

AGARD

ADVISORY GROUP FOR AEROSPACE RESEARCH & DEVELOPMENT

7 RUE ANCELLE 92200 NEUILLY SUR SEINE FRANCE

AGARDograph No.301

Aircraft Trajectories Computation—Prediction—Control

(La Trajectoire de l'Avion
Calcul—Prédiction—Contrôle)

Volume 3

NORTH ATLANTIC TREATY ORGANIZATION



DISTRIBUTION AND AVAILABILITY
ON BACK COVER

NORTH ATLANTIC TREATY ORGANIZATION
ADVISORY GROUP FOR AEROSPACE RESEARCH AND DEVELOPMENT
(ORGANISATION DU TRAITE DE L'ATLANTIQUE NORD)

AGARDograph No.301

Aircraft Trajectories Computation—Prediction—Control

(La Trajectoire de l'Avion
Calcul—Prédiction—Contrôle)

VOLUME 3

Part IX Book of Abstracts
Part X Bibliography
Part XI List of Contributors

Edited by

André Benoit
Programme Director

The Mission of AGARD

According to its Charter, 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:

- Recommending effective ways for the member nations to use their research and development capabilities for the common benefit of the NATO community;
- Providing scientific and technical advice and assistance to the Military Committee in the field of aerospace research and development (with particular regard to its military application);
- 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;
- Exchange of scientific and technical information;
- Providing assistance to member nations for the purpose of increasing their scientific and technical potential;
- 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.

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.

The content of this publication has been reproduced directly from material supplied by AGARD or the authors.

Published May 1990

Copyright © AGARD 1990
All Rights Reserved

ISBN 92-835-0563-8



*Printed by Specialised Printing Services Limited
40 Chigwell Lane, Loughton, Essex IG10 3TZ*

Introduction

Le troisième volume de l'AGARDographie consacrée au calcul, à prévision et au suivi des trajectoires d'aéronefs se subdivise en trois parties:

- (a) un **recueil des résumés** des contributions — le texte intégral sera normalement disponible au moment de la mise sous presse de ce volume;
- (b) une importante **bibliographie** comprenant les coordonnées de la plupart des documents cités par les auteurs des contributions réunies dans le présent ouvrage, et complétée par un index organisé par année. Cet index donne par ordre alphabétique, la liste des auteurs cités dans la bibliographie et pour chacun d'eux, les dates et le nombre de publications mentionnées;
- (c) la **liste des auteurs des contributions** présentée selon l'ordre alphabétique de leurs pays d'origine, avec le nom et l'adresse de leur entreprise ou de leur organisation. Cette liste comprend également un index alphabétique des auteurs précisant la nature et les références de leurs contributions.

* * *

This third volume of the AGARDograph devoted to the **Computation, Prediction and Control of Aircraft Trajectories** includes three main parts, namely

- (a) a **Book of Abstracts** limited to those for which the complete paper or at least an adequate executive summary was available at the date of publication;
- (b) an extensive **Bibliography** which incorporates in particular, most of the references cited by the authors of the contributions to this work. It is completed by an index of authors' names giving for each year a list, in alphabetical order, of the names of authors referred to in the bibliography; for each author, it gives the year of publication and each year the number of publications listed.
- (c) the **List of Contributors**, ordered by countries alphabetically, with applications and professional addresses; this being completed by an index of the contributors' names giving in particular, the type of contribution and whenever applicable, the reference of the paper contributed.

André Benoit
 Directeur du programme
 Membre de la Commission Guidage et Pilotage



Accession For	
NTIS ORA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	

Guidance and Control Panel Officers

Chairman: Ir P.Ph. van den Broek
Department of Aerospace Engineering
Delft University of Technology
Kluyverweg, 1
2629 HS Delft
Netherlands

Deputy Chairman: Prof. E.B. Stear
Executive Director
Washington Technology Center
University of Washington
376 Loew Hall — FH-10
1013 NE 40th Street
Seattle, WA 98195
United States

TECHNICAL PROGRAMME

Programme Director and Editor: Dr André Benoit
Faculté des Sciences Appliquées
Université Catholique de Louvain
B-1348 Louvain-la-Neuve
Belgium

European Organisation for the Safety of Air Navigation
EUROCONTROL
Engineering Directorate
72, rue de la Loi
B-1040 Bruxelles
Belgium

PANEL EXECUTIVE

From Europe
CDT Moustafa Mouhamad (FAF)
Executive, GCP
AGARD-NATO
92200 Neuilly-sur-Seine
France
Telephone: 33(1)4738 5780 — Telex: 610 176F

From USA and Canada
Executive, GCP
AGARD-NATO
APO New York 09777

ACKNOWLEDGEMENT/REMERCIEMENTS

The Guidance and Control Panel wishes to express its appreciation to all authors and co-ordinators who contributed to this AGARDograph, and made its publication possible.

La Commission Guidage et Pilotage tient à remercier tous les auteurs et coordonnateurs qui contribueront à la réalisation et la publication de cette AGARDographie.

Activities in Air Traffic Handling

Over the past 20 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.

The Panel's contributions listed below cover in particular, the air and ground components considered as parts of a single system, the methods, techniques and technologies applicable to or usable for the management of the flows of aircraft and the control of individual flights, the integration of control phases over extended areas such as in the Zone of Convergence type concepts, the 4-D guidance of aircraft in critical conditions, the ever-increasing level of automation and its impact on the essential role of the human acting on-line in the control loop.

AIR TRAFFIC CONTROL SYSTEMS

Guidance and Control Symposium, Edinburgh, Scotland.

26—29 June 1972.

AGARD-CP-105, April 1973.

A SURVEY OF MODERN AIR TRAFFIC CONTROL

AGARDograph AG-209, Vols. I and II

July 1975.

PLANS AND DEVELOPMENTS FOR AIR TRAFFIC SYSTEMS

Guidance and Control Panel Symposium, Cambridge, Mass., United States

20—23 May 1975.

AGARD-CP-188, February 1976.

AIR TRAFFIC MANAGEMENT: Civil/Military Systems and Technologies

Guidance and Control Symposium, Copenhagen, Denmark.

9—12 October 1979.

AGARD-CP-273, February 1980.

AIR TRAFFIC CONTROL IN FACE OF USERS' DEMAND AND ECONOMY CONSTRAINTS

Guidance and Control Symposium, Lisbon, Portugal.

15 October 1982.

AGARD-CP-340, February 1983.

EFFICIENT CONDUCT OF INDIVIDUAL FLIGHTS AND AIR TRAFFIC

or Optimum Utilisation of Modern Technology

(Guidance, control, navigation, surveillance and processing facilities)

for the Overall Benefit of Civil and Military Airspace Users

Guidance and Control Symposium, Brussels, Belgium.

10—13 June 1986.

AGARD-CP-410, December 1986.

AIRCRAFT TRAJECTORIES: Computation—Prediction—Control

AGARDograph AG-301, Vols. 1, 2 and 3:

Volume 1 FUNDAMENTALS

FLIGHT IN CRITICAL ATMOSPHERIC CONDITIONS

IMPACT OF NEW ON-BOARD TECHNOLOGIES ON AIRCRAFT OPERATION

Volume 2 AIR TRAFFIC HANDLING AND GROUND-BASED GUIDANCE OF AIRCRAFT

Volume 3 ABSTRACTS — BIBLIOGRAPHY — CONTRIBUTORS

ON-LINE HANDLING OF AIR TRAFFIC

Guidance & Control Aspects

AGARDograph AG-321, in preparation

Condensed Contents

Detailed Contents of all three volumes follow

VOLUME 1

PREFACE

PART I FUNDAMENTALS

PART II FLIGHT IN CRITICAL ATMOSPHERIC CONDITIONS

PART III IMPACT OF NEW ON-BOARD TECHNOLOGIES ON AIRCRAFT OPERATION

VOLUME 2

PART IV AIR TRAFFIC HANDLING

PART V GUIDANCE OF AIRCRAFT IN A TIME-BASED CONSTRAINED ENVIRONMENT

PART VI SURVEILLANCE

PART VII METEOROLOGICAL FORECASTS

PART VIII AIRCRAFT OPERATION IN AIR TRAFFIC HANDLING SIMULATION

VOLUME 3

PART IX BOOK OF ABSTRACTS

PART X BIBLIOGRAPHY (with Index)

PART XI LIST OF CONTRIBUTORS (with Index)

Contents

VOLUME 1

		Page
INTRODUCTION		iii
GUIDANCE AND CONTROL PANEL OFFICERS AND PROGRAMME DIRECTOR		iv
GCP ACTIVITIES IN AIR TRAFFIC HANDLING		v
CONDENSED CONTENTS		vi
	Reference	Abstract Page
PART I – FUNDAMENTALS		
A – GENERAL OUTLINE OF THE PROBLEM		
INTRODUCTION A L'ETUDE DES TRAJECTOIRES D'AVION: Schéma Général des Problèmes Posés par Frédéric Haus	1F	A-1
INTRODUCTION TO THE STUDY OF AIRCRAFT TRAJECTORIES: General Outline of the Problem by Frédéric Haus	1E	A-1
B – COMPUTATION OF OPTIMAL TRAJECTORIES		
OPTIMAL TRAJECTORIES OF AIRCRAFT AND SPACECRAFT by Antonio Miele	2	A-2
C – NON-LINEAR MODELS OF AIRCRAFT		
COMPARISON OF A MATHEMATICAL ONE-POINT MODEL AND A MULTI-POINT MODEL OF AIRCRAFT MOTION IN MOVING AIR by R.Brockhaus	3	A-3
DETERMINATION DES LOIS DE GUIDAGE QUASI-OPTIMALES EN TEMPS REEL POUR DES TRAJECTOIRES D'AVIONS DE COMBAT (Computation of Sub-Optimal Real-Time Guidance Laws for Combat Aircraft Trajectories) par H.T.Huynh	4	A-3/4
PART II – FLIGHT IN CRITICAL ATMOSPHERIC CONDITIONS		
A – GENESIS OF WIND AND INFLUENCE ON AIRPLANE TRAJECTORIES		
CRITICAL ASPECTS OF TRAJECTORY PREDICTION: Flight in Non-Uniform Wind by Bernard Etkin and David Alexandre Etkin	5	A-5
EFFECT OF WIND AND WIND VARIATION ON AIRCRAFT FLIGHT – PATHS K.U.Hahn, T.Heintsch, B.Kaufmann, G.Schänzer and M.Swolinsky	6	A-5
B – FLIGHT CONTROL IN WINDSHEAR		
AIRCRAFT FLIGHT IN WINDSHEAR by D.McLean	7	A-6
HOW TO FLY WINDSHEAR by Paul Camus	8	A-6

	Reference	Abstract Page
C — FLIGHT SIMULATION		
WIND MODELS FOR FLIGHT SIMULATION by K.U.Hahn, T.Heintsch, B.Kaufmann, G.Schänzer and M.Swolinsky	9	A-7

PART III — IMPACT OF NEW ON-BOARD TECHNOLOGIES ON AIRCRAFT OPERATION

A — FLIGHT MANAGEMENT IN AIR TRANSPORT

AIRCRAFT TRAJECTORY — PREDICTION AND CONTROL IN THE AIR TRANSPORT FLIGHT MANAGEMENT COMPUTER SYSTEM by Peter J.Howells	10	A-8
--	----	-----

B — CREW/AUTOMATION INTERFACE

IMPACT OF NEW TECHNOLOGY ON OPERATIONAL INTERFACE: From Design Aims to Flight Evaluation and Measurement by J.J.Speyer, C.Monteil, R.D.Blomberg and J.P.Fouillot	11	A-9
--	----	-----

VOLUME 2

PART IV — AIR TRAFFIC HANDLING

A — REQUIREMENT: INTEGRATION OF CONTROL PHASES

OPTIMUM ON-LINE HANDLING OF AIR TRAFFIC OVER WESTERN EUROPE by André Benoit and Sip Swierstra	12E	A-11
REGULATION TEMPS REEL OPTIMALE DU TRAFIC AERIEN EN EUROPE OCCIDENTALE par André Benoit et Sip Swierstra	12F	A-11

B — PROSPECT: A FUTURE EUROPEAN AIR TRAFFIC SYSTEM CONCEPT

THE EUROCONTROL FUTURE ATS SYSTEM CONCEPT AND THE PROGRAMME OF STUDIES, TESTS AND TRIALS by V.Vachiéry	13E	A-12
LE CONCEPT DU FUTUR SYSTEME ATS EUROCONTROL ET LE PROGRAMME D'ETUDES, ESSAIS ET EXPERIMENTATIONS par V.Vachiéry	13F	A-13

C — ON-LINE PREDICTION OF AIRCRAFT TRAJECTORIES

(i) General Discussion

PREDICTION OF AIRCRAFT TRAJECTORIES by Stanley Ratcliffe	14	A-14
---	----	------

(ii) Fundamentals

AIRCRAFT DYNAMICS FOR AIR TRAFFIC CONTROL by P.Y.Willems	15	A-14
---	----	------

(iii) Applications

THE APPLICATION OF TRAJECTORY PREDICTION ALGORITHMS FOR PLANNING PURPOSES IN THE NETHERLANDS ATC-SYSTEM by J.N.P.Beers, T.B.Dalm, J.M.ten Have and H.Visscher	16	A-15
GENERATION OF AIRCRAFT TRAJECTORIES FOR ON-LINE OPERATION by André Benoit and Sip Swierstra	17	A-15

D — AIR TRAFFIC MANAGEMENT

(i) Optimisation: Models and Techniques

- | | | |
|---|----|------|
| OPTIMIZATION MODELS AND TECHNIQUES TO IMPROVE AIR TRAFFIC MANAGEMENT
by Lucio Bianco | 18 | A-16 |
|---|----|------|

(ii) Man/Computer Interface

- | | | |
|--|----|------|
| THE HIGH-RESOLUTION GRAPHIC DISPLAY
A possible man/machine interface for a computer assisted ATC management system
by Carlos Garcia Avello | 19 | A-17 |
|--|----|------|

**PART V — GUIDANCE OF AIRCRAFT IN A TIME-BASED
CONSTRAINED ENVIRONMENT**

A — CONTEXT — OBJECTIVES — PLANS

- | | | |
|--|-----|------|
| 4-D CONTROL OF CURRENT AIR-CARRIERS IN THE PRESENT ENVIRONMENT:
Objectives — Status — Plans
by André Benoit | 20E | A-18 |
| REGULATION 4-D DANS L'INFRASTRUCTURE ACTUELLE: Point de la Situation
et Objectifs à Atteindre
par André Benoit | 20F | A-18 |
| NAVIGATION 4-D EN CIRCULATION AERIENNE
par Nicole Imbert et Marc Pélegrin | 21 | A-19 |

B — GENERAL DISCUSSION

- | | | |
|---|----|------|
| ON THE AUTOMATION OF FUTURE ATC CENTRES IN THE LIGHT OF THE
CONCEPT OF THE "ZONE OF CONVERGENCE"
by Victor Attwooll | 22 | A-20 |
|---|----|------|

C — GUIDANCE AND CONTROL: PRINCIPLES AND CONCEPTS

- | | | |
|--|-----|------|
| THE CONTROL OF INBOUND FLIGHTS: Basic Principles
by André Benoit and Sip Swierstra | 23E | A-21 |
| LE GUIDAGE DES VOLS JUSQU'AU SEUIL DE PISTE: Principes Généraux
par André Benoit et Sip Swierstra | 23F | A-21 |
| GUIDANCE CONCEPTS FOR TIME-BASED FLIGHT OPERATIONS
by Dan D. Vicroy | 24 | A-22 |
| 4-D DESCENT TRAJECTORY GENERATION TECHNIQUES UNDER REALISTIC
OPERATING CONDITIONS
by David H. Williams and Charles E. Knox | 25 | A-22 |

D — CONDUCT OF AIR TRAFFIC CONTROL IN A ZONE OF CONVERGENCE

- | | | |
|--|----|------|
| EXPERT SYSTEMS FOR THE GENERATION OF TERMINAL AREA ARRIVAL PATHS
FOR CIVIL TRANSPORT
by Robert W. Simpson | 26 | A-23 |
| A DESCRIPTION AND EVALUATION OF "TIMER": A Time-Based Terminal Flow-Control
Concept
by Léonard Credeur and William R. Capron | 27 | A-23 |
| USE OF 4D RNAV IN TIME-BASED EN ROUTE ARRIVAL METERING
by R.L. Erwin and K.H. Izumi | 28 | A-24 |
| AIR TRAFFIC MANAGEMENT AND AIRCRAFT GUIDANCE IN A ZONE OF
CONVERGENCE
by André Benoit and Sip Swierstra | 29 | A-24 |

	Reference	Abstract Page
E — GROUND-BASED 4-D GUIDANCE OF AIRCRAFT IN MOVING ATMOSPHERE		
GROUND-BASED 4-D GUIDANCE OF FLIGHTS IN STRONG WIND by André Benoit and Sip Swierstra	30	A-25
A PILOTED SIMULATOR EVALUATION OF GROUND-BASED 4D DESCENT ADVISOR ALGORITHM by Thomas J.Davis, Steven M.Green and Heinz Erzberger	31	A-25
F — THE COMPUTER/CONTROLLER/PILOT DIALOGS		
THE AIR TRAFFIC CONTROLLER FACING AUTOMATION: Conflict or Co-Operation by André Benoit, Sip Swierstra and René de Wispelaere	32E	A-26
LE CONTROLEUR DE LA CIRCULATION AERIENNE ET L'AUTOMATISATION: Conflit d'Intérêts ou Convergence? par André Benoit, Sip Swierstra et René de Wispelaere	32F	A-27

PART VI — SURVEILLANCE

A — RADAR TRACKING

AIRCRAFT TRAJECTORY RECONSTITUTION ON THE BASIS OF MULTI-RADAR PLOT INFORMATION by Pieter van der Kraan	33	A-28
BAYESIAN MULTI-SENSOR TRACKING FOR ADVANCED AIR TRAFFIC CONTROL SYSTEMS by H.A.P.Blom, R.A.Hogendoorn and F.J.van Schaik	34	A-28
THE USE OF DOWNLINKED MEASUREMENTS TO TRACK CIVIL AIRCRAFT by Chris C.Lefas	35	A-29

B — SATELLITE TECHNIQUES

L'APPORT DES TECHNIQUES SATELLITAIRES A LA SURVEILLANCE DE LA NAVIGATION AERIENNE (Contribution of the Satellite Techniques to the Surveillance of Air Traffic) par Olivier Carel	36	A-30
--	----	------

PART VII — METEOROLOGICAL FORECASTS

A — IMPACT OF FORECASTS QUALITY ON TRAJECTORY PREDICTION

DEVELOPMENTS TO ENHANCE METEOROLOGICAL FORECASTING FOR AIR TRAFFIC SERVICES by M.E.Cox and D.A.Forrester	37	A-31
--	----	------

PART VIII — AIRCRAFT OPERATION IN AIR TRAFFIC HANDLING SIMULATION

A — REALISTIC OPERATION AND MOTION OF AIRCRAFT

INTEGRATION OF AIRCRAFT CAPABILITY IN AIR TRAFFIC HANDLING SIMULATIONS by André Benoit, S.Swierstra and Yves Delnatte	38	A-32
--	----	------

B — FLIGHT OPERATIONS WITHIN A TERMINAL AREA

SIMULATION OF AUTOMATED APPROACH PROCEDURES CONSIDERING DYNAMIC FLIGHT OPERATIONS by Manfred Ficke and Adreas Hörmann	39	A-33
---	----	------

VOLUME 3

PART IX – BOOK OF ABSTRACTS

A

PART X – BIBLIOGRAPHY

B

A – GLOSSARY

B – REFERENCES

C – INDEX

PART XI – LIST OF CONTRIBUTORS

C

A – CONTRIBUTORS AND AFFILIATIONS

B – INDEX

PART IX

Book of Abstracts

PART I - FUNDAMENTALS

- A - GENERAL OUTLINE OF THE PROBLEM
- B - COMPUTATION OF OPTIMAL TRAJECTORIES
- C - NON-LINEAR MODELS OF AIRCRAFT

A - GENERAL OUTLINE OF THE PROBLEM

Reference 1F

INTRODUCTION A L'ETUDE DES TRAJECTOIRES D'AVION

Schéma général des problèmes posés

par

Frédéric Haus

Professeur Emérite aux universités de Gand et de Liège

RESUME

La détermination d'une trajectoire d'avion comporte un nombre élevé d'opérations. Dans cet article, nous essayons de classer celles-ci et de les répartir en 12 groupes.

Reference 1E

INTRODUCTION TO THE STUDY OF AIRCRAFT TRAJECTORIES

General Outline of the Problem

by

Frédéric Haus

Emeritus Professor Universities of Gand and Liège

ABSTRACT

The determination of the trajectory of an aircraft comprises a large number of operations. In this paper, an attempt is made to classify these into 12 groups.

B - COMPUTATION OF OPTIMAL TRAJECTORIES

Reference 2

OPTIMAL TRAJECTORIES OF AIRCRAFT AND SPACECRAFT

by

A. Miele

Aero-Astronautics Group
Rice University
Houston, Texas 77251-1892

SUMMARY

This paper summarises some of the work done by the Aero-Astronautics Group of Rice University on algorithms for the numerical solutions of optimal control problems and their application to the computation of optimal flight trajectories of aircraft and spacecraft.

Part 1 deals with general considerations on calculus of variations, optimal control, numerical algorithms, and applications of these algorithms to real-world problems.

Part 2 deals with the sequential gradient-restoration algorithm (SGRA) for the numerical solution of optimal control problems of the Bolza type. Both the primal formulation and the dual formulation are discussed.

Part 3 deals with aircraft trajectories, in particular, the application of the dual sequential gradient-restoration algorithm (DSGRA) to the determination of optimal flight trajectories in the presence of windshear. Both take-off trajectories and abort landing trajectories are discussed. Take-off trajectories are optimised by minimising the peak deviation of the absolute path inclination from a reference value. The survival capability of an aircraft in a severe windshear is discussed, and the optimal trajectories are found to be superior to both constant pitch trajectories and maximum angle of attack trajectories.

Parts 4 and 5 deal with spacecraft trajectories, in particular, the application of the primal sequential gradient-restoration algorithm (PSGRA) to the determination of optimal flight trajectories for aeroassisted orbital transfer. Both the coplanar case (problem without plane change, Part 4) and the noncoplanar case (problem with plane change, Part 5) are discussed within the frame of three problems; minimisation of the total characteristic velocity; minimisation of the time integral of the square of the path inclination; and minimisation of the peak heating rate. The solution of the second problem is called nearly-grazing solution, and its merits are pointed out as a useful engineering compromise between energy requirements and aerodynamics heating requirements.

Part 6 presents the conclusions. The references are given in Part 7.

C - NON-LINEAR MODELS OF AIRCRAFT**Reference 3 COMPARISON OF A MATHEMATICAL ONE-POINT MODEL AND A MULTI-POINT MODEL OF AIRCRAFT MOTION IN MOVING AIR**

by

R. Brockhaus

Technische Universität Braunschweig

SUMMARY

The steady growing capacity of computers favours increasingly exact simulation of even complex processes. On the other hand, parameter identification and state estimation require much more precise models than are generally used for the design of feedback systems. In this paper, therefore, a multi-point model of the aircraft motion is proposed in which the different coupling effects between the two sub-processes, "aircraft" and "air flow", can be modelled with much higher accuracy than is obtained by using the ordinary one-point model, where all the force, moment and velocity vectors are referred to the aircraft centre of gravity. The modelling of the effects of aircraft rotation, wing down-wash, wind gradients and other unstationary effects should be greatly improved by a multi-point approach, provided that the aerodynamic effects on the aircraft components (wing, fuselage, tail) can be described appropriately. The nonlinear equations of the total process are set up for the one-point and multi-point models and compiled into block - diagrams, from which the physical background of the interrelations between air and aircraft motion can be seen very clearly. The possible improvement in model quality and the additional computer capacity needed are estimated by comparing the two approaches.

Reference 4 DETERMINATION DES LOIS DE GUIDAGE QUASI-OPTIMALES EN TEMPS REEL

POUR

DES TRAJECTOIRES D'AVIONS DE COMBAT

par

H.T. Huynh

Office National d'Etudes et de Recherches Aérospatiales
29, Avenue de la Division Leclerc,
F - 92320 Chatillon-sous-Bagneux (Hauts-de-Seine)

RESUME

Cet article présente une application de la théorie des systèmes multi-échelles de temps au contrôle en temps réel des trajectoires d'avions de combat.

Après avoir rappelé les principes de la théorie des perturbations singulières dans la résolution des systèmes différentiels multi-échelles de temps, son application à l'optimisation des systèmes non-linéaires est présentée. Les principales difficultés rencontrées dans la détermination des lois de guidage "temps réel" sont ensuite mentionnées, puis différentes techniques utilisées pour les résoudre sont indiquées.

Des lois de guidage "temps réel" en boucle fermée sont ensuite développées pour différents types de trajectoires d'avions de combat: montée en temps minimum, interception dans un plan horizontal, dans un plan vertical et dans l'espace tridimensionnel. Les performances fournies par ces lois sont ensuite évaluées en simulation numérique sur un modèle d'avion type, par comparaison avec les lois optimales en boucle ouverte obtenues par un algorithme numérique de gradient projeté, sans approximation de type multi-échelles de temps.

COMPUTATION OF SUB-OPTIMAL REAL-TIME GUIDANCE LAWS FOR COMBAT AIRCRAFT TRAJECTORIES

by

H.T. Huynh Huu Thanh

Office National d'Etudes et de Recherches Aérospatiales
29, Avenue de la Division Leclerc,
F - 92320 Chatillon-sous-Bagneux (Hauts-de-Seine)

SUMMARY

This chapter presents an application of singular perturbation theory (SPT) for the computation of real-time control laws for Combat Aircraft trajectories.

The principle of SPT is first briefly reviewed for solving a multiple-time scale differential equations, then its application to optimization of non-linear systems is presented. The main drawbacks and difficulties which have been encountered in the computation of real-time control laws for Aircraft trajectories are described, then various techniques are also pointed out in order to overcome with these problems.

Basing of this SPT, real-time guidance laws, of closed-loop type, have been developed for minimum time to climb in a vertical plane and three-dimensional interception for a combat Aircraft. The performances of these sub-optimal guidance laws have been then compared, in numerical simulation using a typical Aircraft model, with optimal control laws, of open-loop type, provided by an iterative numerical algorithm, using a generalized projected gradient technique.

A better than 1 % accuracy has been obtained for the performance index (time-to-climb) for vertical climb trajectories. The real-time guidance laws are slightly less accurate for interception trajectories.

The sub-optimal guidance laws can fulfill final conditions on altitude or/and flight path angle and remain valid for a large flight envelope domain. Their computation times are very small and are compatible with real-time on board computer applications.

PART II - FLIGHT IN CRITICAL ATMOSPHERIC CONDITIONS

A - GENESIS OF WIND AND INFLUENCE ON AIRPLANE TRAJECTORIES

B - FLIGHT CONTROL IN WIND SHEAR

C - FLIGHT SIMULATION

PART II-A - GENESIS OF WIND AND INFLUENCE ON AIRPLANE TRAJECTORIES

Reference 5

CRITICAL ASPECTS OF TRAJECTORY PREDICTION:

FLIGHT IN NON-UNIFORM WIND

by

Bernard Etkin
University Professor Emeritus
Institute for Aerospace Studies, University of Toronto
Toronto, Canada.

and

David Alexander Etkin
Meteorologist
Canadian Climate Centre, Atmospheric Environment Service
Downsview, Ontario, Canada.

SUMMARY

The genesis of natural wind is described from a meteorological standpoint. Its influence on airplane trajectories is discussed with reference to steady winds, turbulence, and wind shear. The main problems exist when flight is close to the ground, during landing, take-off, or terrain following. A model for analysis and simulation is presented consisting of four components - dynamics, kinematics and transformations, aerodynamics, and wind. The axis systems chosen are well suited to simulation of landing and take-off.

Reference 6

EFFECT OF WIND AND WIND VARIATION ON AIRCRAFT FLIGHT - PATHS

by

Hahn, K.-U.; Heintsch, T.; Kaufmann, B.
Schänzer, G.; Swolinsky, M.

Institute of Flight Guidance and Control
Technical University of Braunschweig,
Hans-Sommer-Str. 66. D-3300 Braunschweig

SUMMARY

Wind shear accidents during landing and approach could generally be avoided by using modern flight control systems. The problem is to inform the pilot by an adequate wind shear warning display, that he can understand the reaction of the control system. Wind shear is particularly dangerous if it occurs in a height of approximately 80m - 120m, where the attention of the cockpit crew is affected by getting view contact to the ground. Wind shear during take-off and go-around is a pure flight performance problem. Pilots should avoid a take-off into a thunderstorm. In moderate downbursts a practicable escape manoeuvre is to maintain the flight level at a low height to pass the core of the downburst before starting the climb. This procedure can also be applied on the go-around.

PART II-B - FLIGHT CONTROL IN WINDSHEAR

Reference 7

AIRCRAFT FLIGHT IN WINDSHEAR

by

D. McLean

Westland Professor of Aeronautics
Department of Aeronautic and Astronautics
The University of Southampton
GB - Southampton SO9 5NH

SUMMARY

A brief account of wind-shear and some representations is given before discussing the effects of wind-shear on aircraft motion. A procedure for estimating the vertical and horizontal velocity components of a wind-shear microburst, based on observer theory is developed, and a brief discussion of flying in wind-shear concludes the paper.

Reference 8

HOW TO FLY WINDSHEAR

by

Paul Camus

Group Manager Flight Controls
AIRBUS INDUSTRIE
1 round-point M. Bellonte
F - 31707 BLAGNAC CEDEX

SUMMARY

Aviation safety history is a long fight against severe environmental constraint. Modern aircraft are able to face safely most of them but one still remain a potential killer, that is what is generally described as a windshear situation.

What can be done, necessarily fall either in how to timely detect such a situation in order to avoid it or/and what tools could be given to the crew to better escape should they are trapped in.

Latest state of build-in equipment, 3-D Navigation, Electronic displays and Flight Control, provide now all necessary tools to develop an efficient on-board detection and protection system. Such system will be described altogether with a review of some fundamental criteria to be considered when assessing their efficiency.

PART II-C - FLIGHT SIMULATION

Reference 9

WIND MODELS FOR FLIGHT SIMULATION

by

Hahn, K.-U.; Heintsche, T.; Kaufmann, B.
Schänzer, G.; Swolinsky, M

Institute of Flight Guidance and Control,
Technical University of Braunschweig,
Hans-Sommer-Str. 66, 3300 Braunschweig, FRG

SUMMARY

Wind shear, downdraft and turbulence can endanger take-off and landing approach. The effects of wind result in a modified dynamic response of the aircraft as well as in flight performance variation. In each case flight path deviation can occur, more or less controlled by the pilot. For the analysis of the aircraft's behaviour in changing wind field, a mathematical model of the aircraft is used including the wind effects. It can be said, that gusts and turbulence will have more influence on the pilot's work load and his reaction to this short scale wind disturbances. Large scale wind variations can produce significant flight paths respectively safety problems. An important aspect for the flight safety is the energy situation of an aircraft affected by wind. Therefore this is chosen as a useful criterion for the determination of the influences of the wind and wind variation.

