design, Development and Integration</b> Conference Preprints	April 1983
<b>Advanced Concepts for Avionics Weapon System Design, Development and Integration</b> Conference Proceedings	November 1983
<b>Space Systems Applications to Tactical Operations</b> - Classified Meeting Conference Preprints	October 1983

## ELECTROMAGNETIC WAVE PROPAGATION PANEL

<i>Chairman</i>	Dr J. BELROSI, Canada
<i>Deputy Chairman</i>	Dr J. BLYTHE, UK
<i>Executive</i>	Lt Col J. B. CATILLER, US

### PROGRAMME

The 1983 Electromagnetic Wave Propagation Panel programme will consist of two Symposia and sponsorship of two Lecture Series.

The Spring Meeting will be entitled 'Propagation Factors Affecting Remote Sensing by Radio Waves'. HF radars sense both natural and man-made targets over vast areas well beyond the optical horizon. They do this by bouncing radio waves off the ionosphere. Development of this means of remote sensing has proceeded since the late forties. Early studies concentrated on the mapping of the properties of the ionosphere itself. Later studies have emphasized two applications: (1) the detection and tracking of targets such as aircraft, missiles, and ships, and (2) the measurement of the sea state. On-going research and development activities continue to improve our capability to deal with ionospheric properties which limit the performance of such systems.

This meeting will provide a timely opportunity to review progress on the topic, and to define outstanding problems which may still limit the wider application of the technique as an operational tool. Subjects for discussion will include target detection tracking, sea state monitoring, ionospheric limitations to performance, system techniques (antennas adaptive arrays, transmitters & receivers, data processing and display, techniques and equipment).

The Fall Symposium will be entitled 'Characteristics of the Lower Atmosphere Influencing Radio Wave Propagation'. Radio waves must necessarily travel through the lower atmosphere for any ground or space link where at least one end is near the ground. Consequently, its influence on wave propagation acts on the whole radio spectrum and becomes much greater at frequencies greater than 30 MHz. Though this problem has already been discussed in several symposia it will be interesting to investigate more deeply some aspects which have now become prominent, both from a physical point of view and from a telecommunication point of view. The two following topics will be examined: Effects due to clear air atmospheric refraction, especially super-refraction, including ducting and effects due to non-gaseous elements of atmosphere (rain clouds, snow, hail, sand, etc.).

The two Lecture Series will be on 'Modern HF Communications' and 'The Performance of Antennas in Their Operating Environment'.

### MEETINGS

32nd Panel Meeting/ Symposium	<b>Propagation Factors Affecting Remote Sensing by Radio Waves (NATO-Secret)</b>	23 - 27 May 1983 Germany
33rd Panel Meeting/ Symposium	<b>Characteristics of the Lower Atmosphere Influencing Radio Wave Propagation</b>	7 - 11 November 1983 Norway

### PUBLICATIONS

<i>Subject</i>	<i>Projected Publication Date</i>
<b>Propagation Aspects of Frequency Sharing and Interference and System Diversity</b> Conference Proceedings	March 1983
<b>Propagation Factors Affecting Remote Sensing by Radio Waves - Classified Meeting</b> Conference Preprints    Unclassified Papers	May 1983
<b>Propagation Factors Affecting Remote Sensing by Radio Waves - Classified Meeting</b> Conference Proceedings    Unclassified Papers	October 1983

<i>Subject</i>	<i>Projected Publication Date</i>
<b>Propagation Factors Affecting Remote Sensing by Radio Waves</b> Classified Meeting Conference Proceedings Classified Supplement	October 1983
<b>Characteristics of the Lower Atmosphere Influencing Radio Wave Propagation</b> Conference Preprints	October 1983

## FLIGHT MECHANICS PANEL

*Chairman* Mr R.J.BALMER, UK  
*Deputy Chairman:* Dr S.R.M.SINCLAIR, Canada  
*Executive:* Mr J.LAWFORD, UK

### PROGRAMME

In 1983, the Flight Mechanics Panel will hold two symposia and will support a Special Course, in addition to Working Group and AGARDograph activities.

The aim of the Spring Symposium, on 'Flight Mechanics and System Design Lessons from Operational Experience', is to consider the flight mechanics aspects of aircraft accidents or incidents as the basis for new or improved design or operational concepts. Topics to be covered include:

Methods for reporting and recording operational problems, incidents and accidents, and lessons from the analysis of these data, with particular emphasis on aircraft having recently become operational.

Lessons drawn from experience in adverse environmental conditions (low visibility, icing, turbulence, etc.).

Survivability under failure conditions (e.g., failures in fly-by-wire/active control systems: flight techniques for these conditions).

Man-machine interface flight deck design and displays, training procedures, aircrew factors in accidents.

This symposium will be unclassified.

The second symposium will be concerned with 'Technology for Sustained Supersonic Cruise and Manoeuvre'. Research on aircraft designs during the past decade in NATO nations has been concentrated on improvements at subsonic and transonic speeds. Typically, supersonic flight of current fighters is restricted to short-range dashes. Studies recently made have indicated that there may be value in emphasising also the possibilities of *sustained* supersonic cruise and manoeuvre performance at speeds of about Mach 2 and beyond for future applications. *Potential effectiveness improvements due to supersonic cruise capability may expand attack options and reduce exposure to hostile action.* Another application is related to medium range missile air combat which also may benefit from the supersonic cruise capability of the launching aircraft.