PART III - IMPACT OF NEW ON-BOARD TECHNOLOGIES ON AIRCRAFT OPERATION

A - FLIGHT MANAGEMENT IN AIR TRANSPORT

B - CREW/AUTOMATION INTERFACE

PART III-A - FLIGHT MANAGEMENT IN AIR TRANSPORT

Reference 10

**AIRCRAFT TRAJECTORY - PREDICTION AND CONTROL
IN THE AIR TRANSPORT FLIGHT MANAGEMENT
COMPUTER SYSTEM**

by

Peter J. Howells

Smiths Industries
Grand Rapids, Michigan, USA

SUMMARY

The declining cost of computing power and memory has enabled avionic manufacturers to develop sophisticated airborne computing systems. These systems can predict and control the airplane along complex three and four dimensional flight plans. The most complex airplane system on modern air transport airplanes is the Flight Management Computer System (FMCS) which has reduced pilot workload by taking over the mundane but complex functions - such as navigation - and enabled the transition from the three to two crew airline cockpit. This paper describes the algorithms used in prediction and control and identifies the difficulties and requirements for successful implementation.

PART III-B - CREW/AUTOMATION INTERFACE

Reference 11

IMPACT OF NEW TECHNOLOGY ON OPERATIONAL INTERFACE : FROM DESIGN AIMS TO FLIGHT EVALUATION AND MEASUREMENT

by

J.J. Speyer and C. Monteil
Operations Engineering, Flight Division
Airbus Industrie, B.P. 33, 31707 Blagnac Cedex, France

and

R.D. Blomberg
Dunlap & Associates Inc.
17, Washington Street, Norwalk, Connecticut 06854, USA

and

Dr J.P. Fouillot
Laboratoire de Physiologie
Faculté de Médecine Cochin,
24, Rue du Faubourg St Jacques, F-75104 Paris, France

SUMMARY

Since the early 1980's Airbus Industrie has conducted a progressive research programme investigating the ergonomic, physiological and psychological factors affecting flight crew in their working environment, and progressively refining the data acquisition and analysis techniques.

This self-imposed commitment to a dedicated appreciation of man-machine aspects was met in two ways :

- . Informally, by stringent application of human engineering principles, although in short supply in as far as their explicit formulation is concerned,
- . Formally, by continuous development of statistical methods and engineering experiments, concentrating on pilot questionnaires, performance evaluations and workload models.

The purpose of this paper is to review the span between initial design aims and subsequent flight evaluation and measurement with regard to that aspect of the Airbus programme. Much of our work appears to be relevant to the topic of this Agardograph since air traffic control will not be modernized without improvements in aircraft trajectory control studies. A statistical workload calculation model will for instance highlight the link that permits a correlation of pilot performance (and hence aircraft trajectory) parameters with estimates of the impact of new technology on the operational interface.

Except for the general recommendations of Fitts, Wanner, Nagel, Wiener and Curry, few fundamental design guidelines appear to be available in the scientific field of human factors. A practical review is presented of the operational objectives and technological modules that marked the outgrowth of the Airbus family of commercial aircraft. Progressively integrated, several waves of innovations engineered an evolutionary process that brought to bear growing functionality at the operational interface. The emerging role of the pilot is becoming more that of a systems monitor than that of a controls handler, devoting himself to overall intelligence functions which new technology features were precisely aimed to support. Several contemporary human factors views are mentioned in the paper suggesting that the pilot be brought back into a more active role to avoid automation- or design-induced errors. What has been achieved with the early 1980's A310/A300-600 cockpit however is, in our view, still in the vicinity of the Wiener and Curry philosophy on automation and cockpit design. In the step that was to be taken in the latter 1980's A320/A330/A340 design aims have moreover been intended to cover even more error- tolerance or- protection against incidents of the Wanner scheme.

Reviewing aircrew comments on design aims and achievements from flight evaluation became a practice in the early 1980's when soliciting crewmember opinions received considerable impetus. Conclusions are presented from questionnaire surveys on new technology aircraft conducted successively by Airbus Industrie, Wiener, Curry and Lufthansa. Commonly criticized on most new aircraft types are the autopilot/autothrottle interactions and the FMS whose training definitely needs more emphasis on basic know-how and practice. It appears that crews want automation even further developed to improve system integration and crew interface, with no significant fear for the possibilities of errors or potential loss of flying skill. But what also seems to be requested is intuitive design allowing the pilot to understand more straightforwardly the automation systems at work and to monitor more easily their performance, limits and crew errors.

Measuring the impact of new technology on the operational interface could precisely help setting up this human factors capability. Which in turn should eventually influence on design guidelines and specifications.

The success of the questionnaire technique prompted Airbus Industrie to use it again for its Fly-by-wire proof-of-concept experiment on the A300 testbed. The unanimous enthusiasm of airline & authority pilots for the fly-by-wire/sidestick combination was also confirmed by the fact that, as a group, they did not feel uncomfortable with the idea of being primarily responsible for the management of system interfaces rather than the direct operation of their aircraft. It would appear from these studies that older technology aircraft can more often be discredited on the basis of human factor principles than new ones. It is however with the coming of the latter that more emphasis was gradually put on human factors by all those concerned, manufacturers, airworthiness authorities, pilots and airlines. Even more systematic efforts on man-machine interface analysis were put in the wake of the crew complement question which triggered the development of several evaluation methods. One of these, the Performance Criteria Methodology, was developed to statistically investigate the impact of new technology features such as the EFIS, the FMS and Fly-by-Wire/Sidestick. A brief review is given of engineering experiments' results for the first two to conclude on the contribution of this equipment towards improving smoothness of performance and alleviating workload. The advantages of a FbW system over conventional controls are operationally demonstrated with the third experiment. Performing analysis of variance on basic flight parameter measures allows again to demonstrate marked smoothness and stability improvements, flight efficiency, reduced task- and workload.

Our previous research suggested that workload ratings collected in minimum crew certification campaigns might be modelled using data extraneous to the pilot (aircraft flight performance parameters and flight status measures) and data intraneous to the pilot (heart rate variability measures). The aim was to achieve an objective analysis of an until-then subjective process (workload rating) which had received too little scientific attention. A computer model was evolved from the A310-200 certification process, which indeed conformed well with the subjective data. Certification of the A310-300, a generally similar but sufficient different aircraft, provided a further check on the degree of objectivity attained, helped to simplify the model's formulation. As part of the development program for the A320, the A300 FbW flying testbed had numerous visiting pilots involved in extensive demonstrations as well as special manoeuvres such as simulated engine failure at take-off and a demonstration of the inherent stall protection of the control system. The model was again successfully applied to these flights in order to determine if it could cope with the new control system and the unusual profiles. Finally, the very first flight of the A320 also had both pilots equipped with heart rate monitoring equipment so as to test the model. Cleared for experimental use, the Airbus Workload Model was then used in January 1988 for the A320 Minimum Crew Certification to generate second-by-second estimates of pilots' subjectively estimated workload. The purpose of this demonstration was to provide a range of low to high workload situations by means of 12 scenarios which provided varying flying problems. In all, 48 simulated line flights, which involved different levels of automation, were flown. Crew errors were also recorded and classified according to their severity and awareness. As a tool to investigate the impact of new technology, the Airbus Workload Model presents a novel opportunity to study workload and its relationship to both errors and automation. The findings are descriptive in nature because the certification data base was not constructed to support research on these issues. But they suggest that there is a relationship between the severity and type of error and workload, and that automation and workload are inversely related.

PART IV - AIR TRAFFIC HANDLING

- A - REQUIREMENT : INTEGRATION OF CONTROL PHASES
- B - PROSPECT : A FUTURE EUROPEAN AIR TRAFFIC SYSTEM CONCEPT
- C - ON-LINE PREDICTION OF AIRCRAFT TRAJECTORIES
- D - AIR TRAFFIC MANAGEMENT

PART IV-A - REQUIREMENT : INTEGRATION OF CONTROL PHASES

Reference 12E **OPTIMUM ON-LINE HANDLING OF AIR TRAFFIC OVER WESTERN EUROPE**

by

André Benoît and Sip Swierstra

European Organisation for the Safety of Air Navigation
EUROCONTROL
Engineering Directorate
72, rue de la Loi, B - 1040 Bruxelles (Belgium)

SUMMARY

For today's airlines Western Europe is not very large and the flights they make within it do not last very long. Consequently it should be possible within such an area as Western Europe (defined for simplicity as the non-oceanic area covered by the EUROCONTROL route charges system) to arrange ATC clearances and instructions so that any flight will, from departure clearance to touch-down (including therefore departure and arrival routes, standard or otherwise), be conducted in accordance with airline policy and without the changes to route and profile due to short-term planning which are so disruptive to air traffic.

The present paper recommends an approach for the on-line handling of air traffic over such an area, covering in particular the integration of control phases from departure to destination. This leads to (a) a central on-line optimal definition of departure/arrival sequences and essential characteristics of all flights and (b) a series of regional units to implement the relevant proposals/directives. This should provide the optimum integration of adjacent Zones of Convergence in which the time and altitude at which aircraft enter and leave each Zone are precisely controlled and are affected by the traffic conditions in their corresponding *space/time sphere of influence*.

As a prerequisite to the above, a system is hereby proposed for the purpose of accurately predicting and controlling the 4-D trajectory of an aircraft over any part of a flight, and in particular that part which extends from entry into until exit from the airspace of a given control centre.

Reference 12F **REGULATION TEMPS REEL OPTIMALE DU TRAFIC AERIEN EN EUROPE OCCIDENTALE**

par

André Benoît et Sip Swierstra

Organisation Européenne pour la Sécurité de la Navigation aérienne
E U R O C O N T R O L
Direction Technique
rue de la Loi, 72, B - 1040 Bruxelles (Belgique)

SOMMAIRE

Pour les compagnies aériennes, l'Europe occidentale est devenue un espace bien exigu et les vols y sont de courte durée. Pour plus de commodité, nous entendons ici par "Europe occidentale" la région desservie par le système EUROCONTROL de redevances de route ; à une telle échelle, il devrait être possible de délivrer les autorisations et les instructions de contrôle de telle manière que tout vol, depuis son départ jusqu'au point de prise de contact avec la piste d'atterrissage (c'est-à-dire pour la totalité de l'itinéraire, ce qui inclut notamment les routes d'arrivée, normalisées ou non) puisse être exécuté en conformité de la politique générale décidée par sa compagnie et sans subir les déroutements et modifications de profil de vol qu'impose la planification à court terme et qui perturbent tant la fluidité du trafic aérien.

Le présent exposé vise à recommander une méthode pour la régulation des vols en temps réel pour l'ensemble de cette région, en particulier l'intégration des différentes phases de contrôle depuis le départ jusqu'à l'arrivée. A cette fin, il faut que les séquences d'arrivée et les séquences de départ, ainsi que les principales caractéristiques de tous les vols en cause soient définies au mieux, en direct et à partir d'un point central, et que soient mis en place une série d'organismes régionaux chargés de veiller à l'application des propositions ou directives de régulation. Un tel système optimiserait l'intégration de zones de convergence adjacentes pour lesquelles les heures et les altitudes à l'entrée deviendraient - tout comme les instants d'atterrissage dans une zone unique - subordonnées aux conditions de trafic prévalant dans l'ensemble d'une telle région étendue.

Dans un premier temps, le système de calcul, de prédiction et de contrôle de la trajectoire dans les quatre dimensions mis au point pour la zone de convergence est étendu à l'ensemble du vol depuis son entrée - éventuellement un décollage - jusqu'à sa sortie - éventuellement un atterrissage - de la région de contrôle étendue ainsi constituée, l'ensemble de l'espace aérien concerné relevant d'un centre de gestion déterminé.

PART IV-B - PROSPECT : A FUTURE EUROPEAN AIR TRAFFIC SYSTEM CONCEPT

Reference 13E

THE EUROCONTROL FUTURE ATS SYSTEM CONCEPT

and

THE PROGRAMME OF STUDIES, TESTS AND TRIALS

by

V. Vachiéry

European Organisation for the Safety of Air Navigation
EUROCONTROL
Engineering Directorate
72, rue de la Loi, B - 1040 Bruxelles (Belgium)

SUMMARY

The era of parallel, uncoordinated development of ground systems and guidance, navigation and communications avionics is at an end. The pursuit of optimum economic operating conditions, coupled with the need to handle an increasing volume of traffic, demand that those responsible for Air Traffic Management apply solutions that harmoniously combine available ground and air technologies. Close cooperation between pilot and controller actions constitutes one of the keystones of the future systems.

It will be possible to increase the capacity and efficiency of air traffic management, while at the same time maintaining essential safety requirements, only by making more intensive use of automation for control planning functions. It is considered that increased automation cannot provide real advantages, however, unless the accuracy of aircraft trajectory prediction is substantially improved.

This was made quite clear in the description of the Future ATS Concept drawn up by the EUROCONTROL Organisation. The Concept, the principles of, which were approved by the EUROCONTROL Commission of Ministers in July 1987, will be presented in broad outline.

Its implementation will call for a number of studies and trials, and a rundown will be given of EUROCONTROL's programme. Furthermore, the idea of a Harmonised Programme of Research for ATM (PHARE) is developed.

As will be seen, the EUROCONTROL's programme places considerable emphasis on analysis of the conditions that need to be met to enable ground systems in future to have available facilities for the acquisition and exploitation of aircraft state vector parameters.

The key aspects of the programme are :

- Improvement of the surveillance system (Mode S).
- Improvement of Air/Ground communications (Automatic data link).
- Increased automation.
- Improvement of evaluation methods by recourse to a realistic representation of the airborne side.

Reference 13F

LE CONCEPT DU FUTUR SYSTEME ATS EUROCONTROL

et

LE PROGRAMME D'ETUDES, ESSAIS ET EXPERIMENTATIONS

par

V. Vachiéry

Organisation Européenne pour la Sécurité de la Navigation Aérienne
EUROCONTROL

Direction Technique
72, rue de la Loi, B - 1040 Bruxelles (Belgium)

RESUME

L'ère des développements parallèles et non concertés des systèmes au sol et de l'avionique de guidage, de navigation et de communications est révolue. La recherche de conditions d'exploitation économique optimales d'une part, et la nécessité de faire face à un trafic croissant d'autre part, imposent aux responsables de la Gestion du Trafic Aérien des solutions qui marient harmonieusement les technologies disponibles au sol et à bord. Une concertation étroite entre le pilote et le contrôleur constitue une des clefs de voûte des systèmes futurs.

Accroître la capacité et l'efficacité de la gestion du trafic tout en respectant les impératifs de sécurité, n'est possible que par un recours plus intensif à l'automatisation dans les fonctions de planification du contrôle. Il est considéré que l'automatisation ne peut apporter un bénéfice réel que si la précision dans la prédiction de la trajectoire de l'avion est fortement améliorée.

Cet aspect a bien été mis en lumière dans la description du concept ATS futur élaboré par l'Organisation EUROCONTROL. Ce concept, approuvé sur le plan des principes par la Commission des Ministres d'EUROCONTROL en juillet 1987 sera présenté dans ses grandes lignes.

Sa mise en oeuvre implique un certain nombre d'études et expérimentations. Le programme d'EUROCONTROL sera passé en revue. Par ailleurs l'idée d'un Programme harmonisé de recherche "ATM" (PHARE) est évoqué.

On verra que le programme d'EUROCONTROL fait une large place à l'analyse des conditions à réunir pour que les systèmes au sol puissent disposer dans l'avenir des moyens permettant d'acquérir et d'exploiter les paramètres du vecteur d'état de l'avion.

Les points clefs du programme sont:

- L'amélioration du système de surveillance (Mode S).
- L'amélioration des communications Air-sol (Liaison automatique de données).
- L'augmentation de l'automatisation.
- L'amélioration des méthodes d'évaluation en faisant appel à une représentation réaliste de la partie "air".

PART IV-C - ON-LINE PREDICTION OF AIRCRAFT TRAJECTORIES

(I) GENERAL DISCUSSION

(II) FUNDAMENTALS

(III) APPLICATIONS

Reference 14

PREDICTION OF AIRCRAFT TRAJECTORIES .

by

Stanley Ratcliffe BSc, FRIN, FRAeS

2, Mason Close, Malvern, WR14 2NF, U.K.

SUMMARY

Air traffic management, in designing route structures, drawing up rules for flight in various types of airspace, and in framing the instructions for air traffic controllers, are concerned with predicting the behaviour, often on "worst-case" assumptions, of each class of traffic with which they may have to deal. The present paper will concentrate on the problems of on-line trajectory prediction to a time-horizon perhaps a little longer than the estimated time of the flight or as short as a few tens of seconds, the object being to predict and avoid collision with terrain or with another aircraft, and to ensure that any in-flight delays due to traffic congestion along the route are absorbed as economically as possible. Military aircraft are concerned with the avoidance of anti-aircraft missiles and in intercepting airborne targets. This latter problem may, very loosely, be regarded as collision avoidance in reverse, and will be briefly discussed in what follows, as will the problem of terrain-following by high performance low-flying military aircraft. The conclusion will draw attention to areas where further R & D would seem desirable.

Reference 15

AIRCRAFT DYNAMICS FOR AIR TRAFFIC CONTROL

by

P. Y. Willems

Université Catholique de Louvain, Département de Mécanique
Bâtiment Stévin
B - 1348 Louvain-la-Neuve, Belgique

SUMMARY

This paper presents the equations of motion of airplanes with special emphasis on the kinematical description of the trajectory. The various concepts introduced in ISO norms are presented from a dynamical point of view. The equations are obtained in a form which can easily be implemented in a simulation programme. Furthermore, various approximations are presented together with their implications on the dynamics, and the limitations of their application.

Reference 16

THE APPLICATION OF TRAJECTORY PREDICTION ALGORITHMS FOR PLANNING PURPOSES IN THE NETHERLANDS ATC-SYSTEM

by

J.N.P. Beers, T.B. Dalm, J.M. ten Have

National Aerospace Laboratory (NLR)
Anthony Fokkerweg 2
1059 CM Amsterdam
THE NETHERLANDS

H. Visscher

The Netherlands Department of Civil Aviation (RLD)
P.O. Box 7601
Havenmeesterweg
1118 ZJ Schiphol
THE NETHERLANDS

SUMMARY

The paper first describes briefly some relevant aspects of the Netherlands ATC-environment, it then gives the basic set-up of the trajectory prediction module, the improvements that have been realised so far and the performance figures. Furthermore it lists the applications of the trajectory prediction results in the system. Some of these applications such as data distribution rules, presentation of Estimated Times of Arrival (ETA's), Boundary Estimates etc. are only briefly mentioned. Others are given more attention; among these are: long-term detection of conflicts for overflying aircraft, planning of inbound traffic for Schiphol Airport and planning of departure times for an efficient engine start-up procedure.

Reference 17

GENERATION OF AIRCRAFT TRAJECTORIES FOR ON-LINE OPERATION

Methods - Techniques - Tools

by

André Benoit and Sip Swierstra

Engineering Directorate
EUROCONTROL
European Organisation for the Safety of Air Navigation
72, Rue de la Loi, B-1040 Bruxelles

SUMMARY

An appreciable amount of work has been conducted within the Engineering Directorate of the Agency in the division responsible for the Study of Long-Term ATC System Requirements, in order to generate accurate aircraft trajectory predictions for use in both ATC real-time simulations and on-line operation, in current and most realistic conditions, human interfaces included.

This paper will outline two basic approaches developed for two distinct classes of application : on the one hand, the on-line generation of predictions for use in actual operation and accessorially for real-time ATC simulations, on the other the introduction of realistic response and motion of aircraft in ATC simulations with pilot/auto-pilot interfaces included.

PART IV-D - AIR TRAFFIC MANAGEMENT

(I) OPTIMISATION : MODELS AND TECHNIQUES

(II) MAN/COMPUTER INTERFACE

Reference 18

OPTIMISATION MODELS AND TECHNIQUES TO IMPROVE AIR TRAFFIC MANAGEMENT

by

Lucio Bianco

Director, Progetto Finalizzato Trasporti and Istituto di Analisi dei Sistemi ed Informatica
Consiglio Nazionale delle Ricerche, Viale Manzoni, 30 - 00185 - Roma - Italy

SUMMARY

In this paper a survey of earlier works of our is given with particular emphasis on optimisation models and solution techniques. Firstly, in section 2, a multilevel model of the different ATC functions is proposed. Then, in the successive sections 3, 4 and 5 attention is devoted to the on-line control functions (flow control, on-line strategic control of flights and aircraft sequencing in the terminal area); for each problem, an optimisation model is established and a solution technique is illustrated. The numerical behaviour is also discussed.

Reference 19

THE HIGH-RESOLUTION GRAPHIC DISPLAY :
A possible man/machine interface for a computer assisted
ATC management system.

by

Carlos Garcia Avello.

Engineering Directorate
EUROCONTROL
European Organisation for the Safety of Air Navigation
72, Rue de la Loi - B-1040 Brussels

SUMMARY

This article describes an application of high-resolution graphic display in the field of management and control of air traffic in an extended area including a major terminal, the radius of the area being liable to vary from 150 to 300 nm.

Reference is made to air traffic management and 4-D guidance techniques for individual aircraft in a Zone of Convergence, ZOC, in the knowledge that the graphic display techniques are applicable virtually to all systems affording the controller assistance at the decision-making level.

For the purpose of presenting data to the controller we employ a graphic rectangular display having a resolution of 1280 by 1024 points, capable of displaying 16 colors. A circular display similar to most existing radar scopes could of course be used if it had equivalent resolution and colour characteristics.

The management directives and orders for guidance are presented to the operator, area manager or controller of an individual sector as part of the set of data displayed on the radar surveillance and control scope without the use of additional special tabular displays.

RESUME

Cette communication traite d'une application des écrans graphiques à haute résolution dans le domaine de la gestion et du contrôle du trafic aérien dans une vaste zone comprenant un aéroport important, le rayon de cette zone variant de 150 à 300 miles nautiques.

Les aspects de la gestion du trafic aérien et les techniques de guidage et de contrôle 4D pour chaque avion sont ici appliquées dans une Zone de Convergence. (concept ZOC) Il faut cependant garder à l'esprit que les techniques graphiques employées peuvent être appliquées à tous les systèmes apportant une aide au contrôleur au niveau décisionnel.

L'écran choisi pour la présentation des données au contrôleur est de forme rectangulaire, a une résolution de 1280 par 1024 points et peut présenter 16 couleurs. Un écran de forme circulaire similaire à la plus part des écrans radar actuellement en service peut évidemment être employé pourvu qu'il ait une résolution et des possibilités de couleur semblables.

Les directives de gestion du trafic et de conduite des vols sont présentées à l'opérateur, qui peut être le gestionnaire de la zone ou le contrôleur d'un secteur, sur l'écran radar même intégrées dans l'étiquette de l'avion : cette approche ne nécessite aucun écran tabulaire supplémentaire.

PART V - GUIDANCE OF AIRCRAFT IN A TIME-BASED CONSTRAINED ENVIRONMENT

A - CONTEXT - OBJECTIVES - PLANS

B - GENERAL DISCUSSION

C - GUIDANCE AND CONTROL : PRINCIPLES AND CONCEPTS

D - CONDUCT OF AIR TRAFFIC CONTROL IN A ZONE OF CONVERGENCE

E - GROUND-BASED 4-D GUIDANCE OF AIRCRAFT IN MOVING ATMOSPHERE

F - THE COMPUTER/CONTROLLER/PILOT DIALOGS

PART V-A - CONTEXT - OBJECTIVES - PLANS

Reference 20E **4-D CONTROL OF CURRENT AIR CARRIERS IN THE PRESENT ENVIRONMENT**

Objectives - Status - Plans

by

André Benoît

European Organisation for the Safety of Air Navigation
EUROCONTROL
Engineering Directorate
72, rue de la Loi, B-1040 Bruxelles (Belgium)

SUMMARY

The accurate control of the time of arrival of aircraft will play an essential role in the efficient conduct of air traffic in terms of both economy and capacity. A technique has been developed to select efficiently and control accurately each aircraft trajectory inbound to medium to high density traffic airports.

The selection is made in terms of the overall traffic on the basis of the airline or pilot-preferred criterion, either cost, consumption or time, and the subsequent control is made in a ground/air co-operative manner, using whenever applicable "speed" and/or "track" corrections. This paper concentrates on the 4-dimensional control of individual trajectories as applicable to current air carriers in the present environment, and directly adaptable to future automated air/ground digital communications.

The overall control loop has been simulated in an environment representing in particular the Belgian airspace configuration, using various flight simulators in conjunction with airline pilots and air traffic controllers. The results obtained to date make it possible to envisage on-line tests in the near future, aiming at a 10-second accuracy at the runway threshold for current commercial aircraft.

Reference 20F **REGULATION 4-D DANS L'INFRASTRUCTURE ACTUELLE**

Point de la situation et objectifs à atteindre

par

André Benoît

Organisation Européenne pour la Sécurité de la Navigation Aérienne
EUROCONTROL
Direction Technique
72, rue de la Loi, B - 1040 Bruxelles (Belgium)

SOMMAIRE

Le contrôle précis de l'heure d'arrivée des vols sera un élément essentiel de la régulation efficace du trafic aérien au double plan de l'économie du transport et de la capacité de prise en charge. Une technique a été mise au point pour déterminer efficacement et contrôler avec précision les trajectoires d'arrivée aux aéroports de moyenne à forte activité.

Le sélection des trajectoires porte sur l'ensemble du trafic en fonction du critère que retiennent les compagnies ou les pilotes, à savoir coût, consommation de carburant ou temps de vol; le contrôle intervient ensuite, avec les éléments "sol" et "air" opérant en synthèse et les corrections de "vitesse et/ou de "route" appliquées chaque fois que cela est possible. Le présent exposé s'attache au contrôle 4-D de chaque trajectoire applicable aux avions de transport actuels utilisant l'infrastructure existante, lequel est directement adaptable aux communications air-sol numérisées de demain.

L'ensemble de la boucle de contrôle a fait l'objet de simulations en un environnement représentant en particulier la configuration de l'espace aérien belge, avec utilisation de divers simulateurs de vol et conjointement avec des pilotes de ligne et des contrôleurs de la circulation aérienne. Sur la base des résultats enregistrés à ce jour, on pourrait envisager dans un proche avenir des essais "on line" qui permettraient d'obtenir une précision de 10 secondes au seuil de piste pour les avions commerciaux actuels.

NAVIGATION 4-D EN CIRCULATION AERIENNE

par

N. Imbert et M. Pégérin

Centre d'Etudes et de Recherches de Toulouse
 Complexe Aérospatial de Lescop
 2, Avenue Edouard Belin
 B.P. 4025
 F - 31055 Toulouse Cedex

SOMMAIREHistorique et Principe de la Navigation 4-D

Partant de la constatation que les délais d'attente avant atterrissage sont croissants alors que les cadences maximales possibles ne sont pas atteintes, on a proposé d'introduire une consigne supplémentaire lors de la procédure d'approche consistant en 2 corrections de vitesse et une correction de cap (Nav. 4-D, D pour dimension).

Le premier problème à résoudre fut le choix du modèle mathématique à adopter pour simuler l'avion. La méthode utilisée consistait à partir d'un modèle "le plus complet" (on est parti d'un modèle du 18e ordre) et à le dégrader jusqu'à ce qu'un critère ne soit plus satisfait. Ce critère consistait à mesurer l'erreur entre le modèle complet et le modèle dégradé sur une trajectoire de référence (approche Roissy) longue de 54 km. On admettait que l'erreur apportée par le modèle dégradé ne devait pas atteindre ± 320 m à la balise d'entrée de l'ILS. Un modèle de 6e ordre convenait.

Après un certain nombre de simulations il a été montré que les corrections devaient se placer après l'entrée dans la zone de contrôle (zone de convergence) sur le vol à niveau constant (correction de vitesse), au milieu de la descente effectuée à vitesse indiquée constante (correction de vitesse) et dans la dernière branche avant l'interception de l'ILS (correction de cap).

Par une méthode d'ordonnement on peut, grâce à l'utilisation du modèle utilisé en temps accéléré, affecter un instant de passage optimal à la balise d'entrée de l'ILS, en vérifiant qu'une telle trajectoire peut être obtenue par un "pilotage aisé" (termes qui seront définis dans l'article). Bien entendu, un modèle de l'atmosphère doit être utilisé; on a vérifié que la sensibilité de la méthode proposée par rapport à ce modèle n'était pas critique. On a également vérifié que l'erreur sur le passage à la balise due à l'incertitude sur la masse de l'avion à sa prise en compte n'était pas critique.

Résultats de simulation et mesures en vol

On a comparé par simulation les dispersions des instants de passage à la balise sans correction et avec correction. Pour ce faire le pilote était simulé par les erreurs qu'il introduisait dans le pilotage (erreurs définies stochastiquement par rapport à la "procédure compagnie"); les corrections étaient calculées par l'erreur constatée aux 3 points indiqués précédemment et étaient quantifiées (corrections non inférieures à 5 kts) puis retardées pour tenir compte des délais de transmission.

Sur un lot de 200 simulations on a constaté une division par 3 de l'erreur quadratique moyenne des instants de passage à la balise lorsque les corrections étaient envoyées à l'équipage (9 s au lieu de 27 s), toutes autres conditions étant égales par ailleurs.

Grâce à la collaboration de la compagnie Air Inter, 4 expérimentations en vols réguliers ont été faites. Les corrections étaient données à bord, grâce à des tables pré-établies et à l'aide du contrôle sol pour les positions exactes de l'avion. Après analyse des résultats et corrections dues au vent, les résultats obtenus par simulation ont été confirmés.

Le NASA/Langley a de son côté repris la même méthode (deux corrections de vitesse et une de cap) et a procédé à des simulations (approche Denver, Colorado; avion B737) qui ont confirmé nos premiers résultats (un rapport commun NASA/CERT a été publié).

Perspective pour un ordonnancement temps réel

Dès leur origine nos études ont été suivies par EUROCONTROL et sur contrats de cet organisme nous avons pu étudier des procédures optimales de descentes pour des avions réels (B727; B737, DC10, Caravelles 12, A300) en tenant compte des contraintes réelles d'aéroport (Bruxelles, Londres, Francfort). Les lois de descente devaient minimiser le temps total de circulation des avions et la consommation totale de carburant dans la zone de convergence. La prise en compte d'un nouvel avion dans la zone, oblige à reprendre l'ordonnement et les instants de passage à la balise. Les algorithmes proposés sont décrits.

Avenir

Les études initiales datent de 1975-77 ; elles restent valables aujourd'hui et des expérimentations du trafic réel sur des algorithmes mis au point par EUROCONTROL (voisins de ceux proposés) vont avoir lieu prochainement à Bruxelles.

Cependant le développement des FMS conduit à poser le problème en de nouveaux termes : il y a mélange de 2 catégories d'appareil. Le "pilotage aisé" mentionné au paragraphe 1 sera confirmé pour les avions non munis de FMS. Par contre ceux munis de FMS pourront recevoir une seule information, celle du passage à l'heure à la balise après calcul par le "contrôle sol" (ATC). Le FMS, possédant un modèle de l'avion, doit pouvoir retrouver la solution indiquée par le sol. Mais la solution peut ne pas être unique, aussi est-il nécessaire d'assurer la conformité des 2 trajectoires (celle calculée au sol et celle restituée par le FMS) par l'envoi de paramètres supplémentaires.