The objective of this symposium is to review and report on the current state-of-the-art in technological areas related to sustained supersonic cruise and manoeuvre of aircraft and to consider the *technical problems and the additional technology work* which would be of most benefit. In view of the past de-emphasis of supersonic flight it is important to consider areas of knowledge and research capability for this speed range that might be falling into neglect. The contributions of other Panels will be sought for this review: topics to be addressed will include:

Experience with sustained supersonic cruise, potential mission advantages, overview of critical technologies.

Aerodynamics (supersonic cruise configurations, methods, design variables).

Propulsion (engine requirements, engine/airframe integration).

Integration and design (structures and materials, discipline interactions, stores carriage and separation, performance trades).

The format for this meeting will be that of a 2½ days' symposium, to be followed by a 1-day workshop for a task team of limited size (including representatives of the other interested Panels) which would assess the state of supersonic cruise and manoeuvre technology and recommend additional effort which might be undertaken in order to assure the option for possible future NATO military applications. The FMP would then meet for a ½ day review and discussion of the workshop report. Members of other Panels would be invited to attend this session.

This symposium will be classified NATO Secret.

The Panel will give its support, in conjunction with CPP, to a further Special Course on Flight Test Instrumentation, to be held on this occasion at the Cranfield Institute of Technology. This course will again be aimed at providing flight test instrumentation engineers with both the theory and practical application of instrumentation techniques and will include flight time in a laboratory aircraft.

The activities of the Flight Test Techniques Group (WG 11) will continue, with 5-6 volumes in production by authors from 4 nations. WG 12 on Validation of Missile System Simulation will continue its work: the WG report will be published in 1984.

During 1983 the publication of AGARDographs on simulation fidelity for aircraft ground operations and on flight test methods for pilot workload measurement are planned.

#### MEETINGS

62nd Panel Meeting/ Symposium	<b>Flight Mechanics and System Design Lessons from Operational Experience</b>	9 - 13 May 1983 Greece
63rd Panel Meeting/ Symposium	<b>Technology for Sustained Supersonic Cruise and Manoeuvre (NATO-Secret)</b>	10 - 14 October 1983 Belgium

#### PUBLICATIONS

<i>Subject</i>	<i>Proposed Publication Date</i>
<b>Ground/Flight Test Techniques and Correlation</b> Conference Proceedings	January 1983
<b>Ground Flight Test Techniques and Correlation</b> Technical Evaluation Report	January 1983
<b>Flight Mechanics and System Design Lessons from Operational Experience</b> Conference Proceedings	August 1983
<b>Aircraft Simulation Fidelity for Ground Performance Operations</b> AGARDograph	September 1983
<b>Flight Test Techniques for Pilot Workload Measurement</b> AGARDograph	July 1983
<b>Signal Conditioning</b> AGARDograph	March 1983
<b>Parameter Identification</b> AGARDograph	November 1983
<b>Determination of Antenna Patterns and Radar Reflection Characteristics of Aircraft</b> AGARDograph	

## FLUID DYNAMICS PANEL

*Chairman:* M. l'Ing. en Chef B. MONNERIE, France  
*Deputy Chairman:* Dr L. ROBERTS, US  
*Executive:* Mr R.H. ROLLINS II, US

### PROGRAMME

In 1983, the Fluid Dynamics Panel will hold two Symposia, sponsor two Special Courses, support three Working Groups and publish several reports.

The Spring Symposium of the Panel will be concerned with 'Aerodynamics of Vortical-Type Flows in Three Dimensions'. Because the speed and manoeuvre requirements of modern aircraft increasingly involve flow regimes where vortical flows are formed and our understanding of such flows is fragmentary and mainly qualitative, the symposium will be directed at better understanding the situation. Leading and trailing edge vortical flows and interaction with neighbouring surfaces, vortex formations associated with separation bubbles as well as with extensive separated flows, and the stability of vortical flows will be included in the scope of the meeting. The Symposium will review current work and will lead to recommendations for future areas of profitable research.

The Fall Symposium, on 'Wind Tunnels and Testing Techniques' is planned by the Panel Subcommittee of that name and will include the topics of wind-tunnel design, flow quality, data accuracy, fluid motion problems such as scale effects and operating temperatures, testing techniques, instrumentation and model design, and the use of computers in wind-tunnel testing. The symposium follows a number of preparatory efforts by the Subcommittee during the period since the last large meeting on the subject in 1975.

The Panel will sponsor two Special Courses on the topics 'Aerodynamic Characteristics of Controls' and 'Subsonic/Transonic Aerodynamic Interference' to be presented at the von Kármán Institute.

Working Groups on 'Large Scale Computing in Aeronautics' and 'Test Cases for Steady Inviscid Transonic/Supersonic Flow' are scheduled to complete their work during 1983. A third Working Group on 'Aerodynamics of Aircraft Afterbodies', approved in 1982, will continue its work until 1984.