L'usage d'une transmission automatique air-sol sol-air s'impose.

PART V-B - GENERAL DISCUSSION

Reference 22 **ON THE AUTOMATION OF FUTURE ATC CENTRES IN THE LIGHT OF
THE CONCEPT OF THE "ZONE OF CONVERGENCE"**

by

Victor Attwooll

Civil Aviation Authority
National Air Traffic Services
CAA House, Kingsway 45-59
GB - London WC2 BGTE

INTRODUCTION

Describes the Zone of Convergence concept briefly and its potential benefits.

ASPECTS OF SOFTWARE AT ATC CENTRES

Automated assistance will be required by ATC controllers engaged in sequencing arrivals in a Z.O.C. Important sub-routines are the aircraft performance model and the Conflict Detection process.

The Aircraft Performance Model

This is a model to predict the 4D profile of an aircraft for a given pilot (or autopilot) inputs. Once the model is developed, it is a trivial problem to enhance it so as to answer the reverse question : what pilot input is necessary to achieve a desired profile, specifically to achieve a stated gate time. The output from this process forms the basis of the ATC instructions given to the pilot.

Conflict Detection and Resolution

Having estimated the arrival profiles of a number of aircraft which give the correct sequence at the "gate", they should be further checked for infringement of separation standards along their length. Where such conflict exists, the corresponding profile must be modified to remove the conflict and still, hopefully, achieve the correct time at the gate.

INPUTS REQUIRED FOR THE SEQUENCING PROCESS

The basic aerodynamic or performance information on each type of aircraft must be obtained from the manufacturers, hopefully, in a standard format, for insertion into the aircraft performance model. Other, more transient inputs are :

Meteorological

Up-to-date wind, and perhaps temperature information covering the "playing area". Direct measurement from aircraft is preferred - forecasts may not be accurate enough.

Information on the Aircraft's Intentions

Flight Plan information, suitably updated, intended flight levels, speeds, way-points etc.

METHODS OF COMMUNICATION

These include both air to ground and controller to computer (man-machine interface or MMI)

Air to Ground

It is desirable for reduction in both workload and RT loading that, as much as practicable, communication air to ground should be by data-link (Mode S or satellite). The order of implementation of data-link facilities is likely to be: first ground data held in store (VOLMET etc) ground to air, then ambient meteorological data air to ground, then data on the current state of the aircraft (content of Flight Management Systems) air to ground and finally executive ATC instructions ground to air.

MMI

Possible modes of rapid insertion of updated information to the computer include Direct Voice Input as well as more conventional means.

SUMMARY AND CONCLUSIONS

This would include comments on the potential benefits and likely time-scales of the projects considered. Attention would be drawn to the need for developments to proceed in step with each other and to the need for proper validation before operational service.

PART V-C - GUIDANCE AND CONTROL : PRINCIPLES AND CONCEPTS

Reference 23E

THE CONTROL OF INBOUND FLIGHTS Principles

by

André Benoît and Sip Swierstra

Engineering Directorate
EUROCONTROL
European Organisation for the Safety of Air Navigation
72, Rue de la Loi, B-1040 Bruxelles

SUMMARY

This paper describes the basic principles of the method developed to guide aircraft accurately down to the runway in a time-of-arrival constrained environment. The method is to be used in a Zone of Convergence context or in any similar advanced ATC system characterized by the integration of control phases over an extended area on the one hand and a true "computer assistance" to the air traffic controller on the other, that is to say an assistance given at the decision level through the automatic generation of guidance directives.

The method includes two basic components closely coupled, namely a "predictor" which computes a trajectory once initial conditions and plans are known and a "controller" which adapts the plans to meet the time constraint and generates the guidance directives on the basis of present position -, actual surveillance information - aircraft operation and route constraints.

Reference 23F

LE GUIDAGE DES VOLS A L'ARRIVEE Principes généraux

par

André Benoît and Sip Swierstra

Engineering Directorate
EUROCONTROL
European Organisation for the Safety of Air Navigation
72, Rue de la Loi, B-1040 Bruxelles

SOMMAIRE

Cet article décrit les principes fondamentaux de la méthode mise au point pour le guidage précis des avions jusqu'aux pistes dans le cas où les temps d'atterrissage sont imposés. Cette technique de guidage sera utilisée dans un contexte ATC du genre Zone de Convergence à savoir un système caractérisé par l'intégration des phases de contrôle sur une distance relativement importante d'une part, et par une véritable assistance au contrôleur de la circulation aérienne d'autre part, cette assistance au niveau décisionnel comportant la génération automatique des directives de guidage.

La méthode de guidage proposée comprend deux fonctions fondamentales étroitement couplées ; l'une, la fonction "prédiction", calculant la trajectoire future sur la base des conditions initiales et plans actuels, l'autre, la fonction "guidage", déterminant les ordres de guidage sur la base de la position actuelle - données provenant du système de surveillance -, des procédures de conduite du vol propres à l'avion et des contraintes de route

Reference 24

GUIDANCE CONCEPTS FOR TIME-BASED FLIGHT OPERATIONS

by

Dan D. Vicroy

NASA Langley Research Centre
Hampton, Virginia 23665-5225**SUMMARY**

Airport congestion and the associated delays are severe in today's airspace system and are expected to increase. The National Aeronautics and Space Administration in conjunction with the Federal Aviation Administration, is investigating various methods of alleviating this problem through new technology and operational procedures. One concept for improving airspace productivity is time-based control of aircraft. Research to date has focused primarily on the development of time-based flight management systems and Air Traffic Control operational procedures. Flight operations may, however, require special onboard guidance in order to satisfy the Air Traffic Control imposed time constraints. This paper presents the results of a simulation study aimed at evaluating several time-based guidance concepts in terms of tracking performance, pilot workload, and subjective preference. The guidance concepts tested varied in complexity from simple digital time-error feedback to an advanced time-referenced-energy guidance scheme.

Reference 25

4D DESCENT TRAJECTORY GENERATION TECHNIQUES UNDER REALISTIC OPERATING CONDITIONS

by

David H. Williams and Charles E. Knox

NASA Langley Research Centre
Hampton, Virginia 23665**SUMMARY**

The NASA Langley Research Centre has been conducting and sponsoring research in airborne energy management for a number of years. During the course of this research, two fundamental techniques for the generation of 4D (fixed time) descent trajectories have emerged as viable candidates for advanced flight management systems. The first technique utilizes speed schedules of constant Mach number transitioning to constant calibrated airspeed chosen empirically to produce minimum fuel usage. The second technique computes cost optimised speed schedules of variable airspeed developed through application of optimal control theory. Both techniques have been found to produce reasonable and flyable descent trajectories. This paper evaluates the formulation of the algorithms for each technique and discusses their suitability for operations in realistic conditions. Operational factors considered include: airplane speed, thrust, and altitude rate constraints; wind, temperature, and pressure variations; Air Traffic Control altitude, speed, and time constraints; and pilot interface and guidance considerations. Time flexibility, fuel usage, and airborne computational requirements were the primary performance measures.

PART V-D - CONDUCT OF AIR TRAFFIC CONTROL IN A ZONE OF CONVERGENCE

Reference 26 **EXPERT SYSTEMS FOR THE GENERATION OF TERMINAL AREA ARRIVAL PATHS FOR CIVIL TRANSPORT**

by

Robert W. Simpson

Flight Transportation Laboratory, Room 33-412
Department of Aeronautics & Astronautics
Massachusetts Institute of Technology, Cambridge, MA 02139, U.S.A.

SUMMARY

There are efficiencies to be gained from scheduling the takeoff and landing operations for the system of runways at a major civil airport. It is then necessary to be able to generate a conflict-free set of flight paths which implements this schedule, and which can be easily changed. For arrival aircraft, these flight paths start at a known time, point and speed in the descent towards the airport, and end at a reduced speed and time at the outer marker of the final approach to the assigned runway where desired in-trail separations must be achieved.

To generate sets of conflict-free arrival paths, an "expert systems" approach finds and selects a path feasible within the performance limits of each aircraft from a set of "patterns" which are easily understandable by the human controller. This technique is easily adaptable to the geometric characteristics of different terminal areas and runway configurations, and is subject to rules and procedural limitations which can be easily specified and implemented by ATC controllers themselves, as desired.

The patterns always include a downwind, base, and intercept legs of varying lengths and locations, prior to merging with a "bubble" representing the scheduled position and speed of the arrival aircraft. Arriving aircraft are expected to conform to the early parts of the assigned arrival paths with a known accuracy which ensures safe separations. However, on the downwind and base legs, radar tracking of position, speed and direction is used to dynamically issue commands to turn to base and intercept legs, and to reduce to final approach speed on the intercept leg. The expert system ensures that patterns are selected with a sufficient number of radar scans to ensure steady-state tracking by the primitive straight-line trackers used in current ATC surveillance systems.

Reference 27 **A DESCRIPTION AND EVALUATION OF "TIMER" -- A TIME-BASED TERMINAL FLOW-CONTROL CONCEPT**

by

Leonard Credeur

National Aeronautics and Space Administration
Langley Research Centre
Hampton, Virginia 23665

and

William R. Capron
PRC Kentron
Hampton, Virginia 23666

SUMMARY

A description of a time-based ATC concept called TIMER (Traffic Intelligence for the Management of Efficient Runway-scheduling) and the results of a fast-time and real-time computer evaluation are presented. The concept was designed to improve the efficiency of extended terminal area operations (en route approach, transition, and terminal flight to the runway). TIMER integrates en route metering, fuel-efficient cruise and profile descents, terminal sequencing and spacing together with computer-generated controller aids, in order to fully use runway capacity and improve efficiency of delay absorption. The concept, by using simplified aircraft models, accommodates both 4-D and non 4-D equipped aircraft and is designed for integration into the manual, voice-linked ATC system in an evolutionary manner and still be able to accommodate proposed system upgrade features such as data link and further ground automation.

Fast-time and real-time computer simulation results identify and show the effects and interactions of such key variables as horizon of control, metering fix and final approach delivery time errors, aircraft separation requirements, delay discounting, wind, flight technical error, and knowledge of aircraft final approach speed. The current ATC system has a runway interarrival-error standard deviation of approximately 26 seconds. Simulation results indicate that, with computer aiding, the runway interarrival-error standard deviation for non 4-D equipped traffic can be reduced to the region of 8 to 12 seconds if expected-final-approach speed is known; however, the reduction is only in the region of 16 to 20 seconds if expected-final-approach speed is unknown. Another major finding is that en route metering fix delivery-error standard deviation should be kept to less than a number somewhere between 35 to 45 seconds to achieve full runway capacity. This requirement implies the need for either airborne automation or assistance to the controller since the current manual performance in today's en route metering environment is in the order of 1.5 minutes.

USE OF 4D RNAV IN TIME-BASED EN ROUTE ARRIVAL METERING

by

R.L. Erwin and K.H. Izumi

Boeing Commercial Airplanes
P.O. Box 3707 M/S 9W-38
Seattle, Washington 98124-2207

SUMMARY

Arrival metering in en route airspace can match the demand rate to the airport acceptance rate. Air traffic control (ATC) is evolving time-based control techniques to facilitate en route arrival metering. This allows fuel savings by using speed reduction to absorb delay. The logic for en route arrival metering: 1) estimates the undelayed landing time of each arrival, 2) assigns the earliest available landing time, and 3) controls each arrival to its terminal area arrival (feeder) fix according to the common schedule developed for all arrivals.

The airplane flight management system (FMS), used along with the ATC computer as part of distributed data processing system, can define a minimum fuel cruise and descent flight profile which is consistent with ATC constraints. A study of four-dimensional area navigation (4D RNAV) operational requirements for use in en route arrival metering has determined the functions and time-guidance accuracies needed for ATC-compatible operations. Special investigations have evaluated the use of clean-idle Mach/CAS, constant flight path angle Mach/CAS, and fuel optimal cruise/descent arrival profiles individually and in combination. Significant differences in these descent strategies only appear at high arrival rates.

A 4D RNAV capability is most easily achieved by "wrapping" a time-navigation capability around a 3D FMS. It is estimated that fifty percent of U.S. jet transports will have been delivered with a full 3D FMS by 1995 without any special effort to implement 4D RNAV ATC operations. Inclusion of systems such as performance management systems as candidates for 4D RNAV will bring this estimate well above fifty percent.

Concepts for controlling a mix of 4D RNAV equipped and unequipped aircraft in a time-based en route arrival metering system have been the subject of on-going analyses and simulations by the National Aeronautics and Space Administration (NASA) Ames Research Centre. Meanwhile, Boeing on contract to NASA Langley Research Centre, used a fast-time simulation to show that even with a small percentage of equipped aircraft, the 4D RNAV user could expect a 4D RNAV clearance a high percentage of the time.

The use of 4D RNAV in en route arrival metering operations can save the operator fuel, reduce both pilot and controller workload, and reduce terminal airspace congestion. Eventually, the extension of 4D RNAV to the runway and 4D RNAV departures can increase airport capacity. ATC operational units have shown enthusiasm toward aircraft capable of precisely achieving assigned fix times. The key issue remains of how to get the jet transport fleet to equip so that 4D RNAV operations can grow.

AIR TRAFFIC MANAGEMENT AND AIRCRAFT GUIDANCE IN A ZONE OF CONVERGENCE

by

André Benoît and Sip Swierstra

Engineering Directorate
EUROCONTROL
European Organisation for the Safety of Air Navigation
72, Rue de la Loi, B-1040 Bruxelles

SUMMARY

The basic principles of the air traffic management and the guidance of individual aircraft in a Zone of Convergence have been presented by the authors in previous papers at successive stages in the development of the project (1980, 1982, 1984, 1986). The subject is dealt with in general terms by V. Attwood in Section 5.2.

The purpose of this paper is to summarise these principles and to discuss the level of applicability to the actual operational environment, compatibility with present technology and direct adaptability to future developments, the quality of the interfaces involving the air traffic controller and the aircraft crew and the resultant benefits for the community in terms of economy, use of available capacity and safety.

PART V-E - GROUND-BASED 4-D GUIDANCE OF AIRCRAFT IN MOVING ATMOSPHERE

Reference 30

GROUND BASED 4-D GUIDANCE OF FLIGHTS IN STRONG WIND

by

André Benoît and Sip Swierstra

European organisation for the Safety of Air Navigation
 EUROCONTROL
 Engineering Directorate
 72, rue de la Loi, B - 1040 Bruxelles (Belgium)

ABSTRACT

In strong wind, the ground speed may vary appreciably over a turn as is the case for landing after a U-turn preceeding the localiser intercept. Such conditions are critical for maximum use of the runway and human estimation of aircraft motion then becomes extremely difficult.

This paper summarises the tests which were conducted using a ground-based 4D-guidance program developed to assist the air traffic controller in maintaining the predicted landing time sequence with an accuracy better than 10 seconds for each arrival.

Reference 31

A PILOTED SIMULATOR EVALUATION OF A GROUND-BASED 4D DESCENT ADVISOR ALGORITHM

by

Thomas J. Davis, Steven M. Green, and Heinz Erzberger

NASA Ames Research Centre
 Moffett Field, California 94035, USA.

SUMMARY

A ground-based, four-dimensional (4D) descent-advisor algorithm has been developed that combines detailed aerodynamic, propulsive, and atmospheric models with an efficient numerical integration scheme to generate fuel-efficient descent advisories. This paper investigates the ability of the algorithm to provide advisories for controlling arrival time of aircraft not equipped with on-board 4D guidance systems. A piloted simulation was conducted to determine the precision with which the algorithm predicts the trajectories of typical straight-in descents flown by airline pilots under different wind conditions. The effects of errors in the estimation of winds and initial aircraft weight were also evaluated. A description of the algorithm as well as the results of the piloted simulation are presented.

PART V-F - THE COMPUTER/CONTROLLER/PILOT DIALOGS

Reference 32E

THE AIR TRAFFIC CONTROLLER FACING AUTOMATION: CONFLICT OR CO-OPERATION

by

André Benoît et Sip Swierstra

European Organisation for the Safety of Air Navigation
EUROCONTROL
Engineering Directorate
72, rue de la Loi, B - 1040 Bruxelles (Belgium)

and

René De Wispelaere

Belgian Airports and Airways Agency
Air Traffic Services
Rue du Progrès, 80, B-1210 Bruxelles (Belgium)

SUMMARY

Today, developments in ground-based and on-board computers, navigation and digital air/ground/air communications make it possible to envisage for tomorrow extensive automation of the overall air traffic control process, always provided that reliability, safety and responsibilities can be absolutely covered in all possible eventualities, however remote.

Accordingly, before "tomorrow", an appreciable amount of traffic will cross our skies and be handled by air traffic controllers without the support of advanced automated tools. Nevertheless, at the same time, the potential of automation will continue to increase.

Its inherent benefits for the overall community may be refused and lost for a long period; in contrast, it may contribute to the production of more sophisticated and powerful tools and assist the controller in achieving a degree of efficiency which he could never have dreamed of before. What is it which will tip the scales in favour of one or the other option?

This subject will be discussed in the light of the experience gained during the development of an approach to the definition, assessment and testing in an operational environment of a procedure suitable for guiding aircraft along 4-D trajectories illustrative of the next system generation of ATC. The paper will cover the essential aspects of the computer/controller/pilot/aircraft chain of dialogues, placing the emphasis on the connivance between the computer and the controller, the intelligent interpretation of the surveillance information by the computer, the definition and generation of guidance directives, their relay to the pilot and finally, the use of navigation aide.

The paper concludes by showing the integration of the ground-based 4-D guidance and control system messages on a standard ATC radar display, illustrating this for the guidance of flights conducted by SABENA crews operating B-737 and DC-10 aircraft.

Reference 32F **LE CONTROLEUR DE LA CIRCULATION AERIENNE ET L'AUTOMATISATION :**

CONFLIT D'INTERETS OU CONVERGENCE ?

par

André Benoît et Sip Swierstra

Organisation Européenne pour la Sécurité de la Navigation Aérienne
EUROCONTROL

Direction Technique
72, rue de la Loi, B - 1040 Bruxelles (Belgium)

et

René De Wispelaere

Régie des Voies Aériennes
Rue du Progrès, 80, B-1210 Bruxelles (Belgium)

SOMMAIRE

Les progrès réalisés dans le domaine de l'informatique aéronautique (qu'il s'agisse de l'infrastructure au sol ou de l'élément embarqué), des systèmes de navigation et des télécommunications numérique air-sol-air nous autorisent à imaginer pour "demain" un processus de contrôle de la circulation aérienne hautement automatisé pour autant que dans toutes les éventualités - même dans les moins probables - la fiabilité, la sécurité et la stricte délimitation des responsabilités soient totalement garanties.

Mais bien avant cela, nos cieux auront été traversés d'innombrables vols que les contrôleurs de la circulation aérienne auront pourtant dû prendre en charge sans l'aide de ces techniques de pointe. Entre-temps, toutefois, les possibilités qu'offre l'automatisation ne cesseront de croître.

On pourrait certes vouloir se passer des avantages intrinsèques qu'elle présente pour toute la communauté aéronautique, mais on en perdrait alors le bénéfice pour longtemps; à l'opposé, on peut en tirer parti pour l'élaboration de moyens plus perfectionnées et plus puissants et aider ainsi le contrôleur à atteindre un niveau d'efficacité dépassant tout ce qu'il aurait pu concevoir.

Quel est donc l'élément qui déterminera le choix de l'une ou l'autre option?

Tel est précisément le problème que nous nous proposons d'aborder ici, à la lumière de l'expérience acquise dans la mise au point, l'évaluation et la mise à l'épreuve, en conditions réelles d'exploitation, d'une procédure qui permet de guider les aéronefs sur des trajectoires quadridimensionnelles et qui est représentative de la prochaine génération de systèmes ATC. Nous décrirons par ailleurs les principaux aspects des maillons calculateur/contrôleur/pilote/aéronef constitutifs de la chaîne du dialogue (en nous attachant particulièrement à l'alliance ordinateur-contrôleur), l'interprétation intelligente, par l'ordinateur, des informations destinées à la surveillance, la définition et la production de directives de guidage, la transmission de celles-ci au pilote et, enfin, l'emploi des aides à la navigation.

Dans la conclusion, nous montrons comment on intègre les messages du système sol de guidage et de contrôle quadridimensionnels au dispositif sur les écrans standard de visualisation radar dont sont dotés les services ATC; les exemples choisis pour les besoins de la démonstration sont des vols exécutés par des équipages de la SABENA sur B-737 et DC-10.

PART VI - SURVEILLANCE**A - RADAR TRACKING****B - SATELLITE TECHNIQUES****PART VI-A - RADAR TRACKING**

Reference 33

AIRCRAFT TRAJECTORY RECONSTITUTION

on the basis of

MULTI-RADAR PLOT INFORMATION

by

Pieter van der Kraan

Eurocontrol Organisation for the Safety of Air Navigation
 EUROCONTROL
 Engineering Directorate
 rue de la Loi, 72, B - 1040 Bruxelles (Belgium)

SUMMARY

A short description of the various techniques in use for the establishment of aircraft reference trajectories is presented. Then a description of the principles and operation of the EUROCONTROL program MURATREC (Multi-Radar Trajectory Reconstitution) follows, covering in particular :

- estimation of systematic radar errors ;
- curve fitting by the use of B-splines and dynamically adaptable spline steps ;
- accuracy of the reconstructed positional information ;
- reconstitution of altitude, accelerations and speed.

Applications of the Muratrec program are outlined, including (a) application for the analysis of radar plot and track accuracy (examples) and (b) possible applications for incident investigations, on-line alignment of multi-radar information and simulation of aircraft trajectories in a given radar environment.

Reference 34

**BAYESIAN MULTI-SENSOR TRACKING FOR
ADVANCED AIR TRAFFIC CONTROL SYSTEMS**

by

H.A.P. Blom, R.A. Hogendorm and F.J. van Schaik

National Aerospace Laboratory NLR
 P.O. Box 90502
 NL - 1006 BM Amsterdam
 The Netherlands

SUMMARY

An overview is given of a Bayesian tracking system for a multi-sensor environment. The main modules perform track initiation, track continuation and systematic error estimation, respectively. The track continuation module plays for Air-Traffic Control the most important role. It consists of a combination of those approximate Bayesian methods that proved to be the most efficient for the main problems of track continuation: Extended-Kalman filtering for non-linear dynamics, Probabilistic Data Association for unassociated measurements and Interacting-Multiple-Model filtering for sudden manoeuvres. Comparisons of this new tracking system with α - β , Kalman based and state-of-the-art tracking systems show its superiority for application to Air-Traffic-Control surveillance. It provides better track continuity, more accurate expectations of position and velocity and more complete additional information in the form of probabilities of modes of flight (turning, accelerating and straight modes) and consistent estimates of its own accuracy. With this track information, advanced Air-Traffic-Control systems may better cope with the many uncertainties that are inherent to air traffic.

The results in this paper were obtained partly under contract with the Dutch Organization of Civil Aviation (RLD).

Reference 35

THE USE OF DOWNLINKED MEASUREMENTS TO TRACK CIVIL AIRCRAFT

by

Chris C. Lefas

Associate Professor, Technical University of Crete
19 Arapaki str, 176.76 Kallithea, Athens, Greece

SUMMARY

This paper describes the use of measurements made on board civil aircraft to improve tracking accuracy in air traffic control (ATC) systems. The measurements are transmitted to the ground station via the SSR mode S data link.

First the widely used α - β filter and the first order Kalman filter are reviewed. Next the problem of maneuver handling is described and it is established that significant improvements, in terms of tracking accuracy, are expected when tracking maneuvering aircraft. The shape of maneuvers is examined using recordings made on board civil aircraft during normal scheduled services.

The on board measurements considered are roll angle, heading and true air speed (TAS). Roll angle and the rate of change of Heading are theoretically equivalent, since they are related through aircraft velocity. Maneuver tracking filters using either roll angle or heading are described and compared. It is shown that the filter using heading provides a better performance in the event of missing replies, since changes of heading are eventually detected. Both filters cannot track longitudinally accelerating targets.

Next the use of velocity measurements, derived from TAS and heading, is considered. A filter is described that is capable of estimating the wind speed in the vicinity of the aircraft. The same filter provides satisfactory tracking accuracy during maneuvers and can handle longitudinal accelerations.

Under monoradar coverage, where the data rate and accuracy are fairly constant, the filters reduce to a particularly simple form, that may be regarded as an enhanced α - β filter.

The performance of the filters is evaluated using data recorded during normal scheduled services.

PART VI-B - SATELLITE TECHNIQUES

Reference 36

L'APPORT DES TECHNIQUES SATELLITAIRES A LA SURVEILLANCE DE LA NAVIGATION AERIENNE

par

Olivier Carel,
Ingénieur en Chef de l'Aviation Civile
Chef du Département Radiocommunication et Radioguidage du
Service Technique de la Navigation Aérienne
Membre français du Comité Spécial FANS de l'OACI
246, rue Lecourbe, F-75015 Paris, France

RESUME

La mise en oeuvre des satellites pour les communications, navigation et surveillance de l'aviation a été étudiée et a commencé à être planifiée par l'Organisation de l'Aviation Civile Internationale qui a créé le comité spécial Future Air Navigation Système (FANS) à cet effet. Ce comité vient de rendre son rapport final. La note présente ses travaux et analyse les conséquences de l'introduction des satellites dans le cas particulier de la surveillance du trafic. L'élément le plus important sera la "surveillance dépendante automatique" (ADS) qui consiste en une retransmission automatique de l'avion vers le sol de divers paramètres mesurés à bord, principalement sa position telle qu'elle est fournie par les moyens de navigation de l'appareil. Ce système permettra un contrôle bien plus efficace dans les zones sans infrastructure sol. Dans les zones continentales à fort trafic, les satellites ne substituent pas au radar secondaire, cependant les nouvelles techniques permettront plus de souplesse dans la conception de l'infrastructure.

Reference 36

CONTRIBUTION OF THE SATELLITE TECHNIQUES TO THE SURVEILLANCE OF AIR TRAFFIC

by

Olivier Carel
Ingénieur en Chef de l'Aviation Civile
Chef du Département Radiocommunication et Radioguidage du
Service Technique de la Navigation Aérienne
Membre français du Comité Spécial FANS de l'OACI
246, rue Lecourbe, F-75015 Paris, France

SUMMARY

The International Civil Aviation Organisation asked a special committee FANS (Future Air Navigation Systems) to study satellite system implementation for communication navigation and surveillance applications. This committee issued recently its final report. The paper presents FANS work and analyses the consequences of satellite system implementation upon the surveillance of air traffic. The most important element will be automatic dependent surveillance (ADS) which implies the automatic air to ground return transmission of various airborne measured parameters, i.e. mainly aircraft position as supplied by the aircraft navigation equipments. This concept is to allow a much more efficient air traffic control in every area lacking a ground infrastructure. In continents areas with heavy air traffic, satellites will not substitute the secondary surveillance radar. The new techniques, however, will allow a flexible design of the ground infrastructure.

PART VII - METEOROLOGICAL FORECASTS

IMPACT OF FORECASTS QUALITY ON TRAJECTORY PREDICTION

Reference 37

DEVELOPMENTS TO ENHANCE METEOROLOGICAL FORECASTING FOR AIR TRAFFIC SERVICES

by

M.E. Cox

European Organisation for the Safety of Air Navigation
EUROCONTROL
Engineering Directorate

rue de la Loi, 72, B - 1040 Bruxelles (Belgium)

and

D. Forrester

The Meteorological Office,
London Road, Bracknell,
Berkshire, U.K., RG12 2SZ

SUMMARY

In the future, the quality of the meteorological data available for use both in ground-based systems and on the aircraft will become even more important as ATC strives to handle increasing volumes of traffic in the most efficient manner. This paper, which deals primarily with European work, commences with an indication of the effect of errors in meteorological data on the precision of predictions of aircraft trajectories and then discusses the variability of wind and temperature, showing the influence of location, altitude and season, in the European area. An outline of present-day forecasting methods follows : the data used and accuracies achieved are included. Potential sources of improvements are then discussed with the emphasis being placed on the use of aircraft-derived data : details are given of the accuracy of such data, possible methods of recovery and their application within the Meteorological Services. A further short section describes the impact of turbulence on both the safety of air traffic and the accuracy of flight profile predictions : possible methods of providing aircraft with the means for the automatic reporting of turbulence are included. The final section of the paper describes some of the experimental work either performed or being planned in the European area, aimed at improving the quality of the meteorological data available for ATS purposes as a result of using data recovered from aircraft through both satellite and ground-based (Mode S SSR) systems.

PART VIII - AIRCRAFT OPERATION IN AIR TRAFFIC HANDLING SIMULATION

A - REALISTIC OPERATION AND MOTION OF AIRCRAFT

B - FLIGHT OPERATIONS WITHIN A TERMINAL AREA

PART VIII-A - REALISTIC OPERATION AND MOTION OF AIRCRAFT

Reference 38

INTEGRATION OF AIRCRAFT CAPABILITY

in

AIR TRAFFIC HANDLING SIMULATIONS

by

André Benoît and Sip Swierstra

European Organisation for the Safety of Air Navigation
EUROCONTROL

Engineering Directorate
72, rue de la Loi, B-1040 Bruxelles (Belgium)

and

Yves Delnatte

Direction des Opérations
Belgian World Airlines
SABENA

Brussels - National Airport - B - 1930 Zaventem (Belgium)

SUMMARY

Incorporation of airline/aircrew/aircraft specific procedures and performances in simulations and operations of air traffic handling is a prerequisite for the next generation of management and control techniques. This matter is analysed in the light of the shortcomings inherent to the present situation to meet operators demand in terms of capacity and efficiency.

A practical approach is then proposed to include the operators (aircrew/aircraft/avionics) in the overall ground/air/ground control loop at the development, assessment, validation and real-time simulation levels.

As an illustration of the potential offered, this approach is followed to assess a ground/air coordinated 4-D guidance technique, and the results obtained are presented.

PART VIII-B - FLIGHT OPERATIONS WITHIN A TERMINAL AREA

Reference 39

SIMULATION OF AUTOMATED APPROACH PROCEDURES CONSIDERING DYNAMIC FLIGHT OPERATIONS

by

Prof. Dr.-Ing. Manfred Fricke and Dr.-Ing. Andreas Hörmann

Technical University of Berlin, Institute of Aeronautics and Astronautics
D-1000 Berlin 10, Marchstr. 14, Germany

SUMMARY

During peak hours almost all major commercial airports operate close to their capacity limits. Moreover, the traffic demand often exceeds the offered capacities leading to more or less stringent restrictions in slot allocation.

Purpose of the fast-time air traffic simulations performed at the Technical University of Berlin, was to analyze and assess the performance and the practicability of automated time-based approach concepts, currently being developed to optimize the terminal area air traffic process with respect to safety, capacity and economy.

The developed program system TASIMD (Terminal Area Simulation considering the aircraft Dynamics) simulates flight operations of arriving aircraft within a terminal area during a specified time interval. TASIMD models all major elements of a TMA scenario related to the control and operations of automated approach procedures on the ground and in the air (e.g. surveillance, control procedures, aircraft dynamics, flight guidance).