### MEETINGS

52nd Panel Meeting/ Symposium	- Aerodynamics of Vortical-Type Flows in Three Dimensions	25-29 April 1983 Netherlands
53rd Panel Meeting/ Symposium	- Wind Tunnels and Testing Techniques	26-30 September 1983 Turkey

### PUBLICATIONS

<i>Subject</i>	<i>Projected Publication Date</i>
<b>Two-Phase Flow Advisory Report</b>	February 1983
<b>Subsonic/Transonic Aerodynamics for Aircraft AGARD Report</b>	February 1983
<b>Aerodynamics of Missiles Technical Evaluation Report</b>	March 1983
<b>Aerodynamic Characteristics of Controls AGARD Report</b>	March 1983

<i>Subject</i>	<i>Projected Publication Date</i>
<b>Aerodynamics of Vortical-Type Flows in Three Dimensions</b> Conference Preprints	April 1983
<b>Aerodynamics of Vortical-Type Flows in Three Dimensions</b> Conference Proceedings	July 1983
<b>Wind Tunnels and Testing Techniques</b> Conference Preprints	September 1983
<b>Aerodynamics of Vortical-Type Flows in Three Dimensions</b> Technical Evaluation Report	September 1983
<b>Aerodynamics of Low Reynolds Number Vehicles</b> AGARDograph	December 1983
<b>Wind Tunnels and Testing Techniques</b> Conference Proceedings	December 1983
<b>Two-Dimensional Separated Flow</b> AGARDograph	December 1983

## GUIDANCE AND CONTROL PANEL

*Chairman:* Mr R.S.VAUGHN, US  
*Deputy Chairman:* Dr Ing. R.C.ONKEN, Germany  
*Executive:* Mr B.M.HELIOT

### PROGRAMME

The Guidance and Control Panel programme proposed for 1983 will consist mainly of two symposia and two AGARDographs. In addition, the Panel will sponsor a Lecture Series and initiate, if approved by the Board, two new Working Groups.

The Spring Symposium will deal with the 'Integration of Fire Control, Flight Control and Propulsion Control Systems'. In this symposium, the potential, and problems, of integrating mission critical and flight critical systems will be examined, particularly the various methods of integrating flight control, propulsion control and fire control.

Such integrated systems can be expected to improve the performance of an aircraft in all phases of a mission. During the enroute and return phases fuel conservation flight profiles may be available. Prior to an attack energy management profiles will be available to maximise the energy of the attacker and during the attack phase integrated fire and flight control will maximise the firing opportunities. Similar considerations apply to missiles and other unmanned vehicles.

In addition, integration of these control systems is expected to provide enhancements of flight safety by reducing pilot work load. A further improvement in survivability is also to be expected from the use of curved attack profiles in both air-to-air and air-to-ground attacks particularly when such systems are coupled to direct force controls or vectored thrust controls.

This symposium will cover the Integration of fire control systems; Integration of propulsion control systems; Integration of Diagnostics, self-test, built-in test for flight control, fire control and propulsion; Integration of propulsion flight control; Integration of fire/flight control; Systems studies and results; *Experimental results*.

This meeting will be classified NATO-SECRET.

The Fall Symposium will deal with the 'Guidance and Control Techniques for Advanced Space Vehicles'.

Increased emphasis on military applications in space suggests the need for a symposium to review the concepts and technology issues involved in spacecraft navigation, control and stabilization. The operational need for new, large, long life, flexible spacecraft and the necessity to achieve survivability with new concepts sets a demanding challenge to guidance and control technologies as well as that of command and control, communication and intelligence.

The rapidly developing technologies in computer architecture, microprocessors, and data distribution systems, would permit multifunctional use of various sensors or information sources to provide the capability to produce low cost, more effective and survivable systems. Unique aspects of large spacecraft are the control of the structural configuration in order to achieve a specific pointing accuracy. The purpose of this meeting is to discuss technical aspects, design characteristics and guidance and control considerations involved in assembly and operation of such systems.

The symposium will contain the following sessions: Review of mission requirements and technology issues; Sensors, actuators and configurations; Control and stabilization techniques; Very long lifetime satellites, in-orbit reconfiguration; Large and flexible spacecraft; Simulation, test and performance evaluation.

This meeting will be classified NATO-SECRET.

The Panel will publish the AGARDograph on 'Fire Control Systems' already approved in 1982 and will also prepare for publication a second AGARDograph on 'Fault Tolerant Considerations and Methods for Guidance and Control Systems'.

This AGARDograph will be describing the recent trends and developments in analysis and design methods for fault tolerant guidance and control systems architectures. The problems and issues associated with these architectures, including both hardware and software aspects, will be addressed exploring the many developments underway in NATO in this area.

The Lecture Series sponsored by the Panel on 'Direct Digital Design and Computer Aided Design Methods for Guidance and Control System Design and Analysis' is intended for providing the basic concepts, theories and computer

methods involved in the design of advanced guidance and control systems. It intends also to perform a comprehensive review of direct digital analysis and synthesis procedures; furthermore, an intricate part of this Lecture Series will be computer aided and graphical techniques that can be employed in preliminary design, synthesis and real-time simulation.

Lastly, the Panel will, subject to approval by the National Delegates Board, initiate two new Working Groups. The first on 'Improved Guidance and Control Automation at the Man-machine Interface'. The objective of this working group would be a better utilization of available control technology to improve the man-machine interface of flight vehicles. Historically, the pilot has been given control inputs which correspond to the actuators on the vehicle, e.g. throttle, ailerons, elevator, rudder. However, there is evidence, that under high workload, in poor visibility, or for maximum combat capability, the pilot could perform better with control inputs more directly related to the outputs over which he needs control.

It is important to identify those flight vehicle control functions best suited for automation and those best assigned to the pilot.

The Working Group, of interest to GCP, AMP and FMP, will span over a period of two years. Four meetings would be held in conjunction with the Guidance and Control Panel Symposia, and the report available for printing in 1985.

The second Working Group would deal with 'The Implications of using ADA for Coding Guidance and Control Systems Software'. This proposal will be presented for approval at the Fall 1982 NDB Meeting.

The advent of ADA as a real time high level language for defence systems means that it will potentially be available for coding guidance and control systems software in the mid 1980's.

Before ADA becomes available, a number of areas should be considered first, so that the safety and integrity of guidance and control systems - particularly those critical to aircraft safety - are not compromised. The purpose of the Working Group would be:

- (i) to develop and consider a set of requirements for a high level language from a guidance and control systems viewpoint;
- (ii) to evaluate the features facilities afforded by ADA against these requirements;
- (iii) to consider, if appropriate, a specific subset of the ADA language which would be acceptable for coding guidance and control systems which meets the requirements at (i).

The duration of the Working Group would be two years with four meetings and the report being available in 1985.

#### MEETINGS

36th Panel Meeting/ Symposium	<b>Integration of Fire Control, Flight Control and Propulsion Control Systems (NATO-Secret)</b>	11 - 15 April 1983 Belgium
37th Panel Meeting/ Symposium	<b>Guidance and Control Techniques for Advanced Space Vehicles (NATO-Secret)</b>	25 - 29 September 1983 Italy

#### PUBLICATIONS

<i>Subject</i>	<i>Projected Publication Date</i>
<b>Integration of Fire Control, Flight Control and Propulsion Control Systems</b> Conference Proceedings and Supplement	July 1983
<b>Guidance and Control Techniques for Advanced Space Vehicles</b> Conference Proceedings and Supplement	December 1983
<b>Fire Control Systems</b> AGARDograph	August 1983
<b>Fault Tolerant Considerations and Methods for Guidance and Control Systems</b> AGARDograph	October 1983
<b>Ground and Flight Testing for Aircraft Guidance and Control*</b> AGARDograph	December 1983

\* Deferred from programme of previous year.

## PROPULSION AND ENERGETICS PANEL

*Chairman:* Prof. E.E. COVERT, US  
*Deputy Chairman:* Prof. Ch. HIRSCH, Belgium  
*Executive:* Dr-Ing. E.E. RIESTER, FRG

### PROGRAMME

In 1983 the Propulsion and Energetics Panel will place the primary emphasis for its activities on gas turbine engines. The Panel will hold two Specialists' meetings, the first on *Viscous Effects in Turbomachines*, and the second on *Special Applications in Auxiliary Power Systems*. These meetings are to be held in the Spring of 1983. The Panel proposed a Fall 1983 Symposium on Combustion Problems in Turbine Engines, a subject from which the Panel derived its original name (Combustion Panel). Because of its importance this subject is reviewed regularly. The last meeting on this topic took place in the Fall 1979. The importance of combustion makes this subject attractive at this time.

The final reports of Working Group 13 on Alternative Jet Engine Fuels and of Working Group 14 on Suitable Averaging Techniques in Non-Uniform Internal Flows will be completed in 1982. The Panel will continue its efforts on Working Group 15 on Uniform Engine Testing Program and on Working Group 16 on Supply and Demand Scenarios for Aviation Turbine Fuels in 1983. A new Working Group 17 on Performance of Rocket Motors with Metallized Propellants is proposed to start in 1983. The AGARDograph on Manual for Aeroelasticity in Turbomachines will be continued in 1983 and the Panel will publish the outcome of an Additional Support to Portugal on Measurement Techniques in High-Intensity Flames, as an AGARDograph, in 1983.

#### Viscous Effects in Turbomachines

The Panel agreed that a narrowly defined two-day Specialists' meeting would be desirable and that this could be best accomplished by limiting the contributions to viscous flow and secondary flow effects in multi-stage axial flow machines. A program of 16 to 18 papers is envisioned. The meeting would be arranged in four sessions tentatively entitled: *Multi-stage end-wall boundary-layer prediction; viscous-inviscid interactions; experimental measurements from multi-stage turbomachines; and viscous flow computations.*

#### Auxiliary Power Systems

The scope of this Specialists' meeting will not be limited to auxiliary power units (APUs) for aircraft but will also include power sources for control systems and emergency power generation. Power systems for missiles will be excluded. The main topics will be: *general auxiliary power system requirements and auxiliary power for both fighter and transport aircraft; current experience and future developments of shaft-power take-off, progress in components and accessories, control problems, emergency power generation of auxiliary gas turbines; provision of power for electrical and hydraulic systems and cooling problems, including those problems that arise from use of alternative fuels as a heat sink.*

#### Combustion Problems in Turbine Engines

The scope of the Symposium to be held in the Fall 1983 is not yet determined, but it is intended to be rather broad. Thus, the Symposium will include: *new problems and improvements in the field of combustion and reheat; research and result on combustion stability; distribution of mixture in low-pollution and multifuel combustors; combustion problems with alternative jet engine fuels; combustion of highly aromatic fuels; deflagration-detonation transition in pre-mixed gases.*

#### Working Groups

WG 15 on Uniform Engine Testing Program will have finished the test runs in the US (NASA, NAPC and AEDC), in Canada (NRC), in the UK (NGTE) and probably in France (CEPr). Test series in Turkey will be carried out in 1984. It is planned to run the final or control test at NASA Lewis in 1984, too.

WG 16 ... Supply and Demand Scenarios for Aviation Turbine Fuels will be in a data "processing" phase, based on the European and Canadian input. After the computing is completed, the results will have to be reviewed.