The aircraft fly along 4D-trajectories, described by a horizontal profile, an altitude profile and a speed profile to integrate the time element, considering influences on the path following accuracy in space and time. Sources of error impact are: entry fix time deviation, navigation, wind, airspeed error and profile management algorithm error. Errors are modeled in Monte-Carlo technique.

Two types of automated approach procedures were developed and analyzed: a variable path speed control concept (VPSC) and a fixed path speed control concept (FPSC). Both concepts presume a shared air/ground responsibility for profile control.

Being a typical representative of an airport with capacity problems the terminal scenario of Frankfurt/FRG has been taken as data base for the developed simplified model TMA. The layout of the different scenarios (e.g. configuration with navigation systems) was chosen on the basis of requirements for future terminal navigation previously derived from results of a simplified macroscopic Monte-Carlo simulation. TASIMD is written in FORTRAN and kept as general as possible to allow similar investigations for almost any future terminal scenario.

Generally, the analysis indicated the practicability of applying automated terminal procedures based on a shared air/ground responsibility. In order to adapt such concepts to a real environment, however, many details as e.g. emergency procedures or procedures for aircraft with less sophisticated equipment, have to be considered. The analysis of such questions which would require real time simulations in cooperation with pilots and controllers, however, goes beyond the scope of TASIMD.

PART X

Bibliography

A — Glossary

B — Reference

C — Index

PART X-A - GLOSSARY

G L O S S A R Y

This glossary lists the abbreviations currently used for the names of institutions and the titles of journals and reports frequently cited in the bibliography.

AFNOR	Association française de normalisation Tour EUROPE, CEDEX 7, F - 92080 Paris
AGARD	Advisory Group for Aerospace Research and Development North Atlantic Treaty Organisation, 7, rue Ancelle, 92200 Neuilly-sur-Seine, France
AIAA J	Journal of American Institute of Aeronautics and Astronautics, 1290 Avenue of the Americas, New York, NY-10019, USA
DFVLR	Deutsche Forschungs- und Versuchsanstalt für Luft- und Raumfahrt, Flughafen, Institut für Flugmechanik, 3300 Braunschweig, R.F.A.
EUROCONTROL	European Organisation for the Safety of Air Navigation, 72, rue de la Loi, B-1040 Bruxelles
FAA	Federal Aviation Administration, Washington, DC-20-590, USA
FFA	Flygtekniska Försöksanstalten The Aeronautical Research Institute of Sweden, Stockholm
IEEE	Institute of Electrical and Electronics Engineers, New York
JA	Journal of Aircraft
JAS	Journal of the Aeronautics Sciences
JGC	Journal of Guidance; Journal of Guidance and Control; Journal of Guidance, Control and Dynamics
JSR	Journal of Spacecraft and Rockets
MIT	Massachusetts Institute of Technology, Cambridge
NASA	National Aeronautics and Space Administration Washington, DC-20-546, USA
NLR	National Aerospace Laboratory, P.O. Box 90502, 1006 BM Amsterdam, The Netherlands
RAE	Royal Aircraft Establishment, Farnborough, England
SAE	Society of Automotive Engineers, Warrendale, PA, USA
UTIAS	Institute for Aerospace Studies University of Toronto, 4925, Dufferin Street, Downsview, Ont. Canada, M3H 5T6

Subjects

(ACP)	Aircraft Performance Evaluation
(ATM)	Atmospheric and Meteorologic Sciences (see also (WND))
(CST)	Computer Simulation / Prediction Techniques
(EMY)	Economy Aspects / Fuel Savings / Noise
(FOP)	Flight Optimization
(GEN)	General Considerations
(HSC)	Handling, Stability and Control
(LDG)	Approach and Landing / Miscellaneous
(MEQ)	Flight Mechanics / Equations of Motion
(NCG)	Navigation Control and Guidance
(RFI)	Research Facilities and Instrumentation
(RRP)	Rules, Regulations and Procedures
(SIM)	Simulation, Flight simulators
(TCS)	Traffic Control Systems / Strategies
(WND)	Wind Impact on Aircraft Motion (see also (ATM))

PART X-B - REFERENCES

1

1938

KARMAN Th.V. "On the Statistical Theory of Isotropic Turbulence",
 Proc. Roy. Soc. (a) 164, 1938

TAYLOR G.I. "The Spectrum of Turbulence",
 Proceedings of the royal Society, A 164, 476-490, 1938

1940

KUSSNER H.G. "Das zweidimensionale Problem der beliebig bewegten Tragflächen unter Berücksichtigung der
 Partialbewegung der Flüssigkeit",
 Luftfahrtforschung Band 17, Lfg 11/12, 1940

1941

KOLMOGOROFF A.N. "The Local Structure of Turbulence in incompressible Viscous Fluids for Very Large
 REYNOLDS Numbers",
 C.R. (Doklady) Acad. Sci. U.R.S.S., N.S. 30(48) 301-305, 1941

POSNER E.C. "A simplified method for predicting the change in airplane performance due to a change in
 parameter",
 JAS, Vol. 8, No. 4, p. 419, 1941 (MEQ)

WELLING O. "An approximate method to predict the transition or 'Flare' flight path in the take-off or
 landing of an airplane",
 JAS, Vol. 8, Juli 1941 (LDG)

1942

PHILIPS F.C. "A kinetic energy correction to predicted rate of climb",
 JAS, Vol. 9, No. 5, p. 172, January 1942 (CST-MEQ)

1943

DRYDEN H.L. "A Review of Statistical Theory of Turbulence",
 Quarterly of Applied Mathematics 1, 7-42, 1943

1944

SÄNGER E. and BREDT I. "A Rocket Drive for Long Range Bombers",
 Navi Department, Bureau of Aeronautics, Translation N° CGD-32, 1944

1945

ETKIN B. "Turning in a wind",
 Engineering Journal (Canada), March 1945 (WND)

1946

BLISS G.A. "Lectures on the Calculus of Variations",
 University of Chicago Press, Chicago, Illinois, 1946

1972

JAKOB H. "An engineering optimization method with application to STOL aircraft approach and landing
 trajectories",

1947

ETKIN B. "Effect of wind gradient on glide and climb",
JAS, June 1947 (WND)

FREEMAN "Simple analytical equations for the velocity of an airplane in unaccelerated level, climbing
and diving flight",
JAS, Vol. 14, p. 185, 1947 (MEQ)

1948

HEISENBERG W. "Zur statistischen Theorie der Turbulenz",
Zeitschrift für Physik, pg. 628, 1948

WEIZSÄCKER C.F. "Das Spektrum der Turbulenz bei Grossen Reynold'schen Zahlen",
Zeitschrift für Physik 124, 628, 1948 (ATM)

1951

REICHARDT K. "Gesetzmässigkeiten der freien Turbulenz",
VDI-Forschungsheft 414 (1942), 2. Auflage 1951

RUSSEL M.H. et al "Flight Test Engineering Handbook",
AFTR N° 6273, May 1951

1954

LUSH K.J. "Optimum Climb Theory and Techniques of determining Climb Schedules from Flight Tests",
NATO AGARD Flight Test Manual, 1954 (FOP)

RUTOWSKI E.S. "Energy Approach to the General Aircraft Performance Problem",
Journal of Aeronautical Sciences, Vol. 21, pp. 187-195, March 1954

1956

MORREL J.S. "Fundamental Physics of the Aircraft Collision Problem",
Bendix Aviation Corp., Tech. Memo 465-1016-39, June. (CAS)

1957

ALLEN H.J. and EGGERS A.J. "A Study of the Motion and Aerodynamic Heating of Missiles Entering the
Earth's Atmosphere at High Supersonic Speeds",
NACA, Technical Note N° 4047, 1957

BLACKADAR A.K. "Boundary Layer Wind Maxima and their Significance for the Growth of Nocturnal
Inversions",
Bull. Am. Meteorol. Soc. 83, 283-290, 1957

EGGERS A.J., ALLEN H.J. and NEICE S.E. "A Comparative Analysis of the Performance of Long-Range
Hypervelocity Vehicles",
NACA, Technical Note N° 4046, 1957

1958

=====

CHAPMAN D.R. "An Approximate Analytical Method for Studying Entry into Planetary Atmospheres",
NACA, Technical Note N° 4276, 1958

ETKIN B. "A theory of the response of airplanes to random atmospheric turbulence",
UTIAS Report 54, 1958, also JAS, July 1959 (WND)

MONIN A.S. and OBUCHOW A.M. "Fundamentale Gesetzmässigkeit der turbulenten Vermischung in der bodennahen
Schicht der Atmosphäre",
Statistische Theorie der Turbulenz, Akademie-Verlag, Berlin 1958, S. 199-226

MORREL J.S. "The Mathematics of Collision Avoidance in the Air",
J. Navig. (London) Vol. 11, N° 1 p. 22, January (CAS)

1959

=====

CHAMBER E. "The Jet Streams",
J. Inst. Navig. Vol. 12 N° 3 p. 266, July (ATM)

HINZE J.O. "Turbulence",
Mac Graw-Hill, New York, 1959 (ATM)

KELLEY H.J. "An investigation of optimal zoom-climb techniques",
JAS, Vol. 26, p. 794, 1959 (FOP)

1960

=====

CARSTOIV J. "Minimum time to climb of an airplane",
JAS, Vol. 27, No. 4, p. 311, 1960 (CST-MEQ)

CHAPMAN D.R. "An Analysis of the Corridor and Guidance Requirements for Supercircular Entry into
Planetary Atmospheres",
NASA, Technical Report N° R-55, 1960

KELLEY H.J. "Gradient Theory of Optimal Flight Paths",
ARS Journal, Vol. 30, N° 10, pp. 947-954, 1960

RALSTON A. "Numerical Integration Methods for the Solution of Ordinary Differential Equations",
Mathematical Methods for Digital Computers, Edited by A. Ralston and H.S. Wilf, John Wiley and
Sons, New York, Vol. 1? PP. 95-109, 1960

TROMBLEY "The approximate solution of the equations of motion of an airplane moving in a vertical
plane",
JAS, Vol. 27, No. 5, p. 396, May 1960 (MEQ)

1961

=====

BOLZA O. "Lectures on the Calculus of Variations",
Dover Publications, New York, 1961

BRYSON A.E. Jr. and DENHAM W.F. "Multivariable Terminal Control for Minimum Mean-Square Deviation from a
Nominal Path",
Raytheon Company, Missile and Space Division, Report No. BR-1333, 1961

DWO "Höhenwindmessdaten der Stationen Stuttgart-Schnarrenberg (1961-1970) und Essen (1966-1971)",
Deutscher Wetterdienst Offenbach

1961

====

ETKIN B. "Theory of the Flight of Airplanes in Isotropic Turbulence",
AGARD-Report 372, April 1961

MIELE, A. "The calculus of variations in applied aerodynamics and flight mechanics",
BOEING Scientific Research Laboratories, DL-82-0113, June 1961 (MEQ)

1962

====

BENEDICT T.R. "Synthesis of an Optimal Set of Radar Track-While-Scan Smoothing Equations",
I.R.E. Trans. on Automatic Control Vol. AC-7, July (SUR)

BRYSON A.E. Jr. and DENHAM W.F. "A Steepest-Ascent Method for solving Optimum Programming Problems",
Journal of Applied Mechanics, Vol. 84, No. 3, pp. 247-257, 1962

EICHENBERGER W. "Flugwetterkunde",
Schweizer Druck- und Verlagshaus AG, Zürich, 2. Auflage, 1962

KELLEY H.J. "Method of Gradients",
Optimization Techniques, Edited by G. Leitmann, Academic Press, New York, pp. 205-254, 1962

KRAICHNAN R.H. "Model for Energy Transfer in Isotropic Turbulence",
The Physics of Fluid, Vol 5, No. 5, p. 583, 1962

LEITMANN G. Editor, "Optimization Techniques",
Academic Press, New York, New York, 1962

LONDON H.S. "Change of Satellite Orbit Plane by Aerodynamic Maneuvering",
Journal of the Aerospace Sciences, Vol. 29, No. 3, pp. 323-332, 1962

MIELE, A. "Flight Mechanics" (Vol. 1): theory of flight paths",
Adison-Wesley Publishing Company, Inc., Reading, Massachusetts, U.S.A., 1962 (MEQ)

PONTRYAGIN L.S., BOLTYANSKI V.G., GAMKRELIDZE R.V. & MISHCHENKO E.F.
"The Mathematical Theory of Optimal Processes",
Wiley, New York, 1962 (GEN)

VERNON M.D. "The Psychology of Perception",
p. 139 et seq., Pelican Books (HUM)

1963

====

LOH W.H.T. "Dynamics and Thermodynamics of Planetary Entry",
Prentice Hall, Englewood Cliffs, New Jersey, 1963

KROTOV V.F. "On the optimal mode of horizontal flight of an airplane",
ITS Mech., p. 92-115, August 1963 (Avail. Air Force Systems Command, WRIGHT-PATTERSON AFB,
Ohio) (FOP)

MARKS B.L. "ATC Probabilities, Separation Standards and Collision Risk",
RAE Tech. Note Math 91 (TCS)

OVERESCH E. "The problems of exact calculation of take-off and landing characteristics of conventional
transport aircraft",
AGARD-R-417, Jan. 1963 (ACP-LDG)

1963

=====

POLHEMUS W.L. "Some navigation problems of supersonic transport aircraft (Factors pertaining to navigation and control of supersonic transport aircraft, such as optimum route, sonic boom and fuel consumption)", Deutsche Gesellschaft für Ortung und Navigation, International Congress, Berlin, April 1963, Navigation (PARIS), Vol. 11, p. 343-360, Oct. 1963 (in French) (GEN)

1964

=====

DENHAM W.F. and BRYSON A.E. Jr. "Optimal Programming Problems with Inequality Constraints, Part 2, Solution by Steepest Ascent", AIAA Journal, Vol. 2, No. 1, pp. 25-34, 1964

ICAO/OACI "Manual of the ICAO standard atmosphere extended to 32 kilometres (105.000 feet)", International Civil Aviation Organisation, Doc. 7488/2, 2nd edition, 1964

LUMLY J.L. and PANOWSKY H.W. "The Structure of Atmospheric Turbulence", John Wiley and Sons, New York, London 1964

1965

=====

ISAACS R. "Differential Games", Wiley, New York (TCS)

MIELE A. Editor, "Theory of Optimum Aerodynamic Shapes", Academic Press, New York, New York, 1965

PRANDTL L. "Strömungslehre", Vieweg-Verlag, Braunschweig, 1965

PRITCHARD F.E. "Spectral and Exceedance Probability Models of Atmospheric Turbulence for Use in Aircraft Design and Operation", Air Force Flight Dynamic Laboratory, Wright-Patterson Air Force Base, Ohio, Rep. AFFDL-TR-65-122, 1965

1966

=====

BRUSH R.G. & VINCENT T.L. "Minimum time aircraft trajectories between two points in range altitude space", NASA-CR-631, Oct. 1966 (ACP)

CAIGER B. "Some problems in control arising from operational experiences with jet transports (Jet transport control problems induced by turbulence and pilot misinterpretation of flight instrument data)", NC 052609 National Aeronautical Establishment, Ottawa, Ontario. Also in AGARD, September 1966 (GEN)

DWO "Höhenwindmessdaten der Stationen Stuttgart-Schnarrenberg (1961-1970) und Essen (1966-1971)", Deutscher Wetterdienst Offenbach

FLORA C.C. "Dynamic motions of Aircraft - Survey and Introduction (Dynamic stability and flight handling problems induced by mass and inertial properties of future transport Aircraft - survey and introduction I", AGARD Stability and Control (Sept. 1966) (MEQ)

MEYERSBURG R.B. & WILLIAMS C.H. "The two segment noise abatement approach to landing", Intern. Conf. on the reduction of noise and disturbance caused by civil aircraft, London, November 1966 (LDG-EMY)

HESTENES M.R. "Calculus of Variations and Optimal Control Theory", John Wiley and Sons, New York, New York, 1966

1966

REICH P.G. "Analysis of Long-Range Air Traffic Systems: Separation Standards",
J. Navig. Vol. 19, pp. 88-98, 169-193, 331-347, January, April, July (TCS)

1967

BERTONE C.M., BROWN J.E., GAINER C.A., MONROE R.D., NICHOLS D.W.
"All weather landing simulation for category 3 airborne configuration", Vol. 1 - "Summary of studies on flight directors and split axes control", Final report, Bunker-Ramo Corp., Canoga Park, Calif., B 4338649, July 1967 (LDG-WND)

DAVIES, P.D. "Handling the Big Jets",
Civil Aviation Authority, Aviation House, 129 Kingsway, London, U.K., April 1967,
(reprinted April 1973) (HSC)

HOOVER J.H. "A system solution to the aircraft noise problem",
AIAA Paper 67-761, October 1967 (EMY)

PAINE J.P. "Some Considerations on the Use of Lifting Reentry Vehicles for Synergetic Maneuvers",
Journal of Spacecraft and Rockets, Vol. 4, No. 5, pp. 698-700, 1967

ROSSLER M. "Optimal Aerodynamic-Propulsive Maneuvering for the Orbital Plane Change of a Space Vehicle",
Journal of Spacecraft and Rockets, Vol. 4, No. 12, pp. 1678-1680, 1967

SPEYER J.L., MEHRA R.K., and BRYSON A.E. Jr. "The Separate Computation of Arcs for Optimal Flight Paths with State Variable Inequality Constraints",
Harvard University, Division of Engineering and Applied Physics, Technical Report No. 256, 1967

1968

- ADAMS H.W. "Reliability and operational economics of the next decade of jet transports",
JA, Vol. 5, p. 570, November-December 1968 (EMY)
- BRYSON A.E. & DESAI M.N. "Energy state approximations in performance optimisation of aircraft",
AIAA Paper 68-877, Pasadena, 1968 (ACP)
- CANAVOS G.C. & LINA L.J. "Influence of angle of glide slope on the accuracy of performing instrument
approaches in a simulator",
NASA-TN-D-4835, Nov. 1968 (LDG-CST)
- DRAKE H.M. "An overview of hypersonic aircraft missions and technology (mission and design studies for
Hypersonic transport and air launch aircraft)",
Aviation and Space conference.
American Society of Mechanical Engineers (1968). (GEN)
- KZUCHRY ANDREW J. "Regularisation in optimal trajectory problems",
Technical note, AIAA J, Vol. 6, p. 1209, June 1968 (NCG)
- LASTMAN G.J. "A modified Newtons method for solving trajectory optimisation problems",
AIAA J, Vol. 6, p. 777, May 1968 (NCG)
- MARTIN D.A., WILLETT F.M. Jr. "Development and Application of a Terminal Spacing System",
Final Report, FAA NA-6b-25 (RD-68-16), August 1968
- MIELE A. "Method of Particular Solutions for Linear, Two-Point Boundary-Value Problems",
Journal of Optimization Theory and Applications, Vol. 2, No. 4, pp. 260-273, 1968
- PATTERSON G.A.Jr "Criteria for determination of minimum usable approach speed",
JA, Vol. 5, p. 268, May-June 1968 (FOP)
- PETRIE D. M. "Automatic flight management of future high performance aircraft",
JA, Vol 5, p. 335, July-August 1968 (FOP)
- PRICE Ch.F. "A method for closing the loop in explicit guidance systems",
Technical note AIAA J, Vol. 6, p. 1148, June 1968 (NCG)
- PRONGAY D.M. "Data systems and data analysis methods to support on board in-flight operations",
JA, Vol. 5, p. 578, November-December 1968 (FOP)
- RAWLING A.G. "Passive determination of homingtime",
AIAA J, Vol. 6, p. 1604, August 1968 (NCG)
- TEMPLEMAN J.E. & PARKER R.H. "Boeing/Sperry automatic landing system 727 airplane",
JA, Vol. 5, p. 285, May-June 1968 (FOP)
- WEISS H.G. "A concept for air traffic control (air traffic control of commercial aircraft in allocated
computer monitors)",
Lincoln laboratories, MIT, by digital Lexington LQ054005, 1968 (TCS-RFI)

1969

- BRYSON A.E. & HO Y.C. "Applied Optimal Control",
Blaisdell, Watham, Mass., 1969, Chap 2 (NCG)
- BRYSON A.E. Jr., DESAI M.N. & HOFFMAN W.C. "Energy state approximation in performance optimization of
supersonic aircraft",
JA, Vol.6, Nov.-Dec. 1969 (FOP)
- FOGARTY L.E. and HOWE R.M. "Computer mechanization of six-degree of freedom flight equations",
NASA CR-1344, Washington D.C., May 1969
- GEORGE L., VERNET J.-F. et WANNEER J.-C. "La mécanique du vol. Performances des avions et des engins",
Dunod, Paris, 1969
- ISHIHARA T. "Generation of suboptimal, closed loop guidance for minimum time aircraft trajectories
(generation of suboptimal closed loop guidance for minimum time aircraft trajectories",
ARIZONA UNIV., TUCSON (AX852975) 1969 (CST).
- LASTMAN G.J. "Two formulations for optimisation problems with state variable inequality constraints",
AIAA J, Vol. 7, p. 1378, July 1969 (NCG)
- NEMEREVER W.J. "ATC of the Future (ATC systems Analysis including Airports, ground access and air
transportation)",
INIT-FLIGHT INTERNATIONAL (Jul. 1969) (TCS).
- ODONI A.R. "An Analytical Investigation of Air Traffic in the Vicinity of Terminal Area",
Technical Report No. 46, Operations Research Center MIT, Cambridge, 1969
- POPPLTON E.D. "A generalization of Zerkelo's condition for the minimum-time flight path (Jet aircraft
quasi-level above flat earth, deriving equation of path minimizing linear combination of fuel
consumption and flight time",
Zeitschrift für angewandte Mathematik und Mechanik, Vol. 49, p. 363-365, June 1969 (FOP)
- POWERS W.F. & TAPLEY B.D. "Canonical transformation applications to optimal trajectory analysis",
AIAA J, Vol. 7, p. 394, March 1969 (NCG)
- ROBINSON A.C. "Survey of dynamic analysis methods for flight control design",
JA, Vol. 6, p. 81, March-April 1969 (HSC)
- SCHÄNZER G. "Einfluss von verkoppelten instationären Böenstörungen auf die Flugzeuglängsbewegung",
Dissertation, TU Braunschweig, 1969
- SMITH J.D. "The impact of Air Traffic Control on aviation growth. (Air Traffic Control inadequacy and
restrictive regulations influence on aviation growth, implying need of Airport-Airways system
improvements)",
AIAA Oct. 1969 (TCS).
- THRASHER G.J. "Optimal programming for aircraft trajectories utilizing a new strategy for handling
state inequality constraints",
AIAA Paper 69-812, July 1969 (FOP-LST)
- VAN DINE C.P. "An algorithm for the optimisation of trajectories with associated parameters",
AIAA J, Vol. 7, p. 400, March 1969 (NCG)
- VANDER VELDE W.E., BENTLEY G.K., FAGAN J.H. & McDONALD W.T.
"Onboard computer requirements for navigation of a spinning and maneuvering vehicle",
JSR, Vol. 6, p. 1371, December 1969 (CST)
- WALDMAN R.H. "Les systèmes de navigation pour les avions subsoniques de transport civil dans les
années 1970",
INIT-NAVIGATION / Paris / Juillet 1969 (NCG).
- WARKSON M.A., HOOTON E.N., BURNS H.C. "Design for the future in terminal air traffic control",
JA, Vol. 6, p. 360, July-August 1969 (TCS)

1969

WILLIAMS J.E.D. "Navigation and Economics in the air (air navigation and economics, discussing air traffic control and traffic density effects on fuel consumption and engine life), Institute of Navigation, journal, vol. 22 (Jan. 1969). (EMY).

1970

====

- AIR REGISTRATION BOARD "Civil Aircraft airworthiness data recording programme. En route use of flap (En route aircraft flap control during descent and holding), AR3-TN-99 (Apr. 1970)(HSC-ACP).
- ARDEMA M.D., GREGORY T.J. & WATERS M.H. "Hypersonic transport preliminary performance estimates for an all-body configuration (All-body configuration hypersonic transport aircraft performance by computer synthesis, considering sonic boom constraint, maximum payload ratio and optimal cruise speed)", AIAA Paper 70-1224, Oct. 1970 (ACP)
- BENOIT A. "Aircraft Trajectories. An approach to the calculation of aircraft trajectories for possible application in Air Traffic Control", Half-yearly Information Review of the European Organisation for the Safety of Air Navigation, EUROCONTROL, Vol. II, No. 2, p. 11-17, June 1970
- BENOIT A., CHARVET Y., KUYPERS P. & MARTIN R.H.G. "Study of automatic conflict detection and resolution in Air Traffic Control planning", 7th, ICAS 70-58, Consiglio Nazionale dello Ricerche, Roma, Italy, September 14-18, 1970 (TCS)
- BERNERT J.H. & THELANDER J.A. "Aircraft operating procedure development using integral-variational performance analysis methods", AIAA Paper 70-876, July 1970 (GEN)
- BOX G.E.P. & JENKINS G.M. "Time series analysis, forecasting and control", Holden-Day, San Francisco, 1970
- BRUSCH R. & SCHAPPELLE R.M. "Solution of highly constrained optimal control problems using non linear programming", AIAA Paper 70-964, Aug. 1970 (FOP)
- BURNHAM J. "Atmospheric gusts - a review of the results of some recent RAE research (gust and wind effects near thunderstorms and mountains and during aircraft takeoff and landing)", RAE-TR-68244, 1970 (WND)
- CHAPMAN G.T. & KIRK D.B. "A method for extracting aerodynamic coefficients for free-flight data", AIAA J, Vol. 8, p. 753-758, April 1970 (ACP)
- CODOBAN A. "Range and optimum angle of attack for aircraft flying in a windy atmosphere (flight range and optimum angle of attack under wind conditions of constant velocity and direction, considering fuel consumption for given distance)", Revista Transporturilor, Vol. 17, p. 443-448, 1970 (in Rumanian) (ACP-FOP)
- DIN LN 9300 Flugmechanik, Normenstelle Luftfahrt, 1970
- GRAHAM W. "Separation of Traffic by Visual Means - An Estimate of the Effectiveness of the See and Avoid Doctrine", Proc. IEEE, Vol. 58, No. 3, March (HUM)
- HAGUE D.S. "Application of the variational steepest - Descent Method to high performance aircraft trajectory optimization (application of steepest descent method to trajectory optimization and aircraft performance problems", Aerophysics Research Corp., Bellevue. NASA-CR-73366 1970 (CST).
- HAMEL P. "On the effect of gusts and crosswind on the dynamic response of aircraft in the landing approach", RAE-UB-TRANS-1524, Oct. 1970 (HSC-LDG-WND)
- HAMEL P. & BUCHOLZ F.G. "Gust effects on the dynamics of aircraft during landing approach", NASA-TT-F-12, 751. 1970 (WND)
- ICAO/OACI "Procedures for Air Navigation Services, Rule of the Air and Air Traffic Services", ICAO Doc. 4444-RAC/501/10, 1970

1970

JAZWINSKI A.H., "Stochastic processes and filtering theory",
Academic Press, New York, 1970

KLEIN R.H., McRUER D.T. & WEIR D.H. "A pilot-vehicle systems approach to longitudinal flight director design",
AIAA Paper 70-1001, August 1970 (LDG)

LING C.K. "Quasi-optimum design of an aircraft landing control System, performing worst case simulation for jet transport",
JA, Vol. 7, p. 38-43, Jan. - Febr. 1970 (LDG)

MESAROVIC M.D., MACKO D., TOKAMATA Y. "Theory of Hierarchical Multilevel System",
Academic Press, 1970

MIELE A., PRITCHARD R.E., and DAMOULAKIS J.N. "Sequential Gradient-Restoration Algorithm for Optimal Control Problems",
Journal of Optimization Theory and Applications, Vol. 5, No. 4, pp. 234-282, 1970

MIELE A., and IYER R.R. "General Technique for Solving Nonlinear, Two-Point Boundary-Value Problems via the Method of Particular Solutions",
Journal of Optimization Theory and Applications, Vol. 5, No. 5, pp. 382-399, 1970

1971

- ASSEO S.J. "Constrained gain problem and its application to aircraft control systems",
JA, Vol. 8, p. 241, April 1971 (HSC)
- BARONI A. "Meteorologic influence on the flight of a commercial SST (Atmospheric wind, temperature, turbulence, hydrometeors, ozone, cosmic radiation and radio activity effects on commercial SST Concorde flight)",
Rivista di Meteorologia Aeronautica, Vol. 31, p. 301-305, Italia, September 1971 (ATM)
- BENOIT A. "Applicability of the EROCOA trajectory prediction module to actual scheduled flights",
EUROCONTROL Report 722016, September 1971 (CST-NGC)
- BOGDANOFF S.M. (Chairman) "Turbulent shear flows",
AGARD-CP-93, 13-15 September 1971, London, U.K., Published January 1972 (WND)
- BROWN A.D. "A simulation study of low visibility approaches and landings at night",
RAE-TR-71044, March 1971
- BURROWS J.W. "Combined Inertial - ILS aircraft navigation systems",
JA, Vol. 8, p. 439, June 1971 (NGC)
- COOK G. & THOMASSON F.Y. "Comparison of constant lift - coefficient climbs with flight-manual climbs for a jet transport (KC-135 aircraft climb trajectories for optimum constant lift coefficient, range and fuel amount)",
JA, Vol. 8, p. 810-812, Oct. 1971
- CULBERTSON J.D. "Position required and its application to guidance problems",
AIAA J, Vol. 9, p. 1188, June 1971 (NGC)
- DENHARD W.G. "Technology of tomorrow's commercial air traffic control (Commercial ATC, considering VFR, flight control and inertial navigation)",
MIT Cambridge 1971 (TCS).
- DUNHAM R.E. Jr., ELKINS, H.C., HATFIELD, J.J., SAWYER R.H.
"Flight evaluation of a display for steep approach (vertical situation display concept for alleviating problems of inadequate guidance and display information for making steep approaches)",
NASA Aircraft safety and operating probl. vol. 1 1971 (LDG).
- ERZBERGER H. & LEE H.Q. "Optimum horizontal guidance techniques for aircraft",
JA, Vol. 8, p. 95, February 1971 (HSC)
- GERA J. "The influence of vertical wind gradients on the longitudinal motion of airplanes",
NASA-TN-D-6430, September 1971 (WND)
- JOHNSON C.D. & SKELTON R.E. "Optimal desaturation of momentum exchange control systems",
AIAA J, Vol. 9, p. 12, January 1971 (NGC)
- KELLEY H.J. "Flight path optimisation with multiple time scales",
JA, Vol. 8, p. 238, April 1971 (NGC)
- KISHI W.H. & PFEFFER I. "Approach guidance to circular flight paths",
JA, Vol. 8, p. 89, February 1971 (HSC)
- LEWALLEN J.M., SCHWAUSCH O.A., TAPLEY B.D. "Coordinate system influence on the regularised trajectory optimisation problem",
JSR, Vol. 8, p. 15, January 1971 (NGC)
- LICHTFORD G.B. "Aeronautics and air traffic control",
NASA CR-1833, Washington D.C., August 1971