A new Working Group 17 on Performance of Rocket Motors with Metallized Propellants is approved at the March 1982 NDB meeting to start in 1983. This WG is mainly concerned with the high accuracy needed for the prediction of the specific impulses and for its measurement under altitude conditions.

### Publications

The AGARDograph on Manual for Aeroelasticity in Turbomachines will come into a progress phase after solving the funding problems of the editors in 1981. The AGARDograph will be prepared in collaboration with SMP.

In an AGARDograph the outcome of the Additional Support to Portugal Project on Measurement Techniques in High-Intensity Flames will be published in 1983 after being reviewed by a PEP Review Committee.

### Additional Support to the Southern Flank Countries

The Panel has got NDB approval for three new projects: Training in Spray Measurement Technique (P8); Flash back in advanced pre-vaporizing pre-mixing gas turbine combustors (P9); and Investigations on the performance prediction capabilities of various loss and deviation correlations in turbomachinery (T15).

### MEETINGS

61st Panel Meeting/ Specialists' Meetings	- Viscous Effects in Turbomachines - Auxiliary Power Systems	30 May - 3 June 1983 Denmark
62nd Panel Meeting/ Symposium	- Combustion Problems in Turbine Engines	3 - 7 October 1983 Turkey

### PUBLICATIONS

<i>Subject</i>	<i>Projected Publication Date</i>
<b>Engine Handling</b> Conference Proceedings	January 1983
<b>Evaluation of Measurements in Flames</b> AGARDograph	April 1983
<b>Viscous Effects in Turbomachines</b> Conference Preprints	March 1983
<b>Viscous Effects in Turbomachines</b> Technical Evaluation Report	in the Proceedings
<b>Viscous Effects in Turbomachines</b> Conference Proceedings	August 1983
<b>Auxiliary Power Systems</b> Conference Preprints	March 1983
<b>Auxiliary Power Systems</b> Technical Evaluation Report	in the Proceedings
<b>Auxiliary Power Systems</b> Conference Proceedings	August 1983
<b>Combustion Problems in Turbine Engines</b> Conference Preprints	July 1983

## STRUCTURES AND MATERIALS PANEL

*Chairman:* Dr G.COUPRY, France  
*Deputy Chairman:* Dr W.WALLACE, Canada  
*Executive:* Mr J.M.N.WILLIS, UK

### PROGRAMME

The Spring 1983 Panel Meeting will include two Specialists' Meetings. The first Meeting on 'Characterization, Analysis and Significance of Defects in Composite Materials' will be concerned with the fact that the knowledge which would permit rational decisions on the type and extent of defects that can be accepted is scarce. This tends to result in rejection of any suspected component, often far below the level of reasonable risk. The Meeting will attempt to draw some guidelines for a more comprehensive qualification policy, supported by the experience already gained, the progress of inspection procedures and of analysis methods.

The second Specialists' Meeting will be on the subject of 'Aeroelastic Considerations in the Preliminary Design of Aircraft' and is part of the continuing responsibility of the Aeroelasticity Sub-Committee for the development of methods of analysis of unsteady airloads and the transformation of results into design information.

The Fall 1983 Panel Meeting will include a Specialists' Meeting on 'Materials Recycling and Substitution' which responds to the growing concern in most industrialized nations about the possibility of dislocations in supply, the increasing cost of many materials and fabricated components and the probably limited absolute availability of some elements. The Meeting will review the state-of-the-art of materials recycling and substitution in selected areas of critical importance to aerospace technology with the objective of stimulating the development of new knowledge and technology which will make NATO nations less susceptible to sudden or long-term dislocations.

A cooperative testing programme on 'Aircraft Environment Simulation Fatigue Testing', started in 1981, will be near completion and a Workshop will be held in Fall 1983 to review results to date. A final report will follow in 1984.

Major publications planned for 1983 are the final report on the 'Fatigue Rated Fastener Systems' cooperative testing programme, Vol.II of the Handbook on Corrosion, the Helicopter Fatigue Design Guide, and Chapter 8 of the Manual on Fatigue of Structures. Work will continue on further Volumes of the Handbook on Corrosion and on a Manual for Aeroelasticity in Turbomachines.

### MEETINGS

56th Panel Meeting/ Specialists' Meetings	– Characterization, Analysis and Significance of Defects in Composite Materials – Aeroelastic Considerations in the Preliminary Design of Aircraft	10–15 April 1983 United Kingdom
57th Panel Meeting/ Specialists' Meeting	– Materials Recycling and Substitution	25–30 September 1983 Portugal

### PUBLICATIONS

<i>Subject</i>	<i>Projected Publication Date</i>
Characterization, Analysis and Significance of Defects in Composite Materials Conference Proceedings	August 1983
Aeroelastic Considerations in the Preliminary Design of Aircraft Conference Proceedings	August 1983

<i>Subject</i>	<i>Projected Publication Date</i>
<b>Helicopter Fatigue Design Guide</b> AGARDograph	May 1983
<b>Handbook on Corrosion, Volume I</b> AGARDograph	August 1983
<b>Manual on Fatigue of Structures,</b> Volume II, Chapter 8 French	July 1983
<b>Fatigue Rated Fastener Systems</b> Report	November 1983
Miscellaneous Reports (7)	July - December 1983

## TECHNICAL INFORMATION PANEL

*Chairman* Mr H.F.SAUTER, US  
*Deputy Chairman* Mr H.K.KROG, Norway  
*Executive* Mr E.T.SHARP

### PROGRAMME

In accordance with usual practice, the Technical Information Panel will hold one Specialists' Meeting during the year. This will be in Ottawa, Canada, in the Fall and has as its prime objective a review of new techniques, practices and equipment relating to communication networks and information delivery systems and a discussion of how these are being, or can be, applied to increase the effectiveness of programme managers, engineers, and scientists.