1971

- MACKINNON D. & MADDEN P. "Path accuracy limitations of inertially based flight trajectory control systems in a turbulent environment (Optimization algorithms for jet transport aircraft inertially based flight trajectory control in turbulent atmosphere, comparing with ILS)", Symposium on Automatic Control in Space, 4th, Dubrovnik, Yugoslavia, Proceedings, 1971 (NOG-WND)
- McRUER D.T., WEIR D.H., KLEIN R.H. "A pilot-vehicle systems approach to longitudinal flight director design", JA, Vol. 8, p. 890, November 1971 (NCG)
- MERRICK R.B. "A simplified Kalman estimator for an aircraft landing display", JA, Vol. 8, p. 44, January 1971 (TCS)
- MIELE A., NAQVI S., LEVY A.V., and IYER R.R. "Numerical Solution of Nonlinear Equations and Nonlinear, Two-Point Boundary-Value Problems", Advances in Control Systems, Edited by C.T. Leondes, Academic Press, New York, New York, Vol. 8, pp. 189-215, 1971
- MIELE A., and IYER R.R. "Modified Quasilinearization Method for Solving Nonlinear, Two-Point Boundary-Value Problems", Journal of Mathematical Analysis and Applications, Vol. 36, No. 3, pp. 674-692, 1971
- OSTOSLAVSKI J.V. "Flight dynamics - Aircraft trajectories", AD-727474 FTD-HC-23-637-70, Air Force Systems Command, Wright Patterson AFB, Ohio (translated from Russian), 1971 (MEQ)
- PORITZKY S. B. "Seeking a new precision approach and landing system: A test of maturity", JA, Vol. 8, p. 358, July 1971 (TCS)
- RAMLOW H.D. & THATCHER R.M. "Airplane economic design evaluation (AEDE) computerised model and its application", Engineering note, JA, Vol. 8, p. 576, July 1971 (EMY)
- ROSENAU G. "Umrechnung flugmechanischer Derivative", Z. Flugwiss. Weltraumforsch. 19, 1971, p. 512-517
- RUETENIK J.R., LANGE W.R., THOMPSON J.H. "Analysis of pilot warning indicator performance in terminal area traffic", JA, Vol. 8, p. 905, November 1971 (TCS)
- SCHULTZ R.L. & ZAGALSKY N.R. "The energy state approximation and minimum fuel fixed range trajectories", JA, Vol. 8, p. 448, June 1971 (FOP)
- SINGER R.A., and BEHNKE K.W. "Real-Time Tracking Filter Evaluation and Selection for Tactical Applications", IEE Trans. Aerospace & Electronic Syst. Vol. AES7, January (SUR)
- WEIR D.J. & KLEIN R.H. "Measurement and analysis of pilot scanning behaviour during simulated instrument approaches", JA, Vol. 8, p. 897, November 1971 (RPI)
- WINN M.W. "Aircraft trajectory optimisation using Pontryagin's minimum principle", Elliott-Automation, Camberley, England, ETN-4 KV/B/627/CB.64, March 1971 (FOP)
- WISHOR D.A. "Optimization Methods for Large-Scale System with Applications", Mc Grow-Hill, 1971
- ZARETT H. & SARGENT D. "The critical dynamic errors of a strapdown guidance system", JSR, Vol. 8, p. 1208, December 1971 (NOG)

1972

=====

- BECKMAN D.L. "PB-75 Flight guidance system. (PB-75 Flight guidance system for subsonic commercial transport aircraft operation under category III A. Conditions, describing cruise and ILS operation)",
Electronics and civil aviation (June 1972) (LDG)
- BENOIT A. & MARTIN R.H.G. "On the generation of accurate trajectory predictions for Air Traffic Control purposes",
IATA 19th Technical Conference "Handling the Air Traffic of the Long Term Future", Dublin, October 1972. Also EUROCONTROL Report 722032, August 1972 (CST)
- BENOIT A. & MARTIN R.H.G. "Accurate aircraft trajectory predictions applied to future En-Route Air Traffic Control",
IATA 19th Technical Conference "Handling the Air Traffic of the Long Term Future", Dublin, October 1972. Also EUROCONTROL Report 722031, August 1972 (CST)
- BOER W.P. de "Behaviour of very large aircraft disturbed by wind shear and atmospheric turbulence",
NLR Report TR 72023 U, 1972 (WND)
- BROWN A.D. "Cat. 2: A simulation study of low visibility approaches and landings at night (Flight simulator exercises for investigation of pilot performance in low visibility conditions during approach and landing",
Royal Aircraft Establishment RAE-TR-71044 1972 (LDG).
- COOPER F.L. Jr. "A gradient technique for determining improved aircraft trajectories for reducing aircraft probability of kill to antiaircraft gun fire / M.S. Thesis / (Gradient technique for determining improved aircraft flights paths to reduce kill probability by antiaircraft gunfire),"
Air Force Inst. of Techn. 1972 (CST).
- CRAIG A. "Flying sideways during landing maneuvers (lateral flight path control during aircraft landing in gusty cross-winds by lateral thrust deflection)",
Atmospheric Flight Mechanics Conference, 2nd, Paolo Alto and Moffett Fields, Calif., September 1972, NASA Ames Research Center, Moffett Fields, Calif., 1972 (LDG-WND)
- DONALDSON COLEMAN du P., SULLIVAN R.D., ROSENBAUM H. "A theoretical study of the generation of atmospheric clear air turbulence",
AIAA J, Vol. 10, p. 162, February 1972 (ATM)
- DRUMMOND A.M. "Lateral dynamics of flight on a great circle",
AIAA J, Vol. 10, p. 247, march 1972 (HSC)
- ERZBERGER H. & LEE H.Q. "Terminal-area guidance algorithms automated air traffic control",
NASA-TN-6773, April 1972 (TCS)
- ETKIN B. "Dynamics of Atmospheric Flight",
John Wiley & Sons; Inc., New York-London-Sydney-Toronto, 1972
- FRANKLIN J.A. "Flight investigation of the influence of turbulence on longitudinal flying qualities",
JA, Vol. 9, p. 273, April 1972 (FOP)
- GILES R.F. "An analytical investigation of short-period flying qualities",
JA, Vol. 9, p. 129, February 1972 (HSC)
- HALL G.W. & BOOTHE E.M. "Lateral directional dynamics and roll control power for the landing approach",
JA, Vol. 9, p. 129, February 1972 (HSC)
- ILLARIONOV V.F. & PASHINTSEV V.T. "Properties of the extremal field in an optimal control problem (applied to aircraft flight over assigned distance with minimum fuel consumption)",
Soviet Physics, Doklady, Vol. 16, p. 820-822, April 1972 (FOP)

1972

- JAKOB H. "An engineering optimization method with application to STOL aircraft approach and landing trajectories",
NASA-TN-D-6978, Sept. 1972 (POP)
- LEE H.Q., McLEAN J.D., ERZBERGER H. "Guidance and control techniques for automated air traffic control",
JA, Vol. 9, p. 490, July 1972 (NOG)
- LENSCHOW D.H. "The Measurement of Air Velocity and Temperature Using the NCAR Buffalo Aircraft Measuring System",
NCAR - TN/EDD - 74, 1972
- LUERS J.K., REEVES J.B. "Effect of shear on aircraft landing /Technical Report, Jul. 1971-Nov. 1972)
(Flight simulation to determine effects of wind shear on aircraft landings for various commercial and military aircraft),
NASA-CR-2287 (WND).
- LYKKEN L.O. & SHAH N.M. "Direct lift control for improved automatic landing and performance of transport aircraft",
JA, Vol. 9, p. 325, May 1972 (HSC)
- MARMISOLLE-DAGUERRE E. "Efficient flight management - A step forward in flight safety",
Electronics and civil aviation ; International Conference, Paris, France, June 1972, Reports
Vol. 1, p. 535, Editions Chiron, Paris, 1972 (GEN)
- MELTS I.O. & USKOV G.V. "A gradient method of control correction for the solution of a boundary value problem for aircraft trajectory optimization",
TSAGI, Uchenye Zapiski, Vol. 3, No. 2, p. 77-85, 1972 (in Russian) (POP)
- MIELE A. and DAMOULAKIS J.N. "Modifications and Extensions of the Sequential Gradient-Restoration Algorithm for Optimal Control Theory",
Journal of the Franklin Institute, Vol. 294, No. 1, pp. 23-42, 1972
- PARK S.K., STRAETER T.A., HOGGE J.E. "An Analytic Study of Near Terminal Area Optimal Sequencing and Flow Control Techniques",
AGARD CP - 105, 1972
- SCHULTZ R.L. & ZAGALSKY N.R. "Aircraft performance optimisation",
JA, Vol. 9, p. 108, February 1972 (ACP)
- SMITH J.M., SCHOONMAKER P.B., PYRON E. & BENHOW R.L. "Principles of performance monitoring with application to automatic landing",
JA, Vol. 9, p. 339, May 1972 (POP)
- TIANO A., DAGNINO P. & PIATTELLI M. "Determination of air optimal trajectory in the presence of risk",
AGARD-CP-114, Oct. 1972
(TCS-POP)
- TOBIAS L. "Automated aircraft scheduling methods in the near terminal area",
JA, Vol. 9, p. 520, August 1972 (TCS)

1973

- BENOIT A. (Program Chairman) "Air Traffic Control Systems",
AGARD CP-105, April 1973
AGARD Symposium, Edimburgh, June 1973
- BENOIT A. & BROWN P. A presentation of EROCOA climb and descent performance data with illustrations of the approximation quality",
EUROCONTROL Report 732040, December 1973 (ACP-CST)
- BENOIT A. "A concept of Air Traffic Control based upon accurate aircraft trajectory prediction",
Xith General Assembly of EUROCAE, December 7, 1973. Also EUROCONTROL Report 732041 (TCS)
- BRUENING G., LADEMANN J. & SCHAFRANEK D. "Longitudinal motion of a transport aircraft during steep landing approaches",
Deutsche Gesellschaft für Luft- und Raumfahrt und Deutsche Gesellschaft für Ortung und Navigation, Symposium über neue Anflugverfahren, Düsseldorf, West Germany, May 1973 (Avail. Technische Universität, Braunschweig) (LDG-HSC)
- CLYMER D.J. & FLORA C.C. "Approach path control for powered-lift STOL aircraft (Characteristics of flight control system for approach flight path control of augmentor wing on powered-lift short takeoff aircraft configuration)",
NASA-CR-114574, April 1973 (LDG)
- DESAI, M., MACKINNON, D. "Performance bound of an aircraft lateral control system using the microwave scanning beam landing system",
DOT-TSC-91 IFAC, IFC, ANIPLA June 1973 (LDG-NGC-RFI).
- DIBLEY H. "Optimum descent operations",
BOAC Safety Digest, August 1973, Issue 127 (FOP)
- FALCO M. & KELLEY H.J. "Aircraft symmetric flight optimization ... gradient techniques for supersonic aircraft control",
AF-29(600)-2671, AF-49(638)-1207 NASA-11532, Control and dynamic systems, New York, Academic Press, p. 89-129, 1973 (FOP)
- FOERSTER P. "Numerical analysis of minimum time climbing procedure and minimum fuel climbing procedure for typical subsonic aircraft",
AGARD-LS-56, March 1973 (ACP)
- FRANKLIN J.A. & INNIS R.C. "Flight-path and airspeed control for the STOL approach and landing (flight simulation to determine manual control of flight path and airspeed for approach and landing of powered lift jet short takeoff aircraft)",
NASA-NC-473657, Ames Research center, Moffett Field, Calif., 1973 (LDG)
- FRIEDEL H. "Flight manoeuvre and climb performance prediction",
AGARD-LS-56, March 1973 (ACP)
- FROST W., MAUS J.R., and SIMPSON W.R. "A Boundary Layer Approach to the Analysis of Atmospheric Motion over a Surface Obstruction",
NASA Constructor Report CR-2182, 1973
- HAFER X. "Problems of quality of flight of future transport aircraft in course of development",
L'aéronautique et l'Astronautique, n° 43 (1973) (FOP).
- HALVERSON A.G. & JOLITZ G. "Terminal area delay and fuel consumption analysis",
FAA-EM-78-20, January 1973 (EMY)
- HAVE J.M. ten "Proposal for the trajectory prediction in SARP II (in Dutch)",
NLR Memorandum VG-73-013, (CST)

1973

- HOFFMAN W.C., ZVARA J., HOLLISTER W.M., BRITTING K.R. "A hybrid navigation system simulation for North atlantic routes. (Digital computer simulation program for North atlantic hybrid navigation system configurations, using covariance matrix error analysis for planned increase of commercial airtraffic capacity)", Institute of Navigation, Annual meeting, 29th, St Louis, Mo., DOT-TSC-473, Department of transportation AB (Aerospace Systems, Inc., Burlington, Mass.), June 1973 (TCS)
- HOUBOLD J.C. "Atmospheric Turbulence", (Dryden Research Lecture), AIAA Journal Vol. 11, No. 4, April 1973
- HUBER R.R. Jr. "Optimal control aircraft landing analysis", Air Force Flight Dynamics Lab., AFFDL-TR-73-141, Dec. 1973 (LDG)
- LEAN D. (Chairman) "Flight in turbulence", AGARD-CP-140, 14-17 May 1973, Woburn Abbey, Bedfordshire, U.K., Published November 1973 (WND)
- LIEVENS V. "The estimation of aerodynamic coefficients necessary for performance calculations", AGARD-LS-56, March 1973 (ACP)
- LUERS J.K. & REEVES J.B. "Effect of shear on aircraft landing (Flight Simulation to determine effects of wind shear on aircraft landings for various commercial and military aircraft)", NASA-CR-2287, July 1973 (WND)
- MIDDLETON P. "Minimum time trajectory computation: development of the balakrishnan method", AGARD-LS-56, March 1973 (FOP-MEQ)
- NEWMAN, T.J. "Area navigation systems for air transport aircraft (Area navigation technology for air transportation in USA, discussing present systems and projections as related to airline and FAA activities)", AIAA and GKNT (July 1973) (TCS).
- NICHOLS M.A. & HEDRICK J.K. "The sensitivity of optimal flight paths to variations in aircraft and atmospheric parameters", Joint Automatic Control Conference, 14th, Columbus, Ohio, June 1973, Print New York, IEEE, 1973 FOP
- PAINTER J.A. & SHANNON J.H. "A study to determine the applicability of noise abatement approach procedures to McDonnell Douglas Aircraft", NASA-CR-114677, Dec. 1973 (EMY)
- PARK S.K., STRAETER T.A. "Near Terminal Area Optimal Sequencing and Flow Control as a Mathematical Programming Problem", Symposium on Non-Linear Programming, George Washington University, 1973
- PECKHAM D.H. "Range performance in cruising flight", British Royal Aircraft Establishment, Technical Report 73164, October 1973 (ACP)
- SCHÄNZER G. "The Effect of Gust and Wind Shear for Automatic STOL Approach and Landing", AGARD Conference Proceedings CP 140, "Flight in Turbulence", Bedfordshire 1973
- SCHUST A.P. Jr. "Determination of aircraft response characteristics in approach/landing configuration for microwave landing system (MLS) Program", Naval Air Test Center, U.S. Naval Air Station, Patuxent River, Md., Oct. 1973 (ACP-LDG)
- SKRIPNICHENKO S. "Climbing performance ... optimum altitude for commercial aircraft", Air Force Systems Command, Wright-Patterson AFB, Ohio, Foreign Technology Division AD-772052 FTD-HT-23-538-74, 1973 (ACP-FOP)
- SKRIPNICHENKO S. "The regimes of climbing flight ... optimization conditions", (in German), Technisch-ökonomische Information der Zivilen Luftfahrt, Vol. 11, No. 1, p. 45-51, 1973 (FOP)

1973

====

SPEYER J.L. "On the fuel optimality of cruise ... for aircraft",
JA, Vol. 10, p. 763-765, December 1973 (FOP)

THOMASSON F.Y. & COOK G. "Solving flight-path optimization problems on a minicomputer (Maximum range flight path during climb with specified fuel supply and variable lift coefficient, solving differential equations systems by conjugate gradient procedure)",
Astronautica Acta, Vol. 18, p. 45, February 1973

VIVIER C. & CORMIER P. "Aircraft mass",
AGARD-LS-56, March 1973 (ACP)

WILLIAMS J. (Edited by) "Aircraft performance-prediction and methods optimization",
AGARD-LS-56, March 1973 (ACP)

1974

- AFNOR "Symboles et vocabulaire de la mécanique du vol",
Norme française enregistrée, AFNOR, MF-X02-115, Décembre 1974 (MEQ)
- ARDEMA M. "Singular perturbations in optimal control and solution of the aircraft minimum time-to-climb problem by the method of matched asymptotic expansions",
International Meeting on Optimization Problems in Engineering and Economics, Naples, Italy, Dec. 1974 (FOP)
- ATIAS M. & WEIHS D. "Motion of aircraft trailing vortices near the ground",
JA, Vol. 21, p. 783-786, Oct. 1974 (WND)
- ATTWOOLL V.W. "Aircraft Characteristics and Air Traffic System",
J. Navig. Vol. 27, No. 2, p. 173, April (MEQ, TCS)
- BARR M.M. et al. "Wind Models for Flight Simulator Certification of Landing and Approach Guidance and Control Systems",
FAA-RD-74-206, December, 1974
- BENOIT A. & EVERS E. "Aircraft trajectory prediction data for ATC purposes",
AGARDograph AG-209, Paper 17, July 1975. Also EUROCONTROL Report 742026, November 1974 (CST)
- BENOIT A. & SWIERSTRA S. "A presentation of actual climb data collected during regular scheduled flights of KLM B-747 aircraft",
EUROCONTROL Report 742025, September 1974 (ACP)
- BOER W.P. de & MOOIJ H.A. "Flight characteristics of very large subsonic transport aircraft during landing approach",
Nederlandse Vereniging voor Luchtvaarttechniek, Yearbook 1974 (Avail. NLR) (LDG-ACP)
- BRUENING G., LADEMANN J., SCHAFRANEK D. "Longitudinal motion of an airliner during steep approach",
NASA-TT-F-15616, June 1974, (HSC)
- BULL J.S. & FOSTER J.D. "Jet transport energy management for minimum fuel consumption and noise impact in the terminal area",
AIAA Paper 74-811, August 1974 (EMY)
- CURRIE G.N., DICKEY R.W., DUCLOS R., PRICE W.L. "Forecasting traffic in an air transport network",
Operations Research Society of America and Institute of management sciences, Joint National Meeting, 46th, San Juan, P.R., Oct. 1974 (TCS)
- DAYTON A.D. "The digital airplane and optimal aircraft guidance",
AGARD-CP-137, May 1974 (NCG)
- DELAGE Y. "A Numerical Study of the Nocturnal Atmospheric Boundary Layer",
Quart. J.R. Met. Soc. 100 (1974), 351-364
- DENERY D.G., WHITE K.C. & DRINKWATER F.J. "Resume of the status and benefits of the two-segment approach and its applicability to the jet transport fleet",
AIAA Paper 74-978, August 1974 (LDG)
- DIBLEY H. "How to reduce noise and save fuel-Now",
Journal of the guild of air pilots and air navigation, March 1974 (FOP)
- ERWIN R.L. and others "Strategic Control Algorithm Development",
U.S. Department of Transportation, Report n. DOT-TSC-OST 74-3, Vol. I-IV, 1974
- ETKIN B. "A method for the estimation of flight path perturbations during steep descents of V/STOL aircraft",
CASI Transactions, Vol. 2, p.60, September 1974 (WND)
- FIEDLER F. "Die Grenzschicht der Atmosphäre: Struktureller Aufbau",
in: Promet 4, Heft 1, 1974, S. 1-3

1974

=====

FOUDRIAT E.C. "Aircraft 4-D constant velocity control system",
JA, Vol. 11, p. 326, June 1974 (NCG)

FRANKLIN J.A. & INNIS R.C. "Flight-path and airspeed control during landing approach for powered-lift aircraft",
NASA-TN-D-7791, Oct. 1974 (LDG)

GREY J. Aircraft fuel conservation: On AIAA view: Proceedings of a Workshop",
Conference, Reston, Va., March 1974 (EMY)

HEMESATH N.B., BRUCKNER J.N.H., KRIPPNER R.A. "Three and four-dimensional area navigation study",
Department of Transportation, Federal Aviation Administration, Washington, DC, FAA-RD-74-150,
June 1974 (NCG)

HOLLAND F.C., GARCEAU T.V. "Genealogy of Terminal ATC Automation",
M70-9, REV. 2, MITRE Corporation, March 1974

HULL D.G. "Application of parameter optimization methods to trajectory optimization",
AIAA Paper 74-825, Aug. 1974 (FOP)

HUNTLEY E. "Landing transition paths which optimize fuel, time, or distance for jet-lift VTOL transport aircraft in steep approaches",
ARC-R/M-3732 1974 (LDG).

LUERS J.K. & REEVES J.B. "Wind shear effects on landing touchdown point",
Conference on Aerospace and Aeronautical Meteorology, 6th, El Paso, Tex., Nov. 1974,
NAS-8-26600, 1974

MATHENY N.W. "Flight investigation of approach and flare from simulated breakout altitude of a subsonic jet transport and comparison with analytical models",
NASA-TN-D-7645, April 1974 (LDG-ACF)

McNAMARA J.E. "The fuel crisis and the controller ... turbojet aircraft descent trajectories for fuel consumption reduction",
Journal of Air Traffic Control, Vol. 16, p. 5-9, Jan.-Feb. 1974 (FOP)

MIELE A., DAMOULAKIS J.N., CLOUTIER J.R., and TIETZE J.L. "Sequential Gradient-Restoration Algorithm for Optimal Control Problems with Nondifferential Constraints",
Journal of Optimization Theory and Applications, Vol. 13, No. 2, pp. 218-255, 1974

NAGARAJAN N. "Discrete optimal control approach to a four-dimensional guidance problem near terminal areas",
International Journal of Control, Vol. 20, p. 277, August 1974 (NCG-LDG)

NEUMAN F. & WARNER D.N. "A STOL Terminal area navigation system",
NASA-TM-X-62, 348, 1974 (NCG)

NICHOLS M.A. & HEDRICK J.K. "Minimum time and minimum fuel flight path sensitivity",
JA, Vol. 11, p. 320-325, June 1974 (FOP)

RATCLIFFE S., GENT H. "Quantitative Description of a Traffic-Control Process",
J. Navgn. Vol. 27, No. 3, p. 317, July (TCS)

RATCLIFFE S. "Computer Representation of Air Traffic Route Structure",
Royal Radar Establishment Memorandum N. 2880, Malvern, 1974

REEVES P.M., CAMPBELL G.S., GRANZER V.M., JOPPA R.G. "Development and Application of a non-Gaussian Atmospheric Turbulence Model for Use in Flight Simulators",
NASA CR 2451, 1974

RZEMEK K. "Certain problems of fuel consumption in air transport",
"Technika Lotnicza i Astromantyczna" (Aug. 1974) (EMY).

1974
=====

SCHAENZLER G. & BOEHRET H.H. "Integrated flight control system for steep approach",
AGARD-CP-137, 1974 (NCG)

SCHULTZ R.L. "Fuel optimality of cruise ... aircraft trajectory analysis",
JA, Vol. 11, p. 586-587, Sept. 1974 (FOP)

STOREY J. "A method for the prediction of aircraft trajectories in the vertical plane",
EUROCONTROL-CEE Report No. 73, August 1974 (FOP)

TOBIAS L. & ERZBERGER H. "Simulation of 4-D RNAV in the terminal area",
Proceedings of IEEE Systems, Man & Cybernetics Society, Dallas, Texas, October 1974 (TCS-CST)

WHITE F.M. "Viscous Fluid Flow",
Mc Graw-Hill Book Company, New York, 1974

1975

=====

- BENOIT A. (Program Director and Editor) "A Survey of modern Air Traffic Control",
AGARD-AG-209, Vols. I and II, July 1975
- BENOIT A., STOREY J., SWIERSTRA S. "The introduction of accurate aircraft trajectory predictions in
Air Traffic Control",
AGARD CP-188, p. 28, February 1976. Also EUROCONTROL Report 752011, April 1975 (TCS-CST)
- BEPPU G. "A study of pilot behaviour during controlling the lateral-directional motion of airplanes in
turbulent air",
NASA-TM-X-62464, p. 625-644, 1975
- BIEN Z. "Optimal control of delay systems",
Thesis, University of Iowa, Iowa City, December 1975 (FOP)
- CALISE A.J. "Extended energy management methods for flight performance optimization",
AIAA Paper 75-30, January 1975 (FOP)
- CALISE A.J., AGGARWAL R., ANDERSON G.M.
"Aircraft optimal weapon delivery manoeuvres based on extended energy management ... air-to-air
missile launching",
AIAA Guidance and Control Conference, Boston Aug. 1975 (FOP).
- COUNIHAN J. "Adiabatic Atmospheric Boundary Layers",
A Review and Analysis of Data from the Period 1880-1972
Atmosph. Environment, Vol. 9, S. 871-905, Pergamon Press 1975
- CRAWFORD D.J. "Automatic guidance and control of a transport aircraft during a helical landing
approach",
NASA-TN-D-7980, 1975 (NCG-LDG) "Curved descending landing approach guidance and control",
NASA-TM-X-72200, 1975 (LDG)
- ERZBERGER H., BARMAN J.F., McLEAN J.D. "Optimum flight profiles for short haul missions",
AIAA Paper 75-1124, August 1975 (FOP)
- ERWIN R.L. "Strategic Control of Terminal Area Traffic",
AGARD Conference Proceedings n. 1988, Plans and Development for Air Traffic Systems 3-1, 3-13,
1975
- ERZBERGER H., Mc LEAN J.D. & BARMAN J.F. "Fixed-range optimum trajectories for short-haul aircraft",
NASA-TN-D-8115, December 1975 (FOP)
- FOUDRIAT E.C. "A General Algorithm for Relating Ground Trajectory Distance, Elapsed, Flight Time, and
Aircraft Airspeed and its Application to 4-D Guidance",
NASA TN D-7876, 1975 (NCG)
- GOODWIN E.M. "A Statistical Study of Ship Domains",
J. Navgn., Vol. 28, No. 3, p. 328, July
- HAMEL P. & AIKEN W. Jr. (Editors) "Methods for aircraft state and parameter identification",
AGARD-CP-172, May 1975 (ACP-MEQ)
- HAVE ten J.M. "Infrastructure for the evaluation of the SARP II trajectory prediction module on
the basis of MADAP radar measurements of actual trajectories" (in Dutch), NLR Memorandum VG-
75-015 L, 1975 (CST)
- HEIDEMAN J.C., and LEVY A.V. "Sequential Conjugate Gradient-Restoration Algorithm for Optimal Control
Problems, Part I, Theory",
Journal of Optimization Theory and Applications, Vol. 15, No. 2, pp. 203-222, 1975
- ISO ISO 1151-1153 "Terms and Symbols for Flight Dynamics",
International Organization for Standardization, 1975

1975

- LAX F.M. "Design and simulation of a descent controller for strategic four-dimensional aircraft navigation",
NASA-CR-146127 Nov. 1975 (NCG)
- LEE H.Q., NEUMAN P. & HARDY G.G. "4-D area navigation system description and flight tests",
NASA-TN-D-7874, August 1975 (NCG)
- MIELE A. "Recent Advances in Gradient Algorithms for Optimal Control Problems",
Journal of Optimization Theory and Application, Vol. 17, Nos. 5-6, pp. 361-430, 1975
- PECSVARADI T. "Four-dimensional Guidance Algorithms for Aircraft in Air Traffic Control Environment",
NASA-TN-D-7829, 1975 (NCG)
- PECSVARADI T. "Four-dimensional Guidance Algorithms for Aircraft in an Air Traffic Control Environment",
NASA Washington, D.C., March 1975
- PELEGRIN M. Navigation 4-D en zone terminale considérée comme un problème d'automatique"
AGARD/GCP 1975 (TCS, NCG),
- SHAPIRO N. "Aircraft operational procedures for community noise control",
Inter-noise 75, Proceedings of the International Conference on Noise Control Engineering,
Sendai, Japan, August 1975 (EMY)
- SKRIPNICHENKO S. "Optimization of aircraft flight regimes : Economical flight regimes ...",
(Russian Book) Izdatel' stvo Mashinostroenie, Moscow, 1975 (FOP)
- STEINER J.E. "The 1974 energy crisis - A perspective - The effect on commercial aircraft design",
American Society of civil Engineers, 1975 (EMY).
- STEINER J.E. "Future Commercial air transports developments - its implications for controllers and pilots",
The controller, vol. 14 (Aug. 1975) (TCS).
- SUSSMAN M.B. "Terminal area considerations for an advanced CTOL transport aircraft",
NASA-12018, January 1975 (GEN-LDG)
- SWIERSTRA S. "Results of an analysis of the vertical error associated with short term trajectory prediction methods",
EUROCONTROL Report 752011, April 1975 (CST)
- VAN DE MOESDIJK G.A.J. "The Description of Patchy Atmospheric Turbulence Based on a non-Gaussian Simulation Technique",
Delft University Report VTH-192, February 1975
- WHITE J.A. "Analysis of Queueing Systems",
Academic Press, New York 1975
- WILLIAMSON W.E. "Square-root variable-metric method for function minimization",
AIAA J, Vol. 13, p. 107-109, Jan. 1975 (GEN)
- WILZ R.R., WARNOCK A., MATCAL S. "Expansion of Capacity for Expeditionary Airfields",
Paper at the 20th Guidance and Control Panel Symposium,
AGARD Meeting at Cambridge, Ma., May 1975

1976

- ANDERSON G.M. & OTHLING W.L. Jr "Optimal trajectories of high thrust aircraft",
JA, Vol. 13, p. 180, March 1976 (NCG)
- ASSAD A.A. "Multicommodity Network Flows - Computational Experience",
Working Paper OR 058-76, Operations Research Center, MIT, Cambridge, 1976
- ATTWOOLL V. "The optimization of traffic flow around a network"
AGARD CP-188, pp. 15-1 to 15-6, February 1976
- BARMAN J.P. & ERZBERGER H. "Fixed range optimum trajectories for shorthaul aircraft",
JA, Vol. 13, p. 748, October 1976 (NCG)
- BENOIT A. "Prediction of the trajectories of aircraft operating in a civil ATC environment",
Seminar on "Conflict Detection and Resolution", Institut de la Navigation Aérienne, Luxembourg,
March 23-26, 1976. Also EUROCONTROL Report 762001, January 1976 (TCS)
- BENOIT A. "Capabilities and limitations of trajectory predictions",
Seminar on "Conflict Detection and Resolution", Institut de la Navigation Aérienne, Luxembourg,
March 23-26, 1976 (CST)
- BENOIT A. & ISRAEL D. (Program Chairmen, Symposium Chairmen and Editors) "Plans and Developments for
Air Traffic Systems",
AGARD CP-188, February 1976
- BENOIT A. & SWIERSTRA S. "A presentation of actual descent data collected during regular scheduled
flights of KLM B-747 and DC10 aircraft",
EUROCONTROL Report 762034, September 1976
- BENOIT A. & WEDEL D. "Prediction of the initial and final phases of the trajectory of an aircraft",
Seminar on "Conflict Detection and Resolution", EUROCONTROL Institute of Air Navigation
Services, Luxembourg, March 23-26, 1976. Also EUROCONTROL Report 762003, February 1976 (CST)
- BULL J.S. "Energy management - The delayed flap approach",
Shell Aviation News, No. 434, p. 28-29, 1976 (LDG-FOP)
- CALISE A.J. "Singular perturbation methods for variational problems in aircraft flight",
IEEE Transactions on automatic control, Vol. AC-21, No. 3, p. 345, June 1976 (FOP)
- COX M.E. "The influence of navigation and meteorology on prediction accuracy",
EUROCONTROL-LUXEMBOURG, Report on the seminar conflict detection and resolution, March 1976
(GEN)
- DEAR R.G. "The Dynamic Scheduling of Aircraft in the Near Terminal Area",
FTL R76.9, Flight Transportation Laboratory, MIT Cambridge, 1976
- DIEUDONNE J.E., GROVE R.D. & STEINMETZ G.G. "A simulation study of curved, descending, decelerating,
landing approaches for transport aircraft",
NASA-TN-D-8190, 1976 (NCG-LDG)
- DUTTON J.A. "The Ceaseless Wind",
McGraw-Hill Book, Company, New York, 1976
- ERWIN R.L., Jr. "Strategic control of terminal area traffic",
Boeing Commercial Airplane Co. Seattle, Wash.
AGARD 760200 1976 (TCS).
- FAA "United States Standard for Terminal Instrument Procedures (TERPS)",
FAA Handbook 8260.3B, July 1976 (GEN)
- FAZI, C. "Research for a trajectory with zero incidence and such that the product of dynamic pressure
and incidence is a minimum for the Europa 3 launcher (orbit 200/3600 km)",
S/DEA-3-30-16-518 1976 (MEQ).

1976

=====

- FAZI, C. "Research for a trajectory with zero incidence and such that the product of dynamic pressure and incidence is a minimum for the Europa 3 launcher (orbit 200/3600 km)", S/DEA-3-30-16-518 1976 (MEQ).
- FOXWORTH T.G. "Energy management - An operational outline ... digital flight guidance/control spinoffs from Space Shuttle", Shell Aviation News, No. 434, p. 26-27, 1976 (Avail. Pan American World Airways, New York, N.Y.) (NCG)
- GIFFARD Ch. & MARVILLET J.P. "The STRADA landing trajectory system", AGARD-AG-219, Feb. 1976 (NCG-LDG)
- GILBERT E.G. & PARSONS M.G. "Periodic control and the optimality of aircraft cruise", Engineering note, JA, Vol. 13, p. 828, October 1976 (NCG)
- GILBERT J.W. "Typical Aircraft Trajectories During Collision Avoidance Manoeuvres", British Aircraft Corp. Aerodynamics Dept. Memorandum Aero/S&C/193, August (MEQ)
- HOFMAN C.F.G.M. "Exploratory investigation of decelerating approaches of a twin-engined jet transport, Vol. 2, Moving-base simulation and comparison with related experiments", NLR Report TR 76150 U, Oct. 1976 (LDG-FOP)
- HOFMAN C.F.G.M. "Exploratory investigation of decelerating approaches of a twin-engined jet transport, Vol. 2: Fixed-base simulation", NLR Report TR 75171 U, March 1976 (LDG)
- HOFMAN C.F.G.M. "Investigation of decelerating approaches of a twin engine jet transport aircraft (noise reduction)", AIAA Paper 76-929, September 1976 (LDG)
- JOPPA R.G. "Wind shear detection using measurement of aircraft total energy change", NASA-CR-137839, 1976 (WND)
- LAX F.M. "Design and simulation of a descent controller for strategic four-dimensional aircraft navigation / M.S. Thesis /", MIT Cambridge. Decision and Control Sciences Group. NASA-CR-146127 1976 (NCG).
- LITCHFORD G.A. "SSR-CAS", ICAO Bulletin, March (SUR, TCS)
- MARSH J.H. "747 Climb and descent speeds for fuel economy", Boeing Airliner, p. 7-11, October 1976 (FOP)
- MARTIN R. "Evaluation of longer term trajectory prediction and conflict detection", Seminar on Conflict Detection and Resolution, EUROCONTROL, Luxembourg, March 1976 (TCS)
- NAGARAJAN N. "Four-dimensional guidance problem with control delays", JA, Vol. 13, p. 559, August 1976 (NCG)
- NOAA, NASA, and USAF "US Standard Atmosphere, 1976", US Government Printing Office, Washington, DC, 1976
- OSDER S.S., MOSSMAN D.C., DEVLIN B.T. "Flight test of a digital guidance and control system in a DC-10 aircraft", JA, Vol. 13, p. 676, September 1976 (NCG)
- PELEGRIN M.J. "Four-D Navigation in terminal zones: an automatic control problem", AGARD-CP-188, Febr. 1976 (NCG)
- SLATER A.G.L. "Transformation approach to the terminal control problem", AIAA J, Vol. 14, p. 1206, September 1976 (NCG)

1976

SPEYER J.L. "Nonoptimality of the steady-state cruise for aircraft",
AIAA J, Vol. 14, p. 1604, November 1976 (HSG)

SPEYER J.L. "Non-optimality of the steady-state cruise for aircraft",
Atmospheric Flight mechanics Conference, 3rd, Arlington, Tex., June 1976, Proceedings,
pp. 19-25, New York, AIAA, 1976 (FOP)

STENGEL R.F. & MARCUS F.J. "Energy management for fuel conservation in transport aircraft",
IEEE Transactions on Aerospace and Electronic Systems, vol. AES-12, p. 464, July 1976 (EMY-FOP)

1977

=====

- AGGARWAL R., CALISE A.I. & GOLDSTEIN F. "Singular perturbation analysis of optimal flight profiles for transport aircraft",
Joint Automatic Control Conference, San Fr., Ca., June 19, Proceedings, Vol. 2,
p.1261-1269, F33615-76-C-3104, IEEE, New York, 1977 (FOP)
- AMBLARD P. "Energy saving. An aircraft constructor's viewpoint",
Avions Marcel Dassault-Breguet Aviation AAAF-NT-77-24 (June 1977) (EMY)
- BRINKLEY C.W. "3B-1 Terrain Following Development",
AGARD GCP Symposium on "Guidance and Control Design Considerations for Low Altitude and Terminal Area Flight", AGARD-CP-240 October (NCG)
- BROCKHAUS R., WUST P. "Open Loop Compensation of Wind Shear Effects in Low Level Flight",
AGARD CP-240 "Guidance and Control Design Considerations for Low Altitude and Terminal Area Flight", Dayton, Ohio 1977
- BROCKHAUS R. "Flugregelung I",
R. Oldenbourg, München 1977
- BRUCKNER J.M.H., et al. "3D/4D Navigation System Design, Development and Implementation",
FAA-RD-77-79, July 1977
- BENOIT A., COX. M.E., STOREY J. & SWIERSTRA S. "An evolutionary application of advanced flight path prediction capability to the control of air traffic",
International Conference on Electronic Systems and Navigation Aids, Paris, November 14-18, 1977. Also EUROCONTROL Report 772016, August 1977 (NCG-CST)
- BENOIT A., STOREY J. & SWIERSTRA S. "Aircraft Trajectories. From radar extrapolation to long term prediction",
Review of the European Organisation for the Safety of Air Navigation "EUROCONTROL", Vol. IV, No. 1, p. 29-41, March 1977 (NCG-CST)
- BOCHEM J.H., MOSSMANN D.C. & LANIER P.D. "Simulator evaluation of optimal thrust management/fuel conservation strategies for Airbus aircraft on short haul routes",
NASA-CR-151966, January 1977 (FOP)
- BREAKWELL J.V. "Optimal flight path angle transitions in minimum time airplane climbs",
JA, Vol. 14, p. 782-786, Aug. 1977 (FOP)
- CALISE A.J. "Extended energy management methods for flight performance optimisation",
AIAA J, Vol. 15, p. 314, March 1977 (FOP)
- CUNNINGHAM F.L. "The profile descent",
AIAA Paper 77-1251, August 1977
- DENARO R.P. "The effects of wind shear on automatic landing",
Air Force Flight Dynamics Lab., AFFDL-TR-77-14, 1977 (WND-LDG)
- EUROCONTROL "Traffic Flow Investigation System Progress Report",
International Air Transport Association, 6th Meeting of the ATM Group, Paris, 1977
- FABER B. "Optimization of quasi-stationary long distance flights in the case of different directions for conducting the flight according to a model which has been idealized to a large extend",
German thesis Darmstadt, Technische Hochschule, Fachbereich Maschinenbau, Dr. Ing. Dissertation, 1977 (FOP)
- POLLINGER O., SARTORIUS H. "Anwendungen der Kalmanfiltertechnik (Applications of the Kalman Filter Technique)", Methoden der Regelungstechnik
München, Oldenburg, 1977
- GUSTAFSSON A.L. "On the choice of take-off and landing directions for minimum fuel Consumption",
FFAP-A-402, FFA, November 1977

1977

GUSTAFSSON A.L. & LILJA G. "On the possibilities for fuel savings in holding situations",
 FFAP-A-403, FFA, December 1977

HAVE J.M. ten "The computation of atmospheric properties and flying speed for Air Traffic purposes at
 altitudes below 20 000 meters", (in Dutch),
 NLR Memorandum VG-77-048 U, (ATM)

HAVE J.M. ten "Some remarks concerning additional performance information to be supplied to ATS-units in
 order to improve the prediction of aircraft trajectories",
 MEMORANDUM VG-77-055 L, NLR, December 1977 (ACP-CST)

HOLLEY W.E. and BRYSON A.E. Jr. "Wind Modelling and Lateral Control for Automatic Landing",
 AIAA Journal of Spacecraft & Rockets, Vol. 14, No. 2, February 1977

KLOPPSTEIN G. "Piloting a path in 1976",
 AGARD-CP-212, January 1977 (NCG)

KNOX CH.E. "Experimental determination of the navigation error of the 4-D Navigation, Guidance and
 Control Systems on the NASA B-737 Airplane",
 NASA Langley, 1977 (NCG)

KRAFT D., SHAU G.C., WELL K.H. & BERGER E. "Optimal level controls of high performance aircraft",
 DFVLR-IB-552-77/20, July 1977, (FOP)

KUNCIW B.G. "Optimal flare with wind disturbances",
 Air Force Flight Dynamics Lab., AFFDL-TR-77-15, April 1977 (LDG-WND)

LUKINS J.W. "Role of future automated flight deck displays in improving operating costs",
 AIAA Paper 77-1252, August 1977 (GEN)

MORRISON J.A. "Operational requirements for flight control and navigation systems for short haul
 transport aircraft",
 NASA-CR-137975, 1977 (NCG)

NEUMAN F. & LEE H.Q. "Flight experience with aircraft time-of-arrival control",
 JA, Vol. 14, No. 2, p. 104, February 1977 (NCG)

PELEGRIN M., IMBERT N. "Accurate Timing in Landing through Air Traffic Control",
 AGARD/GCP 1977 (TCS, NCG)

PRINTEMPS A. "Conception Française de la Prévision des Conflits: le Filet de Sauvegarde",
 International Conference on Electronic Systems and Navigation Aids, Paris, Novembre (TCS)

ROZEMA D.J. "A computer programme to calculate aircraft fuel consumption and flight trajectories",
 NLR Memorandum VG-76-039 U and VG-77-025 U, EMY, 1977

SCHÄNZER G. "Böenmodelle in der Flugdynamik",
 Z. Flugwiss. Weltraumforsch. 1, 1977, p. 177-185

SCHMID H. "Air traffic control and the initial operation of supersonic transport aircraft - A review of
 preparatory measures",
 EUROCONTROL, Operational and Requirements Div. Brussels, Belgium 1977 (TCS).

SHERMAN W.L. "A theoretical analysis of airplane longitudinal stability and control as affected by
 wind shear",
 NASA-TN-D-8496, July 1977 (HSC & WND)

WAHI K.M. "Application of dimensional analysis to predict airplane stopping distance",
 JA, Vol. 14, No. 2, p. 209, February 1977 (LDG)

1977

WILT M.v.d. "Comparison of some methods to determine the delays of landing aircraft with respect to runway capacity",
NLR Report TR 77028 U, (TCS)

WILT M.v.d. "A method to determine the delays of landing aircraft with respect to runway capacity",
NLR Report MP 77016 U, (TCS)

1978

====

- ALLES W., SUNDERMEYER P. "Die Verwendung von Näherungsmodellen für die Dynamik eines geregelten Flugzeuges zur Untersuchung von Fragestellungen der Flugführung",
TU Braunschweig, 1978
- ANTHES R.A., PANOFKY H.A., CAHIR J.J., and RANGO A. "The Atmosphere",
C.E. Merrill, Columbus, Ohio, (ATM)
- BEALE G.O. & COOK G. "Optimal digital simulation of aircraft via random search techniques",
JGC, Vol. 1, No. 4, p. 237-241, July-August 1978 (CST)
- BIANCO L., CINI M., GRIPPO L. "Planificazione e Controllo Strategico del Traffico Aereo",
Istituto di Automatica - Università di Roma and CSSCCA, CNR-R 78-28, December 1978
- BIANCO L., NICOLETTI B., RICCIARDELLI S. "An Algorithm for Optimal Sequencing of Aircraft in the Near Terminal Area",
Optimization Techniques (Stoer J. Ed.), Lecture Notes in Control and Information Science,
Springer Verlag, 1978
- BLICK E.F., MCCARTHY J., BENSCH R.R. & SARABUDLA N.R. "Effect of wind turbulence and shear on landing performance of jet transports",
AIAA Paper 78-249, January 1978 (WND-LDG)
- BREAKWELL J.V. "More about flight-path-angle transitions in optimal airplane climbs",
JGC, Vol. 1, No. 3, May-June 1978 (FOP)
- BROCKHAUS R. & WUEST "Open-loop compensation of wind-shear effects in low level flight",
Guidance and Control Design Considerations for Low-Altitude and Terminal-Area Flight,
AGARD-CP-240, 1978 (NCG)
- BRUCKNER J.M.H. & SHARPE T.G. "A 4-D approach control using VOR/DME/ILS guidance",
AGARD-CP-220, Febr. 1978 (NCG-RFI)
- BRUENING G. & HAHN P. "The on-board calculation of optimal climbing paths",
AGARD-CP-242, May 1978 (FOP)
- COX M. & SWIERSTRA S. "Sensitivity of trajectory predictions to variability of input data",
EUROCONTROL Report 782023, November 1978
- CURTIS P.E.M. & MARTIN D.W. "The computation of optimal aircraft trajectories",
NPL-DNACS-11/78, National Physical Lab., Peddington, England, Dec. 1978 (FOP)
- ECKERT K.D. "DME-based system for en-route/terminal navigation, all weather landing and air traffic control",
AGARD-CP-240, April 1978 (RFI)
- ELLIS D.W., KEENAN M.G. "Development of Wind Shear Models and Determination of Wind Shear Hazards",
FAA-Report No. FAA-RD-79-119, Januar, 1978
- ERZBERGER H., LEE H. "Characteristics of Constrained Optimum Trajectories With Specified Range",
NASA TM-78519, September 1978
- FABER B. "A simple criterion to distinguish between point and integral performance problems and its use to simplify flight profile optimisations",
AGARD-CP-242, May 1978 (ACP)
- FUCHTER C. & SWIERSTRA S. "A presentation of actual climb and descent data collected during regular scheduled flights of SABENA B-707, B-737, B-747 and DC10 aircraft",
EUROCONTROL Report 782009, March 1978
- GONZALEZ S., and MIELE A. "Sequential Gradient-Restoration Algorithm for Optimal Control Problems with General Boundary Conditions",
Journal of Optimization Theory and Applications, Vol. 26, No. 3, pp. 395-425, 1978

1978

=====

- GONZALEZ S., and MIELE A. "Sequential Gradient-Restoration Algorithm for Optimal Control Problems with General Boundary Conditions",
Journal of Optimization Theory and Applications, Vol. 26, No. 3, pp. 395-425, 1978
- HAINES A.L. "Parameters of Future ATC Systems Relating to Airport Capacity/Delay",
FAA-EM-78-8, April, 1978
- HAIWES R.F. "Project plan for joint FAA/NASA head-up display concept evaluation",
NASA-TM-78512 1978 (LDG).
- HAVE J.M. ten "Trajectory prediction Software for SARP II Description and Conclusions of the dynamical evaluation" (in Dutch),
NLR Memorandum VG-78-039L, 1978 (CST)
- HULL D.G. "Nonlinear method for parameter identification applied to a trajectory estimation problem",
JGC, Vol. 1, No. 4, p. 286-288, 1978 (CST)
- KNOX C.E. "Experimental determination of the navigation error of the 4-D navigation, guidance and control systems on the NASA B-737 Airplane",
AGARD-CP-240, April 1978
- KUNCIW B.G. "Optimal flare in presence of wind shears",
JGC, Vol. 1, No. 4, p. 284-286, 1978 (WND-LDG)
- LOTZ M. & FREIDEL H. "Analysis of error sources in predicted flight performance",
AGARD-CP-242, May 1978 (NCG)
- LOWE J.R. "Improving the accuracy of HUD approaches in wind shear with a new control law",
AIAA Paper 78-1494, August 1978 (SDG)
- MARSH J.H. "Climb speeds for fuel economy 702-727/737",
Boeing Airliner, p.3, April 1978 (FOP)
- MENGA G. & ERZBERGER H. "Time controlled descent guidance in uncertain winds",
JGC, Vol. 1, No. 2, p. 123, March-April 1978 (WND-NCG)
- MOHLEJI S.C., RUCKER R.A., HOROWITZ B.M. & EADDY N.O.
"ATC accomodation of fuel conservative turbojet operations",
FAA-EM-78-14, May 1978 (FOP-EMY)
- PELEGRIN M. & IMBERT N. "Accurate timing in landings through air traffic control",
AGARD-CP-240, April 1978 (NCG)
- PSARAFTIS H.N. "A Dynamic Programming Approach to the Aircraft Sequencing Problem",
FTL R78-4, Flight Transportation Laboratory, MIT, Cambridge, 1978
- REID L. D. "Correlation Model for Turbulence along the Glide Path",
JA, Vol. 15, No. 1, p. 13-20, Jan. 1978 (WND)
- REID L.D. "Correlation Model for Turbulence along the Glide Path",
AIAA Jour. of Aircraft, Vol. 15, No. 1, January 1978
- RICHARDSON J. "A computerised aircraft performance system",
AGARD-CP-242, May 1978 (ACP)

1978

====

- ROTTGER J., KLOSTERMEYER J., CZECHOWSKY R., and SCHMIDT G. "Remote Sensing of the Atmosphere by VHF Radar Experiments",
Naturwissenschaften 65, pp. 285-296, 1978 (ATM)
- ROZEMA D.J. "Calculated aircraft fuel savings as a result of continuous descent approach and low power/low drag procedures",
NLR Report TR 78151 L, 1978
- SALMIRS S. & MORELLO S.A. "Flight experiments to improve terminal area operations",
NASA Washington Tech. Memo 78685, May 1978 (FOP)
- VAN DE MOESDIJK G.A.J. "Non-Gaussian Structure of the Simulated Turbulent Environment in Piloted Flight Simulation",
Delft University Report M-304, 1978
- WALSH Th.M. & WEENER E.F. "Automatic flight performance of a transport airplane on complex microwave landing system paths",
AGARD-CP-240, April 1978 (LDG)
- WHITE W.F. (compiled by) "Flight demonstrations of curved, descending approaches and automatic landings using time reference scanning beam guidance",
NASA LANGLEY, Tech. Memo 78745 (NCG)

1979

=====

- ADAM V., LEYENDECKER H. "Erhöhung der Führungsgenauigkeit durch den Einsatz eines integrierten digitalen Flugführungssystems. (Increasing the guidance accuracy by using an integrated digital flight-guidance system)", Symposium "Flying in the terminal manoeuvring area", DGON, Order No. 120-1, Hamburg 1979 (NCG)
- A'HARRAH R.C., LEMANNA W.J. & HODGKINSON J. "Are today's specifications appropriate for tomorrow's airplanes?", Stability and Control, AGARD-CP-260, p. 23-1-23-12, May 1979 (HSC)
- AGGARWAL R., DUSHMAN A., CALISE A.J. "An analysis of operational procedures and design modifications for aircraft fuel conservation", AIAA-79-1656 (1979) (EMY)
- ARDEMA M.D. "Linearization of the boundary layer equations of the minimum time-to-climb problem", JGC, Vol. 2, No. 5, p. 434, September-October 1979 (ACF)
- ARMSTRONG J.H. & McDONNELL J.D. "Advanced Digital avionics for the DC-9 Super 80", Douglas Paper 6843, Ft. Worth., Texas, Nov. 1979 (GEN)
- ASHFORD N., WRIGHT P.H. "Airport Engineering", John Wiley & Sons, 1979
- BADNER J. "Low-level wind shear: a critical review ... aviation safety", PB-300715/O, NOAA-TM-NWS-FCST-23 Meteorological Services Div., National Weather Service, Silver Spring, Md, April 1979 (ATM)
- BEATTY A.J. "Micro-wave landing system - an operational point of view", International Air Transportation Conference, New Orleans, La., May 1979, Proceedings, Vol. 1, p. 49-53, American Society of Civil Engineers, 1979 (LDG)
- BIANCO L., CINI M., GRIPPO L. "A Strategic Approach to Air Traffic Control", 9th IFIO Conference on Optimization Techniques, Warsaw, September, 1979
- BIANCO L., RICCIARDELLI S., RINALDI G., SASSANO A. "The Aircraft Optimal Sequencing as a N Job-One Machine Scheduling Problem", Istituto di Automatica - Università di Roma and CSSCCA--CNR-R79-36, 1979
- BROCKHAUS R. "Flugregelung II", R. Oldenbourg, München 1979
- BROCKHAUS R. "Größen zur Beschreibung des Windeinflusses auf das Flugzeug", or "Variables characterizing the wind effects on the aircraft", Z. Flugwiss. Weltraumforsch. 3, Heft 4, 1979 (WND)
- BROKOF U., HURRASS K.H. "Ein einfaches integriertes Navigationssystem basierend auf mehrfach DME (A simple integrated navigation system based on multiple DMPE)", Symposium "Flying in the terminal manoeuvring area", DGON, Order No. 120-1, Hamburg 1979 (NCG)
- COFFIN M.R. "Evolution in the vertical landing plane ... of transport aircraft", Paper 79-1177 Société des Electriciens, des Electroniciens et des Radioélectriciens, Journée d'Etudes sur Anticollisions et Collisions organisées, Ecole supérieure d'Electricité, Gif.-sur Yvette, Essonne, France, Nov. 1979 (LDG)
- COLLINS B.P. "Analysis of potentially correctable landing delays at Atlanta", FAA-EM-7923, Nov. 1979 (LDG-TCS)
- COVERY R.R., MASCETTI G.J., ROESSLER W.U. & BOWLES R.L. "Operational energy conservation strategies in commercial aviation", Conference on Decision and Control, and Symposium on Adaptive Processes. 18th, Fort Lauderdale, Flo., December 1979, Proceedings, Vol. 1, IEEE, p. 408-414, 1979 (FOP)

1979

===

COX M.E. "Data Link - The key to improvements in civil/military air traffic management?",
AGARD-CP-273, Guidance und Panel Symposium in Copenhagen, Oktober 1979 (Published
February 1980) (GEN)

ERWIN R.L. "Strategic control of terminal area traffic",
Boeing Commercial Airplane Co., Seattle, Wash. BR 798021 (TCS)

FAA "Report of the FAA task force on aircraft separation assurance",
FAA-EM-78-19, Jan 1979 (TCS)

FORRESTER D.A. "Data Link Application Study: the exploitation of aircraft-derived meteorological
data",
EUROCONTROL 792030 (GEN)

GREPPER P.O. & HUGUENIN F.E. "Four-dimensional helical approach of aircraft in an air traffic control
environment",
JGC, Vol. 4, No. 3, p. 262, 1979 (FOP)

GREPPER P.O. & HUGUENIN F.E. "4-D helical approach of a transport aircraft in an ATC environment",
AIAA Paper 79-1776, 1979 (NCG-CST)

GUSTAFSSON A.L. "How to choose take-off and landing direction for minimum fuel consumption",
FFA-TN-AU-1443, Part 2, FFA, August 1979

HALL D.L. & AMODEO F.A. "Opportunities analysis of potential advanced vortex systems separation
standards",
FAA-EM-79-17, July 1979 (TCS)

HAVE J.M. ten "The semi-operational evaluation of the trajectory prediction method for SARP II",
NLR Report MP 79038 U, (CST)

HOTOP H.J., LECHNER W., and STIELER B. "Probleme bei der bordseitigen Bestimmung des Windes mit
Optimalfiltern. (Problems in the on-board determination of the wind by optimal filters)",
Symposium "Flying in their terminal manoeuvring area", DGON, Ordre No. 120-1, Hamburg,
1979 (ATM)

ICAO "Document DOC 8168-OPS/1611, Vol. II", 1979

IMBERT N., FOSSARD A.J. and COMES M. "Gestion à moyen terme du trafic aérien en zone de convergence",
IFAC/IFOR symposium, Toulouse, France, March 6-8, 1979

KNOX C.E. & CANNON D.G. "Preliminary test results of a flight management algorithm for fuel
conservative descents in a time based metered traffic environment",
NASA Tech. Memo 80194, November 1979 (FOP)

KOENIG R. "Missed approach of commercial aircraft regarding wind shear in the ground boundary layer",
DGLR Paper 79-028, Deutsche Gesellschaft für Luft- und Raumfahrt und Deutsche Gesellschaft für
Ordnung und Navigation, April 1979 (Avail. Technische Universität, Braunschweig, West Germany)
(WND)

KRAUSE P. & KLENNER J. "Berichtigung des Windeinflusses in den flugmechanischen Gleichungen" or
"Representation of the effect of winds in the equations of motion",
Z. Flugwiss. Weltraum-forsch. 3, p. 23, 1979 (WND-MEQ)

LEE H., and ERZBERGER H. "Algorithm for Fixed Range Optimal Trajectories",
NASA TP-1565, 1979

LILJA G. "A flight path and fuel calculation method for use in studies of saving airline operations",
FFA-TN-AU-1443, Part 1, FFA, 1979

1979

====

- McCONNELL W.J., MATTHEWS R.J., and CLEMENT R.D. "Study for Incorporating Time-Synchronized Approach Control into the CH-47/VALT Digital Navigation System", NASA CR-159151, October 1979 (NCG)
- MEHRA R.K., WASHBURN R.B. Jr. "Aircraft trajectory optimization using singular perturbation methods", Scientific systems, Inc. NAS1-15113 (October 1979) (CST)
- MERONEY R.N. "WECS Site Screening by Physical Modeling", Proceedings Conference and Workshop on Wind Energy Characteristics and Wind Energy Siting DEO and AMS, Oregon, USA, 1979
- MOYER H.G. "The computation of optimal aircraft trajectories", Grumman Aerospace Corp. System Science 1979 (CST)
- SCHROEPL H. "Teldix Taschenbuch der Navigation", Teldix Heidelberg, 1979
- SCHUBERT M., und VÖLCKERS U. "Analyse von zwei Verkehrsabläufen im Anflugbereich Frankfurt/Main vom 3. August 1979. (Analysis of two traffic sequences in the Frankfurt Main approach area on 3 August 1979)", DFVLR-Mitteilung 81-17, 1981 (TCS)
- SORENSEN J.A. "Concepts for generating optimum vertical flight profiles", NASA Contractor Report 159181, September 1979 (NCG)
- SORENSEN J.A., MORELLO S.A., ERZBERGER H. "Application of trajectory optimisation principles to minimise aircraft operating costs", Proceedings of the 18th IEEE conference on Decision and Control, Vol. 1, p. 415, 1979 (FOP)
- STEIN K.J. "New procedures key to fuel savings", Aviation week and Space Technology, Vol. 111, No. 9, p. 105-111, August 1979 (FOP)
"Advanced systems aid profile descents", Aviation week and Space Technology, Vol. 111, No. 8, p. 57-62, August 1979 (FOP)
- SWEDISH W.J. "Evaluation of the potential for reduced longitudinal spacing on final approach", FAA-EM-79-7, August 1979 (LDG)
- VOIGT J. "Der Einfluss des Flughafen-Nahbereichs auf den Betrieb einer Luftverkehrsgesellschaft. (The influence of the terminal manoeuvring area on the operation of an airline company)", Symposium "Flying in the terminal manoeuvring area", DGON, Order No. 120-1, Hamburg, 1979 (EMY, GEN)
- WASHBURN R.B., MEHRA R.K. & SAJAN S. "Application of singular perturbation techniques/SPT/and continuation methods for on-line aircraft trajectory optimization", NAS1-15113, 1979 (FOP)
- WILHELM K. & MARCHAND M. "Investigation of landing flare in presence of wind shear", DFVLR-F8-79-20, June 1979 (LDG-WND)
- WILLIAMSON W.F. "Minimum and maximum endurance trajectories for gliding flight in a horizontal plane", JGC, Vol. 2, No. 6, p. 457, November-December 1979 (ACP)
- WINTERMOYER H.C., PAILEN W. & MEYER D. "An assessment of terminal air traffic control system performance with and without basic metering and spacing automation", FAA-RD-79-81, March 1979 (TCS)
- WRIGHT P.F. & OLIVER R.J. "L-1011 Flight management system design considerations", International Air Transportation Conference, New Orleans, LA, April-May 1979, Proceedings, Vol. 1, New York, American Society of Civil Engineers, p. 383-398, 1979 (Avail. Lockheed - California Co., Burbank, Calif.) (NCG)

1980

=====

- ALLES W. "Investigations into the manual computer-aided piloting of a transport airplane along unconventional approach paths", German Thesis, p. 179, Technische Universität, Fakultät für Maschinenbau und Elektrotechnik, Braunschweig, 1980 (LDG-CST)
- ALLES W. "A contribution to the investigation of the dynamic behavior of a controlled aircraft under wind shear condition", TUBS/FB-80-07-01, p. 97, Inst. für Flugführung, Technische Universität Braunschweig, West Germany, July 1980 (NCG-HSC-WND)
- BANNISTER J.D. & HICKS R. "The role of the aircraft model in avionics systems simulation", AGARD-CP-268, January 1980 (CST)
- BEDDOES T.S. "Application of identical aerodynamic functions", AGARD-R-679, June 1980 (MEQ)
- BENOIT A. (Program Chairman) "Air Traffic Management - Civil/Military Systems and Technologies", AGARD CP-273, February 1980
- BENOIT A. & SWIERSTRA S. "Basic fuel and trajectory data to investigate economy aspects of cruise-descent profiles", EUROCONTROL Report 802019, September 1980 (ACP-EMY)
- BENOIT A. & SWIERSTRA S. "A minimum fuel transit procedure for the control of inbound flights", EUROCONTROL Report 802007, April 1980 (EMY-NCG)
- BENOIT A. & SWIERSTRA S. "Impact of minimum cost und fuel conservation policies on the selection of cruise/descent speed profiles", EUROCONTROL Report 802006, March 1980 (FOP)
- BENOIT A. & SWIERSTRA S. "Optimum use of cruise/descent control for the scheduling of inbound traffic", International Conference sponsored by Flight International on "Fuel Economy in the Airlines". Royal Aeronautical Society, London, U.K., April 1980. Also EUROCONTROL Report 802013, February 1980 (FOP)
- BENOIT A. & SWIERSTRA S. "On-line assessment of 4d-trajectory prediction techniques (OLEVAT-I)", EUROCONTROL Report 802009, February 1980 (CST)
- BENOIT A. & THORNE B. "Aircraft trajectory prediction and fuel conservation", EUROCONTROL Report 812005, September 1980 (EMY)
- BIANCO L., BIELLI M., CINI M., GRIPPO L., and RICCIARDELLI S. "New Approaches to Air Traffic Control and Management", Invited Paper to the World Conference on Transport Research, London, 1980
- BIELLI M., CALICCHIO G., NICOLETTI B., RICCIARDELLI S. "Flow Control of Large Scale Air Traffic Systems", 2th Symposium IFAC, Large Scale Systems (Titli A and Singh M.G. Eds), Pergamon Press, 1980
- BIRD M. & KARMARKER J. "Flight trajectory control investigation", Final Report, 15 May 1978 - 30 Oct. 1980, AD-A104549 Lear Siegler, Grand Rapids, Mich., M.
- BROMLEY G.R. "General aviation fuel conservation in the 1980's", Flight testing in the eighties; Proceedings of the Eleventh Annual Symposium, Atlanta, GA, August 1980, Avail. Beach aircraft Corp., Wichita, KS (EMY)
- BRUCKNER J.M.H. & SADOWSKY J.S. "Flight control strategies for performance computers", Journal of the Institute of Navigation, Vol. 27, No. 2, p. 137, Summer 1980 (NCG)