Attention will be directed particularly to the interconnecting of data bases and information centres within communications systems which will permit the retrieval and delivery of separate pieces of information for aggregation and post-processing by end-users. Other matters to be dealt with are ways and means by which intelligent terminals, micro- and mini-computers can be used in the actual aggregation and post-processing tasks. Examples of how the new technologies, etc., can improve the decision-making capability and increase the productivity of scientists and engineers will be provided.

A Lecture Series on 'Development and Use of Numerical and Factual Data Bases' is also proposed by the Panel for 1983.

### MEETING

36th Panel Meeting/ Specialists' Meeting	<b>The Application of New Technologies to Improve the Delivery of Aerospace and Defence Information</b>	12-16 September 1983 Canada
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### PUBLICATIONS

<i>Subject</i>	<i>Projected Publication Date</i>
<b>The Application of New Technologies to Improve the Delivery of Aerospace and Defence Information</b> Conference Preprints	September 1983
<b>The Application of New Technologies to Improve the Delivery of Aerospace and Defence Information</b> Conference Proceedings	December 1983
<b>AGARD Index of Publications 1980-1982</b>	July 1983
<b>Bibliography of Guides to Aerospace Research and Development Institutes in NATO Countries</b> Report	November 1983

## CONSULTANT AND EXCHANGE PROGRAMME

*Chief, Plans and Programmes* – Mr C.E. BORGEAUD  
*Deputy, Plans and Programmes* – Col J.C. de CHASSEY (FAF)

### INDIVIDUAL CONSULTANTS

The Consultant and Exchange Programme makes available to the NATO member Nations scientific and technical expertise in the aerospace field. Individual consultants and exchange visits are specifically requested by the National Delegates of the nations concerned. Individual consultants are also made available to support various AGARD activities. Panels or Panel members requested individual consultants' expertise, visits and lectures by individuals or by teams of experts (special courses and short courses) for carrying out part of their programmes.

Panels, Working Groups and the AASC also make use of individual consultants to support specific projects.

In 1983 the Consultant Programme will also support four Special Courses:

#### **AMP – The 7th Advanced Operational Aviation Medicine Course**

The Advanced Operational Aviation Medicine Courses have been organized every two years since 1969.

In 1983 the Course will be organized in Norway, 14 – 18 November.

Course Director: Dr ANDERSEN (Norway)

#### **FMP – Special Course on Flight Test Instrumentation**

In 1975 the FMP sponsored a Course on Flight Test Instrumentation (FTI) in the UK at Cranfield Institute of Technology (CIT). The aim of the course was to provide FTI engineers with both the theory and practical applications of instrumentation techniques; and class-room instruction was enhanced by flight experience in the CIT laboratory aircraft.

The Course was repeated in 1977 at DFVLR Braunschweig, with the support of the CIT aircraft and staff; and again at Cranfield in 1977; and at Delft University of Technology (DUT) in 1981 with the support of the CIT aircraft and staff.

In 1983 the Course will be organized at Cranfield. Funding from the AGARD Consultant and Exchange Programme will support four to six lecturers. The remaining costs will be met by a course fee paid by each participant.

Course Director: Dr M.E. ESHELBY (UK)

#### **FDP – Special Course on Aerodynamic Characteristics of Controls**

This Special Course will be given in Belgium at the von Kármán Institute (VKI), 7 – 11 March 1983.

The Course Director will be: Professor A.D. YOUNG (UK)

#### **FDP – Special Course on Subsonic/Transonic Aerodynamic Interference for Aircraft**

This Special Course will be given in Belgium at the von Kármán Institute, 2 – 6 May 1983.

This Course will also be requested by the US as a Short Course and will be given at Wright Patterson Air Force Base, Dayton, Ohio, on 16 – 20 May 1983.

The Course Director will be: Dr H. YOSHIHARA (US)

### LECTURE SERIES

Following the proposals made by the AGARD Panels, the Consultant and Exchange Programme proposes to implement the six Lecture Series approved for 1983 by the National Delegates Board in March 1982 and, in addition, the classified GCP Lecture Series, LS 122, which was approved in March 1981 for presentation in September 1982. The NDB having considered the difficulties encountered in the organization of this classified Lecture Series decided that it should be held early in 1983, but on the 1982 budget.

Due to the large number of requests received from the NATO nations it is proposed to hold LS 122 at three locations (USA, UK, and Italy, in March 1983), and the six Lecture Series on the 1983 budget at eighteen locations.

The six Lecture Series proposed in the 1983 budget are described in the following text.

The budget proposed for 1983 includes the printing of the Lecture Series publications as well as the preparation of the Lecture Series: travel, subsistence allowance and honorarium when appropriate for participating speakers.

**Lecture Series No.126**      **MODERN DISPLAY TECHNOLOGIES FOR**      **June 1983**  
(AVP)      **AIRBORNE APPLICATIONS**      **UK/Italy/US**

The objective of the lectures will be to familiarize the participants with the human factors involved, the cockpit environment problems, and to present the state-of-the-art in the areas of CRT's and VFD's, LCD's, LED's and EL other displays and to discuss applications. The Lecture Series Director will chair a round-table discussion at the end of the presentations during which comments and suggestions will be expected from participants.

Lecture Series Director: Dr G.H.Hunt (UK).

**Lecture Series No.127**      **MODERN HF COMMUNICATIONS**      **June 1983**  
(EPP)           **US/Greece/Italy**

The sophistication of satellite communications and the vulnerability of satellites from the military point of view has lead to a reassessment of HF and a renewal of interest in this portion of the radio spectrum.

The state-of-the-art in microprocessors, synthesizers and other equipments has lead to the belief that HF communications can be adaptive without going beyond presently developed components.

The Lecture Series will examine the present state-of-the-art of HF. General military requirements will be outlined. Remote areas beyond the line of sight need and use HF. Systems configurations will be discussed.

The Lecture Series Director will chair a round-table discussion at the end of the presentations.

Lecture Series Director: Dr J.Aarons (US).

**Lecture Series No.128**      **COMPUTER-AIDED DESIGN AND ANALYSIS OF**      **September 1983**  
(GCP)      **DIGITAL GUIDANCE & CONTROL SYSTEMS**      **Germany/Greece/France**

This Lecture Series is intended to provide the basic concepts, theories and computer methods involved in the design of advanced guidance and control systems.

The degree of advantages in the application of modern microprocessor technologies is already largely affected by the way corresponding systems are designed in the very early stage of a development programme.

It is intended to perform a comprehensive review of direct digital analysis and synthesis procedures, furthermore, an intricate part of this Lecture Series would be computer aided and graphical techniques that can be employed in preliminary design, synthesis and real-time simulation.

The Lecture Series Director will chair a round-table discussion at the end of the presentations.

Lecture Series Director: Dr J.Wall (US).

**Lecture Series No.129**      **SPEECH PROCESSING**      **June 1983**  
(AVP)           **Norway/Denmark/Netherlands**

The aim of the lectures will be to familiarize participants with the potential applications of speech processing (and, in particular, the military applications). The Lecture Series will present the state-of-the-art in the areas of research in speech recognition, isolated word recognition systems, automatic speaker identification, test and evaluation of automatic word recognition systems, and it will discuss applications of speech processing to avionics.

Lecture Series Director: Dr J.Bridle (UK).

**Lecture Series No.130**      **DEVELOPMENT AND USE OF NUMERICAL AND**      **October 1983**  
(TIP)      **FACTUAL DATA BASES**      **US/UK/Portugal**

Numerical and factual data, as sources of information for all levels of aerospace and defence R & D management and staff activity, are becoming increasingly important. These data are necessary to support research and engineering efforts in all fields. They are also becoming increasingly important to support or assist in the decision-making process. Today, a number of numerical data bases are available through national information centres and others are available from academic or commercial information sources. Data in many of these data bases can be retrieved and manipulated in display systems currently available. There is, however, a great need to improve the quality, reliability, availability, accessibility, dissemination, utilization and management of these data.

Better knowledge regarding the generation and availability of such data bases, and the techniques for their use, will be of benefit to the R & D community and their information service centres.

The scope of the Lecture Series should include:

1. Generation of numerical data.
2. Consideration of the quality and reliability of the data.

3. Methods for publishing and disseminating the data.
4. A review of the data bases that are currently available.
5. How these data bases can be used, and
6. Future needs for numerical data bases.

There will be a round-table discussion at the end of the presentations.

Lecture Series Director: Dr R.F.Taschek (US).

**Lecture Series No.131**                      **THE PERFORMANCE OF ANTENNAS IN THEIR**                      **October 1983**  
**(EPP)**                                              **OPERATING ENVIRONMENT**                                              **Portugal/Greece/Turkey**

Antennas gain in any direction, and the effect of the operating environment on this parameter is fundamentally important for the performance of radio systems. Yet the effect of the environment on antennas is often overlooked. The performance of the antenna is more usually specified in terms of its operation over a perfectly conducting flat ground plane.

This Lecture Series will cover: techniques for measurement/prediction (numerical and experimental modelling); performance of fixed and transportable antennas (terrain effects, masts and buildings effects, re-radiation by supporting towers); performance of mobile antennas (effects of supporting platforms such as aircraft, ships, automobiles); performance of antennas in plasmas.

This Lecture Series will be coordinated with AVP who may have an interest in the prediction of antenna radiation patterns and radar backscatter for complicated bodies such as aircraft, targets, earth surface.

There will be a round-table discussion at the end of the presentations.

Lecture Series Director: Dr J.S.Belrose (Canada).

**Lecture Series No.122**                      **APPLICATION OF DIGITAL MAPPING**                      **March 1983**  
**(GCP)**                                              **TECHNOLOGY TO GUIDANCE AND**                                              **US Italy UK**  
**CONTROL SYSTEMS (CLASSIFIED)**

The Lecture Series is intended to address the theoretical analysis, functional and implementation techniques involved in the application of Digital Mapping Technology to guidance and control systems. Areas that will be addressed are computer-generated information requirements, methods of integrating positioning systems and the computation requirements associated with guidance and control integration. Emphasis will be placed upon the analysis, functional and simulation techniques to provide the necessary informational and functional capabilities. New procedures in analysis and estimation techniques will be stressed. This will provide one document which covers the necessary design background and state-of-the-art involved in the application of advancing technologies.

Lecture Series Director: Dr T.E.Perfitt (US).