1980
 =====

- COVERY R.R., MASCETTI G.J., ROESSLER W.U. & BOWLES R.L.
 "Past and potential near term fuel savings in commercial aviation through modified operational strategies",
 SAE Paper 800766, Society of Automotive Engineers, International Air Transportation Meeting, Cincinnati, Ohio, May 1980 (Avail. U.S. Department of Energy, Washington, D.C.) (EMY-TCS)
- DANESI A., SMOLKA S., CHINAPPI U. "Modeling and flight simulation of an active configured aircraft under MLS guidance",
 AGARD-CP-268, January 1980 (CST)
- ELZER P. "Trends in the development of software for guidance and control",
 AGARD-AG-258, May 1980 (NCG)
- ENGLAND J., and ULBRICHT H. "Flugmeteorologie",
 Transpress VEB Verlag für Verkehrswesen, Berlin, 1980
- ERKELENS L.J.J. "A flight simulation investigation on the feasibility of curved approaches under MLS guidance",
 AGARD-CP-268, January 1980 (LDG)
- ERZBERGER H. & LEE H.Q. "Constrained optimal trajectories with specified range",
 JGC, Vol 3, No. 1, p. 78, January-February 1980 (NCG)
- ETKIN, B. "The turbulent wind and its effect on flight",
 The AIAA Wright Brothers lecture, 1980. Also UTIAS Review No. 44, Toronto, Canada, 1980 (WND)
- FARMER R. "Delco Electronics Flight Management System for Air Force C-141 aircraft",
 NAECON (1980 May) (NCG)
- FUJITA T.T. "Downbursts and Microbursts - An Aviation Hazard",
 Proc. 19th Conf. on Radar Meteorology, American Meteorological Society, Boston, pp. 94-101, 1980
- GANDELMAN J., and HOLDEN R. "A Pilot Training Manual for the Terminal Configured Vehicle Electronic Attitude Director Indicator",
 NASA CR-159195, 1980
- GOTO N. "A statistical method applied to pilot behaviour analysis in multiloop systems",
 JGC, Vol. 3, No. 1, p. 62-67, Jan-Feb 1980
- GRIEM H. "Some aspects of advanced flight management systems and their application to modern transport aircraft",
 ICAS Congress, 12th, Oct. 1980, Munich, West Germany (TCS)
- HAVE J.M. ten "Trajectory prediction updating using filtered track speed data",
 NLR Memorandum VG-80-037 L, 1980
- HEIMBOLD R.L., LEE H.P., and LEFFLER M.F. "Development of Advanced Avionics Systems Applicable to Terminal-Configured Vehicles",
 NASA CR-3280, 1980 (NCG)
- HURRASS K.H., and WINTER H. "Gyro Accuracy Requirements in a Strap-Down INS with GPS Aiding for RPV Missions",
 AGARD-AR-147, Vol. IID, February 1980 (NCG)

1980

- JOHNSON T.L. & RADER J.E. "Minimum time turns with thrust reversal ... high performance aircraft trajectory control",
AIAA Paper 80-1595, 1980 (ACP)
- KAUFMAN B. "Atmospheric Turbulence and Unsteady Aerodynamics in Aircraft Simulation",
2nd International symposium on Aviation Safety, Toulouse, November 1986
- KNOX Ch.E. "Capturing and tracking performance of the horizontal Guidance and Control Systems of the terminal configured vehicle",
NASA Tech. Memo 80068 (TCS)
- KNOX Ch. E. & CANNON D.G. "Development and test results of a flight management algorithm for fuel-conservative descents in a time-based metered traffic environment",
NASA-TP-1717, Oct. 1980 (FOP)
- KONIG R., KRAUSPE P., and SCHÄNZER G. "Procedures to Improve Flight Safety in Wind Shear Conditions",
Proceedings of the 12th Congress of the Aeronautical Sciences, Munich, Germany, October 1980
- KRAFT D. "FORTRAN-Programme zur numerischen Lösung optimaler Steuerungsprobleme",
DFVLR, Mitteilung 80-03, March 1980 (FOP)
- LILJA G. "The potential fuel-savings in holding",
FFAP-A-487, FFA October 1980
- LILJA G. & HASSELROT A. "Computer algorithms for flight performance and fuel calculation in an air traffic simulator",
FFA-TN-AU-1443 Part 3, FFA, October 1980.
- LOWE J.R. & HAMILTON F.W. "The DC-9 Super 80 Compensated Control",
DC Flight Approach, Douglas Aircraft Company, Long Beach, Cal, Jan. 1980 (HSC)
- Mc LEAN J.D. "A new algorithm for horizontal capture trajectories",
NASA-TM-81186, March 1980 (NCG)
- NADKARNI A.A. "Automatic flare transition penetrating wind shears",
Joint automatic Control conference, San Francisco, Ca, August 1980, Proceeding, Vol. 1, IEEE, New York, 1980 (WND)
- O'BRIEN P.J., WILLETT F.M. Jr. & TOBIAS L. "Dynamic air traffic control simulation of profile descent and high-speed approach fuel conservation procedures",
FAA-RD-80-12 (and FAA-NA-79-28), May 1980 (EMY-FOP)
- PSARAFTIS H.N. "A Dynamic Programming Approach for Sequencing Group of Identical Jobs",
Ops. Res. 6, 1980
- RICHARDSON D.W. & RICH P.M. "The integration of area navigation and the microwave landing system",
AGARD-CP-273, February 1980 (TCS)
- SHINAR J., MERARI A., BLANK D. & MEDINAH E.M. "Analysis of optimal turning maneuvers in the vertical plane",
JGC, Vol. 3, No. 1, p. 69-77, Jan.-Feb. 1980 (FOP)
- SLIWA S.M. "Impact of longitudinal flying qualities upon the design of a transport with active controls",
NASA Langley Research Center AIAA 80-1570 (FOP)
- STEINMETZ G.G. "Simulation Development and Evaluation of an Improved Longitudinal Velocity-Vector Control-Wheel Steering Mode and Electronic Display Format",
NASA TP-1664, 1980

1980

STRIUKOV B.A. "Secondary processing optimal algorithms and circuits ... for aircraft trajectory measurement",
Radiotekhnika July 1980 (CST)

STRIUKOV B.A. "Optimal algorithms and secondary processing devices ... for aircraft trajectory measurement",
Radiotekhnika vol 35, July 1980 (CST)

THORPE A.S., MILLER H.H., and MONO "Dynamic Models of Two-Dimensional Downdrafts",
Quart. J. R. Met. Soc., 1980, 106, 463-484

URBAN L.J. (Editor) "Guidance and control software",
AGARD-AG-258, May 1980 (NCG)

VORSMANN P., SWOLINSKY M. "Wind Shear Detection from PCM-Recorded MLS-Flight Data",
12 ICAS Congress, Conference Proceedings, Munich, October 1980

VINH N.X., BUSEMANN A., and CULP R.D. "Hypersonic and Planetary Entry Flight Mechanics",
University of Michigan Press, Ann Arbor, Michigan, 1980

WHITON R.C. & HEROD P.L. "Wind factor simulation model: Model description,"
Air Force Environmental Technical Applications Center, Scott AFB, Ill., Final Report
AD-A085733, April 1980 (ATM-WND)

WUEST W. "Pressure and Flow Measurement",
AGARDograph No. 160, Vol. 11, July 1980

1981
 =====

- ADAM V., LEYENDECKER H. "Control Law Design for Transport Aircraft Flight Tasks",
 AGARDograph No. 251, "Theory and Applications of Optimal Control in Aerospace Systems", 1981
 (NCG)
- ANDREWS J.W. "An Improved Technique for Altitude Tracking of Aircraft",
 MIT Lincoln Lab. Project Report ATC-105 (SUR, TCS)
- ANDREUSSI G., BIANCO L., CINI M., and GRIPPO L. "Un Approccio Strategico per il Controllo in Linea del
 Traffico Aereo",
 IASI-CNR-RI-7, 1981
- ANDREUSSI A., BIANCO L. and RICCIARDELLI S. "A simulation model for aircraft sequencing in the near
 terminal area",
 European Journal of Operational Research, Vol. 8, pp. 345-354, 1981
- BEERS J.N.P. "The Planning Conflict Detection Method for SARP",
 (in Dutch), NLR Report TR 81153, 1981
- BENOIT A. & DEVRY H. "Impact of excess route lengths on fuel consumption in a European airroute
 network",
 EUROCONTROL Report 802021, December 1981. Abstract: EUROCONTROL 802021-A, December 1981 (LAMY)
- BENOIT A. & SWIERSTRA S. "The control of cruise-descent profiles. Experiments using B-737 and Airbus
 flight simulators",
 EUROCONTROL Report 212020, August 1981 (NCG)
- BENOIT A. & SWIERSTRA S. "Introduction of a smooth cruise-to-descent transition for application in a
 zone of convergence",
 EUROCONTROL Report 812019, July 1981 (NCG)
- BERT C.W. "Prediction of Range and Endurance of Jet Aircraft at Constant Altitudes",
 JA, Vol. 18, No. 10, p. 890, 1981 (ACP)
- BIELLI M., CALICCHIO G., IOZZIA S., and NICOLETTI B. "Air Traffic Control Systems: Modelling and
 Evaluation",
 IFAC Control Science and Technology - Kyoto (Akashi H., Ed.) Pergamon Press, 1981
- BROKOF U. & HURRASS K. "Integrated navigation systems based on multiple DME",
 AGARD-CP-298, March 1981 (RFI)
- BURROWS J.W. "Fuel optimal aircraft trajectories with fixed arrival times",
 AIAA Paper 81-1749, 1981 (FOP)
- CALISE A.J. "Singular perturbation techniques for on line optimal flight path control",
 JGC, Vol. 4, No. 4, p. 398, 1981 (FOP)
- CASPARI M. & KRICKE D. "Improvement of fuel economy by flying with maximum rearward center-of-gravity
 positioning",
 Technischökonomische Information der Zivilen Luftfahrt, Vol. 17, No. 3, p. 142-145, 1981 (ACP)
- CHAKRAVARTY A.J.M. "Application of singular perturbation theory",
 Washington Univ., Seattle, 1981 (FOP)
- CHAKRAVARTY A.J.M. & VAGNERS J. "Application of singular perturbation theory to onboard aircraft
 trajectory optimization for commercial jet transport aircraft",
 AIAA Paper 81-0019, Jan. 1981 (FOP)
- CHELINI J. & FARMER R.H. "Real-time flight management avionics software system",
 AIAA Paper 81-2340, 1981 (NCG)

1981

CREDEUR L., DAVIS C.M., and CARPON W.R. "Evaluation of Microwave Landing System (MLS) - Effect on the Delivery Performance of a Fixed-Path Metering and Spacing System", NASA TP-1844, August 1981

DECUYPER M., DEUTSCH J., and WILLEMS P.Y. "Bases Physiques de la Mécanique", Masson, Paris, 1981

DIBLEY H.P.K. "Operational and performance aspects of fuel management in civil aircraft", Energy management and its impact on avionics. Proceeding of the Symposium, London, England, March 1981, Royal Aeronautical Society, London, 1981 (TCS-FOP)

ERZBERGER H. "Optimum climb and descent trajectories for airline missions", AGARD-AG-251, July 1981 (FOP)

ERZBERGER H. "Automation of On-Board Flightpath Management" NASA TM-84212, December 1981 (NCG)

ERZBERGER H. & McLEAN J.D. "Fuel-conservative guidance system for powered-lift aircraft", JGC, Vol. 4, No. 3, p. 253-261, May-June 1981 (NCG-EMY)

ETKIN B. "Turbulent wind and its effect on flight", JA, Vol. 18, No. 5, May 1981 (WND)

ETKIN B. & ZHU S. "Control logic for landing-abort autopilot mode", UTIAS Report No. 258, CN ISSN 0082-5255, Oct. 1981 (LDG)

FARMER R.H. "Flight management systems for modern jet aircraft", Proceedings of the National Aerospace and Electronics conference, Dayton, OH, May 1981, Vol. 2, pp. 823-829 (Avail. General Motors Corp., Delco Electronics Division, Goleta, CA) (NCG)

FERGUSON D.R. "A practical economic criterion for fuel conservation", DOE symp. on Com. Aviation Energy Conserv. Strategies, p. 259-280, April 1981 (EMY)

GOFF C., WILLOUGHBY W., and BARBOZA G. "Dissemination of Weather Information in the Air Traffic Control System", FAA/RD 81-47, FAA Techn. Center, Atlantic City, USA, June 1981 (ATM)

HARGRAVES Ch., JOHNSON F., PARIS St. & RETTIE I. "Numerical computation of optimal atmospheric trajectories", JGC, Vol. 4, No. 4, 1981 (CST-FOP)

HARRISON J.V., DALY K.C. & GAI E. "Reliability and accuracy prediction for a redundant strapdown navigator", JGC, Vol. 4, No. 5, p. 523-529, Sept.-Oct. 1981 (NCG)

HELD V., KNAPP L., KRICKE D. "Single Aircraft Analysis for Definition of Operational Requirements", ESG München, August 1981

HUESCHEN R.M., CREEDON J.F., BUNDICK W.T. & YOUNG J.C. "Guidance and control system research for improved terminal area operations - terminal controlled vehicle", NASA Langley, March 1981 (TCS-NCG)

HUGUET M.P., ZANELLI R., FAGE J.M. "Low level wind shear detection system for airport landing approach areas using the Bertin Doppler acoustic sounder/Sodar/", AMS, May 1981 (WND)

JACOBSON I.D. & MELTON R.G. "Minimum noise impact aircraft trajectories", NASA-CR-164719, Sept. 1981 (EMY)

1981

=====

- JOOSTEN B.K., and PIERSON B.L. "Minimum Fuel Aerodynamic Orbital Plance Range Manoeuvres",
Paper No. AIAA-81-0167, AIAA 19th Aerospace Sciences Meeting, St. Louis, Missouri, 1981
- KONIG R., KRAUSPE P. "The Influence of Wind Shear and Vertical Winds on Take-Off and Go-around",
Airport Forum No. 5, 1981
- KRAUSPE P., SWOLINSKY M. & VOERSMANN P. "Wind determination and wind shear detection from flight test
and airline flight data",
International Conference on Aviation Weather System, 1st., Montreal, Canada, 4-6 May 1981,
Proceedings, Boston, MA, American Meteorological Society, p. 79-86, 1982 (WND)
- KREINDLER E. & NEUMAN F. "Minimum fuel horizontal flight paths in the terminal area",
NASA-TM-81313, August 1981 (LDG-EMY)
- LARGE E. "Minimum fuel paths for a subsonic aircraft",
JA, Vol. 18, p. 410-414, May 1981 (EMY-FOP)
- LATYPOV A.F. & SOROKA B.N. A mathematical model of a subsonic transport aircraft",
Akademika Nauk SSSR, Institut Teoreticheskoi i Prikladnoi Mekhaniki Novosibirsk, USSR,
Oct. 1981 (MEQ)
- LEE J.T. "Turbulence and wind shear experiments related to aircraft operation in the terminal area",
International Conference on Aviation Weather System, 1st, Montreal, Canada, May 1981
Proceedings, Boston, MA, American Meteorological Society, p. 93-101, 1982 (WND)
- LENTZ R.H., and LOVE W.D., SIGNORE T.L., TORNESE R.A., and ZEITLIN A.D. "Automatic Traffic Advisory &
Resolution (ATARS) Algorithm including Resolution Advisory Register Logic",
Report DOT/FAA/RD 87/45, 1&2, June (TCAS)
- LEFAS C., and THOMAS H.W. "Final Report on the Use of Aircraft Derived Data in Radar Tracking",
Eurocontrol Experimental Centre Task D.40, Report No. 145, July (SUR)
- LEITMANN G. "The Calculus of Variations and Optimal Control",
Plenum Press, New York, New York, 1981
- MARKOV A.B. "The landing approach in variable winds: curved glidepath geometrics and worst-case wind
modelling",
UTIAS Report No. 254, CN 155N 0082-5255, University of Toronto, December 1981 (LDG)
- MARKOV A.B., REID L.D., MACKENZIE R.B. "On-line wind shear generation for flight simulator
applications",
AIAA 81-0970 (WND-LDG)
- McLEA J.D., and ERZBERGER H. "Design of a Fuel-Efficient Guidance System for a STOL Aircraft",
NASA TM-81256, March 1981 (NCG, EMY)
- MUSZYNSKI F. "Civil aviation - Onboard electronic equipment and fuel savings",
L'Aeronautique et l'Astronautique, No. 88, p. 73-78, 1981 (EMY-NCG)
- NEUMAN F & HARDY G. "Flight investigation of a four-dimensional terminal area guidance system for STOL
aircraft",
NASA-TM-81271, March 1981 (NCG)
- OFFI D.L., LEWIS W. "Wind Shear detection with a modified airport surveillance radar",
AMS (Nov.-Dec. 1981) (WND)
- PERGUSON D.R. "Fuel conservation integrated into airline economics",
AIAA Paper 81-0831, May 1981 (EMY)
- REID J.G., CHAFFIN D.E. & SILVERTHORN J.T. "Output predictive algorithmic control: precision tracking
with application to terrain following",
JGC, Vol. 4, No. 5, p. 502-509, 1981 (NCG)

1981

- Royal Aeronautical Society "Energy management and its impact on avionics",
Proceedings of the Symposium, London, England, March 19, 1981 RAS-1981 (EMY)
- SAMMS K.H. & MORELLO S.A. "Pilot guidance and display considerations for energy efficient flight profiles",
NASA Langley Research Center, Hampton, Va., June 1981 (FOP-CST)
- SAUER "Evaluation of aircraft prediction methods applied to low altitude phases in the present mode of operation based on AF, BA and LH actual flight data",
EUROCONTROL Report 812004, March 1981 (CST)
- SHEPTUNOV V.N. "Application of a dimensionless criterion of transport efficiency in evaluating aircraft modifications",
Aviatsionnaya Tekhnika, No. 4, p. 65-70, 1981 (EMY)
- SCHUBERT M., and VÖCKERS U. "Analyse von zwei Verkehrsabläufen im Anflugbereich Frankfurt/Main vom 3. August 1979. (Analysis of two traffic sequences in the Frankfurt Main approach area on 3 August 1979)",
DFVLR-Mitteilung 81-17, 1981 (TCS)
- SORENSEN J.A. & WATERS M.H. "Airborne method to minimise fuel with fixed time of arrival constraints",
JGC, Vol. 4, p. 348, May-June 1981 (NCG)
"Generation of optimum vertical profiles for an advanced flight management system",
NASA CR 165674, 1981 (NCG)
- STEVENS M.C. "Multipath and Interference Effects in SSR Systems",
IEE Proc. Vol. 12, p. 43 (SUR)
- TATOM F.B., SMITH S.R., FICH G.H. & CAMPBELL C.W. "Simulation of atmospheric turbulent gusts and gust gradients",
JA, Vol. 19, No. 4, p. 264, 1981 (ATM)
- THRIFT P.R. "The impact of increasing energy costs upon the design philosophy of avionic fuel management systems",
RAS (March 1981) (EMY)
- VAN GOOL M.F.C. & WEINGARTEN N.C. "Comparison of low-speed handling qualities in ground-based and in-flight simulator tests",
AIAA Paper 81-2478, Nov. 1981 (CDG)
- VINH, N.X. "Optimal trajectories in atmospheric flight",
Elsevier Scientific Publishing Co, Amsterdam, 1981 (FOP)
- WAUER J.C., BRUCKNER J.M.M. & HUMPHREY C.H.
"A study of airplane sensitivities to lateral and vertical profiles",
JGC, Vol. 4, p. 606-613, Nov. - Dec. 1981 (ACP - FOP)
- WESTON J.L. "Thrust management - Current achievements and future developments",
RAS (1981 March) (EMY)

1982

=====

- ACHTEMEIJER G.L. "Short range prediction of mesoscale wind fields",
American Meteorological Society, 1982 (ATM-WND)
- ADAM V. & LECHNER W. "A concept for 4D-guidance of transport aircraft in the TMA",
ICAS Proceedings 1982, Vol. 1, p. 642-653 (Avail. New York, AIAA) (NCG)
- ADAM V., LECHNER W. "Investigations on four-dimensional guidance in the TMA",
AGARD Conference Proceedings No. 340, October 1982
- BACH R.E. JR. "A mathematical model for efficient estimation of aircraft motions",
Identification and system parameter estimation 1982; Proceedings of the Sixth Symposium,
Washington, DC, Vol. 2, p. 1156-1161, Oxford and New York, Pergamon Press, 1982 (Avail. NASA,
Ones Research Center, Moffett Field (CA) (MEQ)
- BENOIT A. & SWIERSTRA S. "Available tools for the prediction, control and economy assessment of flight
profiles",
International Seminar on "ATC Contributions to Fuel Economy, Institute of Air Navigation
Services, Luxembourg, 26-28 October, 1982. Also EUROCONTROL Report 822033, September 1982
(FOP-CST)
- BENOIT A. & SWIERSTRA S. "The dynamic control of aircraft for minimum cost operation",
International Seminar on "ATC Contributions to Fuel Economy", Institute of Air Navigation
Services, Luxembourg, 26-28 October, 1982. Also EUROCONTROL Report 822034, September 1982 (FOP)
- BENOIT A. & SWIERSTRA S. "Integrated dynamic control for flight economy",
Prepared for Pergamon Encyclopaedia of Systems and Control.
Also EUROCONTROL Report 822042, December 1982 (FOP-NCG)
- BENOIT A. & SWIERSTRA S. "The dynamic control of inbound flights. Experiments conducted on the SABENA
DC-10 flight simulator",
EUROCONTROL Report 822028, June 1982 (NCG-CST)
- BENOIT A., SWIERSTRA S. "Dynamic Control of Inbound Flights for Minimum Cost Operation",
AGARD Conference Proceeding No. 340, October 1982
- BENOIT A. & SWIERSTRA S. "A ground/air coordinated control procedure for minimum cost operation over
an extended area",
Conference on "Today & Tomorrow Mini & Micro Computers in Airline Operations", Royal
Aeronautical Society, London, U.K., 21-22 October 1982. Also EUROCONTROL Report 822036,
September 1982 (EMY-TCS)
- BENOIT A. & SWIERSTRA S. "Simulation of air traffic operation in a zone of convergence. Aircraft
(PARZOC) Performance Data",
EUROCONTROL Report 812031-2, April 1982 (TCS-CST)
- BEST M.R. "Two-dimensional flight-path reconstruction by means of spline approximation",
NLR Report TR 82075 U, July 1982 (LDG)
- BIELLI M., CALICCHIO G., NICOLETTI B., and RICCIARDELLI S. "The Air Traffic Flow Control Problem as an
Application of Network Theory",
Computers and Operations Research, Vol. 9, 1982
- BISIAUX M., COX M.E., FORRESTER D.A., STOREY J.T. "Possible improvements in meteorology for aircraft
navigation",
EUROCONTROL Doc. 822037, November 1982, Brussels, Belgium (ATM)
- BLANK D. & SHINAR J. "Efficient combinations of numerical techniques applied for aircraft turning per-
formance optimization",
JGC, Vol. 5, No. 2, p. 124-130, March-April 1982 (FOP)
- BOWES R.C. "Improvements to Secondary Radar for ATC",
J. Navgn., Vol. 35, No. 2, p. 193, May (SUR)

1982

- BROKOP U., HURRASS K.H. "Simple Integrated Navigation Systems",
International Congress of Institutes of Navigation, Paris, France, Sept. 1982 (NCG)
- BURROWS J.W. "Fuel optimal trajectory computation",
JA, Vol. 19, p. 324, April 1982 (NCG)
- CALISE A.J. & MOERDER D.D. "Singular perturbation techniques for real time aircraft trajectory optimization and control",
Final Report, Febr. 1978 - Dec. 1981, NASA-CR-3597, August 1982 (FOP)
- CAMPBELL W. "A conceptual framework for using Doppler radar acquired atmospheric data for flight simulation",
NASA/MFSC NASA-TP-2182 (ATM-CST)
- CARRO A., GOFF C. "Numerical Simulation of Wind Fields Calculated from Assumed Mode S Data Link Inputs",
DOT/FAA/RD 81-100, FAA Techn. Center, Atlantic City, USA, June 1982 (ATM)
- CHAKRAVARTY A.J.M. & VAGNERS J. "Development of 4-D time-controlled guidance laws using singular perturbation methodology",
American Control Conference, 1st, Arlington, VA, June 1982, Proceedings, Vol. 3, p. 1107-1108, New York, IEEE, 1982 (NCG-FOP)
- CHANDLER C.L. & EMMONS C.J. "Minimum cost atmospheric cruise control - Most efficient airspeed for a given wind component",
AIAA Paper 82-0341, January 1982 (FOP)
- CHONG C.Y., MORI S., TSE E., WISHNER R.P., Distributed hypothesis formation in distributed sensor networks,
Report TR 1015-1, Advanced Decision Systems, Mountain View, CA, 1982
- DREW A.D., HUNT B.A., and LOGAN H.K. "Departure Runway Capacity at Heathrow Airport",
UK Civil Aviation Authority paper 83013, August (TCS)
- DUNHAM R.E. Jr. "Low-altitude wind measurements from wide-body jet transports",
NASA-TM-84538, August 1982 (ATM)
- ENDERS J.H., MELVIN V.W., FROST W., CAMP D.W. "Summary Proceedings of a Wind Shear workshop",
NASA-CP-2270 Oct. 1982 (WND)
- ETKIN B. "Dynamics of flight stability and control",
I. Wiley & Sons, New York, 1982 (HSC)
- FROST W., CAMP D.W., HERSHMAN L.W. "Proceedings: Sixth Annual Workshop on Meteorological and Environmental Inputs to Aviation Systems",
NASA-CP-2274 (Oct 1982) (ATM)
- FROST W., TURKEL B.S., MCCARTHY J. "Simulation of phugoid excitation due to hazardous wind shear",
AIAA Jan 1982 (WND)
- GOLDBERG J.H. "Gust response of commercial jet aircraft including effects of autopilot operation",
NASA-CR-165919, June 1982 (HSC)
- GREENE R.W. & WILLIAMSON W.E. Jr. "Variable node drag parameterization for re-entry trajectory estimation",
JGC, Vol. 5, No. 4, p. 321-324, July-August 1982 (FOP)
- GRUNDY P.M. "Fuel conservation: The airline-ATC",
The Controller, Vol. 21, p. 39, 40, 47, May 1982 (EMY)

1982

====

- HEIMBOLD R.L. & LEFFLER M.F. "The fourth dimension ... flight management system for airline operations", Lockheed Horizons, Summer 1982, Avail. Lockheed California Co., Burbank, CA (NCG-FOP)
- JACOB H.G. "Optimal open-loop aircraft control for go-around maneuvers under wind shear influence", ICAS Congress, 13th, and AIAA aircraft systems and technology conference, Seattle, WA, August 1982, Proceedings, Vol. 1, p. 654-664, New York, AIAA, 1982 (FOP-WND)
- KNORR W. "Einfluss verschiedener Hügelumströmungen auf den Steigflug von Flugzeugen", Studienarbeit am Institut für Flugführung der TU Braunschweig, 1982
- KÖNIG R. "Erhöhung der Flugsicherheit bei Scherwindanflügen durch Modifikation von Schubregelungssystemen und bestehender Cockpit-Instrumentierung", Jahrestagung der DGLR, Stuttgart, 5. - 7. Oktober 1982, Vortrag Nr. 82 - 033 und Wissenschaftliche Berichte, SFB 58 "Flugführung", TU Braunschweig u. DFVLR, 1982
- KOTTMEIER C. "Die Vertikalstruktur nächtlicher Grenzschichtstrahlströme", Dissertation am Institut für Meteorologie und Klimatologie der Universität Hannover, 1982
- KRAUSPE P., SWOLINSKY M., VOERSMANN P. "Wind determination and wind shear detection from flight test and airline flight data", AMS 1982 (WND-ATM)
- KREINDLER E. & NEUMANN F. "Minimum fuel horizontal flight paths in the terminal area", JGC, Vol. 5, p. 490-497, Sept. - Oct. 1982 (FOP)
- LECOMTE P. "L'avion de transport de demain : élément d'un système lui-même", Aéronautique et Astronautique, N° 96-5, 1982 (GEN)
- LEE H.P. & LEFFLER M.F. "Development of the L-1011 four-dimensional flight management system", NASA-CR-3700, Final Report, July 1982 (NCG)
- LOVERING P.B. & BURDESS S.B. "Advanced display for complex flight trajectories", AGARD-CP-329, July 1982 (RFI)
- LUERS J.K., HAINES P. "Heavy rain/wind shear accidents", AMS, 1982 (ATM)
- MAHAPATRA P.R., DOVLAK R.J. & ZRNIC D.S. "Radar detection of low level wind shear affecting aircraft terminal navigation", National Airspace Meeting, Moffett Field, CA, March 1982, Proceedings, p. 52-59, Washington, DC, Institute of Navigation, 1982 (WND)
- MARKOV A.B. "The landing approach in variable winds: curved glidepath geometries and worst-case wind modelling", UTIAS-254, p. 376, Dec. 1982 (LDG-WND)
- MELTON R.G. "Minimum noise impact aircraft trajectories", Virginia University, Charlottesville, 1982 (EMY)
- MOHLEJI S.C. "Operational and Functional Requirement for the Navigation system in Terminal areas", Mitre McLean, VA, February 1982
- MOOIJ H.A. & VAN GOOL M.F.C. "Handling qualities of transports with advanced flight control systems", AGARD-CP-333, June 1982 (HSC)
- NADKARNI A.A. "Suboptimal trajectory following during flare maneuvers in presence of wind shears", Annual Pittsburgh Conference, 13th, Pittsburgh, PA, April 1982, Proceedings, Part 1, p. 35-44, Research Triangle Park, Instrument Society of America, 1982 (WND)