#### LECTURE SERIES PUBLICATIONS – 1983

<i>Lecture Series No.</i>	<i>Panel</i>	<i>Title</i>	<i>Projected Publication Date</i>
LS 126	AVP	Modern Display Technologies for Airborne Applications	April
LS 127	EPP	Modern HF Communications	May
LS 128	GCP	Computer-Aided Design and Analysis of Digital Guidance and Control Systems	August
LS 129	AVP	Speech Processing	May
LS 130	TIP	Development and Use of Numerical and Factual Data Bases	September
LS 131	EPP	The Performance of Antennas in their Operating Environment	September
LS 122	GCP	Application of Digital Mapping Technology to Guidance and Control Systems	March (on 1982 budget)

## MILITARY COMMITTEE STUDIES

### AEROSPACE APPLICATIONS STUDIES COMMITTEE

*Chairman:* Mr H.A.ZWEMER, US

### MILITARY COMMITTEE STUDIES DIVISION

*Chief:* Colonel P.A.PRYOR, US

*Deputy:* Colonel G.ALEXIS, France

*Deputy:* Dr J.A.TOPP, FRG

## PROGRAMME

Two studies were begun in 1982: AAS-16 'Stand-Off System Concepts for the Acquisition and Neutralisation of Mobile Surface Targets' and AAS-17 'Options for Future Interceptor Weapon Systems'. AAS-18 'Attack and Defence of Helicopters Conducting Tactical Operations' has been approved to start in January 1983. Topics for additional studies will be reviewed by the AASC and will be submitted to the AGARD Steering Committee in March 1983 for consideration.

## MEETINGS

<b>AASC Meeting No.23</b> – Define Final Terms of Reference for AAS-19 and 20 (Classified)	– Organize Working Group for AAS-19 – Initial Review of AAS-18	May 1983 Norway
<b>AASC Meeting No.24</b> – Review Terms of Reference for New Studies (Classified)	– Organize Working Group for AAS-20 – Final Review of AAS-18 – Initial Review of AAS-19	November 1983 Netherlands

## PUBLICATIONS

<i>Subject</i>	<i>Projected Publication Date</i>
<b>Active, Semi-Active and Passive Surveillance Sensors and Fire Control for Air Defence – Volume I (English and French), Volume II (English)</b> (AAS-15) Advisory Report	January 1983
<b>Stand-Off System Concepts for the Acquisition and Neutralisation of Mobile Surface Targets – Volume I (English and French), Volume II (English)</b> (AAS-16) Advisory Report	May 1983

**HEADQUARTERS****OFFICE OF THE DIRECTOR****MEETINGS**

54th NATIONAL DELEGATES BOARD MEETING	23 - 25 March 1983
32nd STEERING COMMITTEE MEETING	Paris, France
34th PANEL CHAIRMEN MEETING	
13th NATIONAL COORDINATORS MEETING	
19th AGARD ANNUAL MEETING	21 - 23 September 1983
55th NATIONAL DELEGATES BOARD MEETING	Munich, Federal Republic
35th PANEL CHAIRMEN MEETING	of Germany

**PUBLICATIONS**

<i>Subject</i>	<i>Projected Publication Date</i>
AGARD Bulletin 83/1	March 1983
AGARD Bulletin 83/2	September 1983
AGARD Highlights 83/1	March 1983
AGARD Highlights 83/2	September 1983
Calendar of Selected Aeronautical and Space Meetings	June 1983 December 1983

## III - BUDGET SUMMARY

## 1983 TECHNICAL PROGRAMME

(In Thousands of 1982 French Francs)

Panels	1981 <i>Commitments</i>	1982 <i>MBC Approved</i>	1983 <i>Proposed</i>
AMP	231	525	481
AVP	118	277	281
EPP	373	332	336
FMP	455	537	556
FDP	559	412	691
GCP	338	604	495
PEP	310	479	459
SMP	488	450	555
TIP	140	37	269
	<hr/>	<hr/>	<hr/>
SUB-TOTAL - PANELS	3,012	3,653	4,123
INDIVIDUAL CONSULTANTS	472	531	681
LECTURE SERIES	1,067	1,154	1,069
SUPPORT TO NATIONS	692	953	1,348
MILITARY COMMITTEE STUDIES	82	94	197
HEADQUARTERS	182	148	203
OTHER COSTS (Certificates, Layout Sheets, Forms, Meeting Announcements, Distribution)	421	221	499
	<hr/>	<hr/>	<hr/>
SUB-TOTAL - OTHERS	2,916	3,101	3,997
AGARD TECHNICAL PROGRAMME			
<u>GRAND TOTAL</u>	<u>5,928</u>	<u>6,754</u>	<u>8,120</u>

## IV - 1983 PUBLICATIONS SUMMARY

<i>Activity</i>	<i>Reports</i>	<i>Advisory Reports</i>	<i>AGARDographs</i>	<i>Conference Preprints</i>	<i>Conference Proceedings</i>	<i>Misc.</i>	<i>Total</i>
AMP	-	-	5	-	1		6
AVP	-	-	-	2	2		4
EPP	-	-	-	2	3		5
FMP	-	1	5	-	2		8
FDP	2	3	2	2	2		11
GCP	-	-	3	-	4		7
PEP	-	-	1	3	3		7
SMP	8	-	2	-	3	1	14
TIP	1	-	-	1	1	1	4
DPP	-	-	-	-	-	7	7
MCS	-	4	-	-	-	-	4
HQ	-	-	-	-	-	6	6
	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
TOTALS	11	8	18	10	21	15	83

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