1982

- NEUMANN F. & KREINDLER E. "Optimal turning climb-out and descent of commercial jet aircraft",
SAE Paper 821468, NASA Ames Research Center, Moffett Field, Cal., Oct. 1982 (POP)
- NEWBERRY R.R. "The Capability and Potential Role of Airborne Avionic Systems in Air Traffic Management",
RAS Spring Convention, May 1982
- OLIVER J.G., MOAGLAND M.R. & TERHUNE G.J. "Automation of the flight path - The display required",
Behavioral Objectives in Aviation Automated Systems Symposium, Proceedings of the Aerospace Congress and Exposition, Anaheim, CA, Oct. 1982 (Avail. Air Line Pilots Association International, Washington DC) (RFI)
- ONKEN R., ADAM V., and LECHNER W. "Zeitgenaues Fliegen von Verkehrsflugzeugen - ein Weg zur Leistungssteigerung über bord- und bodenseitige Hilfen. (Accurately timed flying of commercial aircraft - a way to increase in performance by aircraft- and ground based aids)", DGLR Symposium "Increase in Performance of plane-flying aircraft", dglr advance copy 82-095, Frankfurt, Oct. 1982 (NCG)
- PERFITT T.E., FILECCIA G.L., YOUNG W.L. "Trajectory generation - An automation concept of the future",
Society of Automotive Engineers, Inc. October 1982 (CST)
- QUANBECK D.B. "Methods for generating aircraft trajectories",
AD-A122386, p. 58, Center for Naval Analyses, Alexandria, Va., Sept. 1982 (NCG)
- RATCLIFFE S., and FORD R.L. "Conflicts Between Random Flights in a Given Area",
J. Navgn. Vol. 35, No. 1, p. 47, January (TCS),
Printer's errors corrected in Vol. 35, No. 3, p. 516
- RATCLIFFE S. "Secondary Radar for Airborne Collision Avoidance",
J. Navgn. Vol. 35, No. 2, p. 204, May (CAS, SUR)
- RENTEUX J.L., SCHROETER H. "Fuel Saving in Air Transport. Possible Contribution of ATC in Europe",
EUROCONTROL Report 813007, February 1982, (EMY)
- RUCKER R.A. "Potential fuel savings of specific ATC system improvements",
FAA-EM-82-11, February 1982 (EMY - TCS)
- SCHLICHTING M. "Grenzschicht-Theorie",
Verlag G. Braun, Karlsruhe 1982
- SHANNON J.A. "Direct aircraft velocity determination by L-band moving target detector radar",
DOT/FAA-RD-82-41, June 1982
- STENGEL R.F. "Equilibrium response of flight control systems",
Automatica Vol. 18, No. 3, p 343-348, May 1982 (HSC)
- STEVENS V.C. "A technique for determining powered-lift STOL aircraft performance at sea level from flight data taken at altitude",
Flight testing technology: A state-of-the-art review, Proceedings of the Thirteenth Annual Symposium, New York, Sept. 1982 (Avail. NASA, Ames Research Center, Moffett Field, CA) (ACP)
- STIELER B., and WINTER H. "Gyroscopic Instruments and their Application to Flight Testing",
AGARDograph No. 160, Vol. 15, September 1982
- THOMAS J. et al. "Derivation and Analysis of Operational Requirements for Future Air Navigation",
DFVLR Braunschweig, December 1982
- THOMAS H.W., and LEFAS C.C. "Use of Aircraft derived Data to Assist in ATC Tracking Systems. Some Practical Filters",
Proceedings of the IEE, Pt F, No. 5, p. 359, 1982

1982

WELL K.H., FABER B. & BERGER E. "Optimization of tactical aircraft maneuvers utilizing high angles of attack",
JGC, Vol. 5, No. 2, March April 1982 (FOP)

WIGGS J.F. "Cost and fuel consumption per nautical mile for two engine jet transports using OPTIM and TRAGEN",
NASA-CR-168973, April 1982 (EMY-CST)

1983
 ===

- ADAMS M.B. "Operational and control display concepts for flight management systems in new generation transport aircraft",
 AIAA Paper 83-2489, Oct. 1983 (GEN)
- ALEXANDER M.B. & CAMP D.W. "Low-level flow conditions hazardous to aircraft",
 NASA/MFSC FY-83, Atmospheric Res. Rev., p. 22-23, Marshall Space Flight Center, Huntsville, Ala., Oct. 1983 (WND)
- ANONYMOUS N.N. "Low Altitude Windshear and Its Hazard to Aviation",
 National Academy Press, Washington, DC, 1983
- ANONYMOUS N.N. "Aircraft Accident Report: Pan American World Airways, Clipper 759, Boeing 727-235, N4737, New Orleans International Airport, Kenner, Louisiana, July 9, 1982",
 Report No. NTSB-AAR-8302, National Transportation Safety Board, Washington, DC, 1983
- ARDEMA M.D. & RAJAN N. "Separation of time scales in aircraft trajectory optimization",
 AIAA Paper 83-2136, August 1983 (FOP)
- ASSEC S.J., SHAW P.D. "Automation of fighter aircraft trajectory control",
 NAECON 1983 (HSC)
- ATTWOOLL V., BENNETT L., BENOIT A., MAGGS R. & SWIERSTRA S.
 "Comparison of three inbound control procedures applied to a zone of convergence including and surrounding London main airports, Part I. Fuel consumption and economy aspects",
 EUROCONTROL Report 832027, November 1983 (NCG-TCS)
- BASSANI M. "Wind shear - A danger for flight",
 Rivista di Meteorologia Aeronautica (Jan 1983) (WND)
- BENOIT A. (Program Chairman) "Air Traffic Control in Face of User's Demand and Economy Constraints",
 AGARD-CP-340, February 1983
- BENOIT A. & SWIERSTRA S. "Potential fuel consumption savings in medium - to high density extended terminal areas",
 EUROCONTROL Report 832004, March 1983 (EMY)
- BENOIT A., SAUER P. and SWIERSTRA S. "Estimates of nugatory fuel consumption in an extended terminal area (Traffic inbound to Brussels National)",
 EUROCONTROL Report 8120038, March 1983
- BENOIT A. & SWIERSTRA S. "Cost efficient control of inbound flights. Individual and global aspects",
 Symposium on "Applied Control and Identification" organized by the International Association of Science and Technology for Development, Copenhagen, June 28 - July 1, 1983. Also EUROCONTROL Report 832003, May 1983 (FOP)
- BENOIT A. & SWIERSTRA S. "Dynamic Control of inbound flights for minimum cost operation",
 AGARD CP-340, p. 31, February 1983. Also EUROCONTROL Report 822041, October 1982 (FOP-NCG)
- BENOIT A., GARCIA C. & SWIERSTRA S. "Selection of flight conditions for economical operation of air traffic",
 EUROCONTROL Report 832031, December 1983 (FOP)
- BENOIT A., GARCIA C. & SWIERSTRA S. "Ground-air coordinated control of time of arrival. Part 1: Integration of cruise and en-route descent (Tests conducted using airlines (B-737, A-300, DC-10) flight simulators",
 EUROCONTROL Report 832028, December 1983 (FOP)
- BENOIT A., SAUER P. and SWIERSTRA S. "Estimates of nugatory fuel consumption in an extended terminal area (Traffic inbound to London Heathrow)",
 EUROCONTROL Report 812021, March 1983

1983

- ====
- BEST M.R. "Two-dimensional flight-path reconstruction by means of spline approximation",
NLR Report TR 82075 U, July 1983 (LDG)
- BEST M.R. "Three-dimensional flight-path reconstruction by means of spline approximation",
NLR REPORT TR 83091 U, July 1983
- BIRD M.W., SCHNEBLE R. "Predictive controller issues for trajectory control ... of military aircraft",
SAE PAPER October 1983 (LDG)
- BLOM H.A.P. "Comparison of a jump-diffusion tracker with a Kalman tracker - an evaluation with emphasis on air traffic control",
NLR Report TR 83063 U, March 1983 (TCS)
- BLOM H.A.P. "Comparison of a Jump-Diffusion tracker with a Kalman tracker. An evaluation with emphasis on Air Traffic Control",
Report NLR TR-83063, National Aerospace Lab. NLR, 1983.
- BMV "Untersuchung technischer Möglichkeiten zur Erhöhung der Sicherheit bei Scherwindanflügen",
Bundesministerium für Verkehr, BMV, L-5/79, Bonn, März 1983
- BOUCEK G.P., PFAFF T.A., SMITH W.D. "The use of holographic head-up display of flight path symbology in varying weather conditions",
SAE PAPER: Aerospace behavioral Engineering Technology Conference (October 1983) (ATM)
- BROOKER P. "Aircraft Separation Assurance Systems Design",
J. Navig., Vol. 36, No. 1, p. 28, January (TCS)
- BROWN H.A. "Specification of slant wind shear with an offset tower observation system",
American Meteorological Society, 1983 (WND)
- BROWN H.A. "Analysis and specification of slant wind shear",
Interim report. Air force Geophysics Lab. AD-A125883 (WND-LDG)
- BURROWS J.W. "Fuel-optimal aircraft trajectories with fixed arrival times",
JGC, Vol. 6, p. 14, January 1983 (NCG) & (EMY)
- CHAKRAVARTY A. "4-D fuel-optimal guidance in the presence of winds",
AIAA Paper 83-2242, 1983 (NCG-FO-WND)
- CHAKRAVARTY A. & VAGNERS J. "4-D aircraft flight path management in real time",
American Control conference, San Francisco, California, June 1983 (NCG)
- CICOLANI L.S., KANNING G. & SCHMIDT S.F. "A Kalman filter algorithm for terminal-area navigation with sensors of moderate accuracy",
JGC, Vol. 6, No. 5, p. 321, September-October 1983 (TCS)
- COLLIN S. "Numerical model of the optimized flight altitude for use in general aviation",
Navigation (ISSN-0028-1530), vol. 31, p. 389-400, Paris, Oct. 1983 (POP)
- CREEDON J.F. "Flight Management Systems: What Are They and Why They Are Being Developed?",
AIAA-Guidance and Control Conference, Gatlinburg, Tennessee, USA, Aug. 1983 (NCG)
- CRUZ M.I. "Trajectory Optimization and Closed-Loop Guidance of Aerossisted Orbital Transfer",
Paper No. AAS-83-413, AAS/AIAA Astrodynamics Conference, Lake Placid, New York 1983
- DENTON R.V., JONES J.E. "Optimal TF/TA route planning using digital terrain elevation data ... terrain following/terrain avoidance",
IEEE 1983 (NCG)

1983

=====

- DLOUNY R., HALEM M. "Observing system simulation experiments related to space-borne Lidar wind profiling. Part 2: Sensitivity to atmospheric and instrumental influences", 1983 (ATM-WND-CST)
- DUKE E.L., SWANN M.R., ENEVOLDSON E.K. & WOLF T.D. "Experience with flight test trajectory guidance", JGC, VOL.6, No. 5, Sept-Oct. 1983 (NCG)
- ETKINS B., ZHU S. "Control logic for landing-abort autopilote mode", UTIAS-258 1983 (LDG)
- FITZJARRALD D.E., DIMARZIO D.A. "Aviation-related wind data obtained with an airborne and ground-based Doppler lidar system", NASA Conference on Aerospace and Aeronautical Meteorology (June 1983) (ATM-WND)
- FRICKE M. & HORMANN A. "Simulation Analysis and Derivation of Accuracy Requirements for Future Terminal Area Navigation. Part 1: Single Aircraft Analysis", BMFT-FB-W-83-035-PT-1, Technische Univ. Berlin, West Germany, May 1983 (CST-LDG)
- FRICKE M. & HORMANN A. "Simulation Analysis and Derivation of Accuracy Requirements for Future Terminal Area Navigation (Part I: Single-Aircraft-Analysis)", BMFT-FB-W 83-035, December 1983
- FRICKE M. & HORMANN A. "Simulation Analysis and Derivation of Accuracy Requirements for Future Terminal Area Navigation (Part II: Multi-Aircraft-Analysis)", BMFT-FB-W 83-036, December 1983
- FRIEDEL R. "Flight simulation investigations for the problem of flyability of noise optimal approach and takeoff paths", Technische Hochschule, Darmstadt, West Germany, Oct. 1983 (EMY)
- FROST W. "Flight in low-level wind shear", Final Report June 1981 - August 1982, NASA-CR-3678, March 1983 (WND-MEQ)
- FROST W. & CAMP D.W. "Feasibility study of a procedure to detect and warn of low-level wind shear", NASA/MFSC FY-83, Atmospheric Res. Rev., p. 18-19, Marshall Space Flight Center; Huntsville, Ala., Oct. 1983 (WND)
- F.T.A. "Development of Scheduling and Flight Path Generation Algorithm for MATCALs", Technical Report to Naval Electronics Systems Command, Washington D.C. by Flight Transportation Associates, March 1983
- GERLING W. "Kostenoptimale Konfigurierung von Funknavigationsanlagen und Bewertung konkurrierender Systeme", DFVLR FB 83-32, Braunschweig 1983
- GORDON C.N. "Flight Software for optimal trajectories in transport aircraft", AIAA Paper 83-2241, 1983 (FOP)
- HAINES P. & LUERS J. "Aerodynamic penalties of heavy rain on landing airplanes", JA, Vol. 20, p. 111-119, Feb. 1983 (LDG-ATM-ACP)
- HALYO N. "Terminal area automatic navigation, guidance and control research using the Microwave Landing System (MLS) Part 5: Design and development of a Digital Integrated Automatic Landing System (DIALS) for steep final approach using modern control techniques", 1983 NASA-CR-3681
- HOGG D.C., DECKER D.M.T., GUIRAUD F.O., EARNSHAW K.B., MERRITT D.A., MORAN K.P., SWEETZ W.B., STRAUCH R.G., WESTWATER E.R., and LITTLE C.G. "An Automatic Profile of the Temperature, Wind and Humidity in the Troposphere", J. Climate and Applied Meteor, May 1983, pp. 807-831

1983

====

HUESCHEN R.M. "Flight test results for the Digital Integrated Automatic Landing Systems (DIALS): A modern control full-state feedback design",
NASA Aircraft Controls Research 1983 (LDG-CST)

KAUL R. "Path discrepancies between great circle and rhumb line",
NASA-TM-85522, December 1983 (NCG)

KECHICHIAN J.A., CRUZ M.I., VINH N.X., and RINDERLE E.A. "Optimization and Closed-Loop Guidance of Drag Modulated Aeroassisted Orbital Transfer",
Paper No. AIAA-83-2093, AIAA Flight Mechanics Conference, Gatlinburg, Tennessee, 1983

KHAN MOHAMMADI S. "Gestion automatisée du trafic aérien sur un ensemble d'aéroports",
Thèse n° 81/1983, Ecole Nationale Supérieure de l'Aéronautique et de l'Espace, Toulouse, France, October 1983

KIM B.K., BOSSI J.A. "Wind shear estimation by frequency shaped optimal estimator",
IEEE 1983 (ATM-WND)

KINGSBURY J.A., MALTHOUSE N.S. & SCHWAMB K.B. "Automated en route air traffic control algorithmic specifications, Vol. 2: Airspace probe",
AD-A136850, DOT/FAA/ES-83/5, p. 138, September 1983 (CST-TCS)

KINGSBURY J.A., POOL D.A., GHOSH S.K., MALTHOUSE N.S. & ROUILLIER G.J. "Automated en route air traffic control algorithmic specifications Vol. 1: Trajectory estimation",
AD-A137088, DOT/FAA/ES-83/4, p. 395, September 1983 (CST-TCS)

KLEHR J.T. "Meteorological inputs to flight simulators",
JA, Vol. 20, p. 91-92, Jan. 1983 (CST-WND)

KNOX Ch.E. "Planning fuel - conservative descents with or without time constraints using a small programmable calculator. Algorithm development and flight test results",
NASA-TP-2085, March 1983 (CST-FOP-EMY)
"Description of the computations and pilot procedures for planning fuel conservative descents with a small programmable calculator",
NASA-TM-85642, 1983 (EMY) & (FOP)

KNOX Ch.E. "Application of Fuel/Time Minimization Techniques to Route Planning and Trajectory Optimization",
1st Annual NASA Aircraft Controls Workshop, Hampton, USA, 1983 (FOP)

KÖPP F. "Erstellung und Erprobung des Laser-Doppler-Anemometers zur Fernmessung des Windes. (Designing and testing the laser Doppler anemometer for remote wind measurement)",
DFVLR Forschungsbericht 83-14, 1983 (ATM)

KRAUSPE P. "Beiträge zur Längsbewegung von Flugzeugen in Windscherungen",
Dissertation, Fakultät für Maschinenbau und Elektrotechnik der TU Braunschweig, 1983

LAMBREGTS A.A. "Operational aspects of the integrated vertical flight path and speed control system",
SAE Paper 831420, 1983 (NCG)

LECHNER W. "Zeitgenaues Fliegen durch die Verwendung von Kalmanfiltern zur Windvorhersage. (Accurately time flying by using Kalman filters for the wind prediction)",
DGLR Annual Meeting 1982, Munich, 1983 (ATM)

LEE H.Q., and ERZBERGER H. "Time Controlled Descent Guidance Algorithm for Simulation of Advanced ATC Systems",
NASA TM-84373, 1983 (NCG, TCS)

LOWE J.R. & ORNELAS J.R. "Applications of Head-Up displays in commercial transport aircraft",
JCG, Vol. 6, No. 2, March-April, 1983 (NCG)

1983

- LUERS J., HAINES P. "Heavy rain influence on airplane accidents",
 J.A. vol. 20 Feb. 1983 (ATM)
- MACCARTHY J., WILSON J.W. "Applications of Doppler radar to aviation operations - JAWS experiences",
 AIAA Aerospace Sciences Meeting 1983 (ATM-WND)
- MAHAPATRA P.R., ZRNIC D.S., DOVIAK R.J. "Optimum siting of NEXRAD to detect hazardous weather at
 airports",
 JA vol. 20 Apr. 1983 (ATM)
- MARKOV A.B. "The landing approach in variable winds: Curved glidepath geometries and worst-case wind
 modeling",
 UTIAS-254 1983 (LDG-WND)
- MCCARTHY J., WILSON J., FUJITA T.T. "The Joint Airport Weather Studies (JAWS) Project",
 NASA/MSFC 83 (ATM)
- MOOIJ H.A., VAN GOOL M.F.C. "Handling qualities of transports with advanced flight control systems",
 National Aerospace Lab., Amsterdam. AGARD CP-333 1983 (HSC)
- NEUMAN F. & KREINDLER E. "Minimum fuel turning, climbout and descent guidance of transport jets",
 NASA-TM-84289, 1983 (FOP-EMY)
- PATTIPATI K.R., SANDELL N.R., Jr, "A unified view of state estimation in switching environments",
 Proc ACC, June 1983, pp. 458-465
- PHILIPS Ch. L., WILSON R.F. & STARKS S.A. "Observers as noise filters in an automatic aircraft landing
 system",
 JGC, Vol. 6, No. 2, p. 119-120, March-April 1983 (LDG)
- PINTY B., SOULAGE R.G. "Observation of a variable northerly wind component in the African monsoon
 lager",
 Monthly Weather Review (Sept. 1983) (WND-ATM)
- PRICE D.B. & GRACEY C. "A study of altitude and flight path angle dynamics for a singularly perturbed
 fuel optimization problem",
 American Control Conference, San Francisco, CA, June 1983, Proceedings, Vol. 2, p. 796-798,
 New York, IEEE, 1983 (FOP)
 "Altitude/path-angle transitions in fuel optimal problems for transport aircraft",
 American Control Conference, San Francisco, CA, June 1983, Proceedings, Vol. 2, p. 519-525,
 New York, IEEE, 1983 (FOP)
 "Feedback Laws for Fuel Minimization for Transport Aircraft",
 1st Annual NASA Aircraft Controls Workshop, Hampton, USA, 1983 (FOP, EMY)
- QUANBECK D.B. "Methods for generating aircraft trajectories",
 Center for Naval Analyses, Alexandria 1983 (NCG-CST)
- RALITSIZAFY A.M.C. "Generalized flight optimization equations for commercial aircraft",
 Revue Roumaine des Sciences Techniques, Série de mécanique appliquée, ISSN 0035-4074, Vol. 28,
 p. 413, July-August 1983 (FOP)
- SAINT S. "The missing element in wind shear protection",
 SAE Business Aircraft Meeting and Exposition, Wichita (Apr. 1983) (WND)
- SAUNDERS A.F. "Evaluation of a simple aircraft model",
 Royal Signals and Radar establishment, Memorandum 3634, November 1983 (CST)
- SCHÄNZER G. "Influence of Windshear on Flight Safety",
 62nd Symposium of the Flight Mechanics Panel, AGARD, Athen, Greece, 1983
- SHANGXIANG Z., Etkin B. "Fluid-dynamic Model of a Downburst",
 UTIAS-Report No. 271, April 1983

B-60

1983

SHELKOVNIKOV M.S. "Strujnye techeniya na malykh vysotakh (Strahlströme in geringer Höhe)",
Meteorologiya i gidrologiya, 1983, Nr. 11, Moskau, S. 44-46

SIMPSON C.H. "Advanced navigation systems and fuel conservation",
Canadian Aeronautics and Space Journal, Vol. 29, Air Canada, Montreal, Canada, March 1983 (EMY)

SIMPSON R.W. "Advanced Automated Control of Aircraft in Terminal Airspace",
MIT, Flight Transportation Laboratory, First Year Progress Report (unpublished) under
NASA Grant NAG-2-190, September 1983

SOBOCINSKI R. "Flight test results with collision avoidance systems",
IEEE 1983 (TCS)

SORENSEN J.A. "Generation and evaluation of near-optimum vertical flight profiles",
NAS1-15497, 1983 (FOP)

SORENSEN J.A. & MORELLO S.A. "Flight management concepts development for fuel conservation",
International Symposium on Air Breathing Engines, 6th, Paris, France, June 1983, Symposium
Papers, p. 357-366, New York, AIAA, 1983 (EMY-TCS)

SORENSEN J.A., WATERS M.H., and PATMORE L.C. "Computer Programs for Generation and Evaluation of Near-
Optimum Vertical Flight Profiles",
NASA CR-3688, May 1983 (FOP, EMY)

STEIN K.J. "Airborne Digital Systems use Expands",
Aviation Week and Space Technology, March 1983 (NCG)

STENGEL R.F. "A unifying framework for longitudinal flying qualities criteria",
JGC, Vol. 6, No. 2, p. 84-98, March-April 1983 (HSC)

STIKLE J.W., HALL A.W. "Operating safety in adverse weather environments",
NASA (nov. 1983 (ATM)

SWOLINSKY M., and WORSMANN P. "Windmessung an bord des Forschungsflugzeuges CO 28 Skyservant für das
Merkur-Experiment. (Wind measurement on board the DO 28 Skyservant research aircraft for the
mercury experiment)",
Universität Braunschweig, August 1983 (ATM)

TOBIAS L., ERZBERGER H., and LEE H.Q. "Mixing 4D-Equipped and Unequipped Aircraft in the Terminal Area",
1st Annual NASA Aircraft Controls Workshop, Hampton, USA, 1983 (NCG, TCS)

TOBIAS L. "Time Scheduling of a Mix of 4-D Equipped and Unequipped Aircraft",
NASA TM-84327, 1983 (NCG, TCS)

TURNER R.E. & CAMP D.W. "NASA/MSFC FY-83 Atmospheric Research Review",
NASA-CP-2288, Oct. 1983 (ATM)

VOELCKERS U. "The COMPAS system for more efficient approach traffic ... for aircraft",
DFVLR-Nachrichten, p. 23-28, June 1983 (in German)

WOODFIELD A.A., WOOD J.F. "Worldwide Experience of Wind Shear During 1981-1982",
AGARD CP No. 347, Athens, 10 - 13 May 1983

1984

- ADAM V. & LECHNER W. "Guidance and control research flight testing with HPB 320 Test aircraft", AGARD-AG-262, Dec. 1984 (NCG)
- ALEXANDER M.B. & CAMP D.W. "Wind speed and direction shears with associated vertical motion during strong surface winds", NASA-TM-82566, Feb. 1984
- ATTWOOLL V. & BENOIT A. "Fuel economies effected by the use of FMS in an advanced TMA system", the Royal Institute of Navigation, London, UK, 15th February 1984. Also EUROCONTROL Report 842003, February 1984 (EMY-TCS)
- ATTWOOLL V., BENNETT L., BENOIT A., MAGGS R. & SWIERSTRA S. "Comparison of three inbound control procedures applied to a zone of convergence including and surrounding London main airports, Part II. Safety and use of available capacity", EUROCONTROL Report, 1984 (TCS)
- ATTWOOLL V.W. and RICKMAN D. "A study of conflicts within a Zone of Convergence", Proceedings of the EUROCONTROL SPACDAR 11th Meeting, Brussels, September 25-27, 1984
- BEDARD A.J. JR., MACCARTHY J. "A case study illustrating time scales and operational responses for a wind shear episode during the JAWS project ... Joint Airport Weather Studies Project", AIAA-Aerospace Sciences Meeting, 22nd Jan. 1984 (ATM-WND)
- BEERS J.N.P. Evaluation and Adaptions of the SARP Trajectory prediction model", NLR Memorandum VG-84-004 L, 1984
- BENOIT A. & SWIERSTRA S. "Air traffic control in a Zone of Convergence: Assessment within Belgian Airspace", 14th ICAS Congress, Toulouse, France, September 10-14, 1984. Also, EUROCONTROL Report 842009, April 1984 (NCG-TCS)
- BENOIT A. & SWIERSTRA S. "Ground-air coordinated control of time of arrival. Part II: Integration of final descent, approach and landing (Tests conducted using SABENA DC-10 and NLR FK-28 aircraft flight simulators", EUROCONTROL Report, 1984 (NCG)
- BENOIT A. & SWIERSTRA S. "A cost-efficient control procedure for the benefit of all airspace users", AGARD Guidance and Control Symposium on "Cost-effective and affordable guidance and control systems", Cesme, Izmir, Turkey, 16-19 October 1984. Also EUROCONTROL Report 842011, August 1984 (EMY-NCG)
- BERGER D., HURET M. & RIVRON V. "Climb speed and rating optimization", ICAS Proceedings 1984, Vol. 2, p. 1065, Toulouse, France, September 1984 (avail AIAA) (FOP)
- BLOM H.A.P. "Application of a probabilistic tracking filter: A first evaluation with emphasis on air traffic control. PART 1: Evaluation results", NLR Report TR 82088 U PT 1 (TCS)
- BLOM H.A.P. "Application of a probabilistic tracking filter: A first evaluation with emphasis on air traffic control: PART 2: Live traffic samples", NLR Report TR 82088 U PT 2 1984 (TCS)
- BLOM H.A.P. "Markov jump-diffusion models and decision-making-free filtering", Proc. 6th Int. Conf. Analysis and Optimization of systems, June 1984, Eds: A. Bensoussan & J.L. Lions, Springer, 1984, Part 1, pp. 568-580
- BLOM H.A.P. "A Sophisticated Tracking Algorithm for ATC surveillance radar data", Proc. Int. Conf. on Radar, Paris, May 1984, pp. 393-398
- BLOM H.A.P. An efficient filter for abruptly changing systems, Proc. 23rd IEEE Conf. on Decision and Control, Dec. 1984, pp. 656-658

1984

====

- BLYTHE J.H. (Editor) "Propagation influences on digital transmission systems. Problems and solutions",
AGARD CP-363, October 1984
- BOCHIS V. "Dynamics of an aircraft in wind shear of arbitrary direction",
JGC, Vol. 7, No. 5, Sept.-Oct. 1984 (WND)
- BRASUNAS J.C. "A comparison of storm tracking and extrapolation algorithms",
Lincoln Lab., Mass Inst. of Techn., Lexington 1984 (ATM-WND)
- BRAY R.S. "A method for three-dimensional modelling of wind-shear environments for flight simulator applications",
NASA-TM-85969, July 1984 (CST-ATM)
- BREEMAN J.H., ERKELENS L.J.J., NIEUWPOORT A.M.H.
"Determination of performance and stability characteristics from dynamic manoeuvres with a transport aircraft using parameter identification techniques",
National Aerospace Lab. AGARD - CP-373, 1984 (HSC-ACP)
- BROOKER P. "Aircraft Collision Risk in the North Atlantic Region",
J. Opl. Res. Soc., Vol. 35, No. 8, August (TCS)
- BROUSSARD J.R. & HALYO N. "Investigation, development and application of optimal output feedback theory, Vol. 2: Development of an optimal, limited state feedback outer-loop digital flight control system for 3-D terminal area operation",
NASA-CR-3829, August 1984 (NCG)
- BROWN S.C., HARDY G.M. & HINDSON W.S. A flight test and simulation evaluation of the longitudinal final approach and landing performance of an automatic system for a light wing loading STOL aircraft equipped with wing spoilers",
NASA-TM-85873, September 1984 (ACP-CST)
- BUHRMAN J. (Editor) "Future requirements for airborne simulation",
AGARD-AR-188, April 1984
- CALISE A.J. "Optimization of aircraft altitude and flight path angle dynamics",
JGC, Vol. 7, p. 123-125, Jan.-Feb. 1984 (FOP)
- CAMPELL C.W. "A spatial model of wind shear and turbulence for flight simulation",
NASA-TP-2313, p. 131, May 1984 (WND-CST)
- CAMPOS L.M.B.C. "On the influence of atmospheric disturbances on aircraft aerodynamics",
Aeronautical Journal, Paper No 1085, June-July 1984, Instituto superior Técnico, Lisbon, Portugal (WND)
- CAVALCANTI S.G. "Critical Conditions for the Automatic Control of Landing from Decision Height in Variable Winds",
University of Toronto, UTIAS Report No. 284, Oct. 1984
- CHANG C.B., TABACZYNSKI J.A. , "Application of state estimation to target tracking",
IEEE Tr. Automatic Control, Vol. 29 (1984), pp. 98-109.
- CLIFF E.M., KELLEY H.J. & BILIMORIA K.D. "Classical and neo-classical cruise-dash optimization",
AIAA Paper 84-2125, 1984 (FOP)
- DEJERNETTE F.R. "Effects of Aircraft and Flight Parameters on Energy-Efficient Profile Descents in Time-Based Metered Traffic",
AIAA Paper 84-1915 & NASA-CR-172338, 1984 (FOP)
- DEJERNETTE F.R. "Effects of Aircraft and Flight Parameters on Energy-Efficient Profile Descents in Time-Based Metered Traffic",
NASA-CR-17023, February 1984, Addendum November 1984

1984

====

- DUNHAM R.E. JR. & USRY J.W. "Low altitude wind shear statistics from measured and FAA proposed standard wind profiles",
AIAA Paper 84-0114, Jan. 1984 (ATM)
- EBNER R.E. & WIE S.Y. "Integrated flight control navigation sensors",
AIAA/IEEE 6th Digital Avionics Systems Conference, December 1984
- EMPFINGER J.E. "A310 Flight Management System",
Sperry Flight Systems, Phoenix, USA, 1984 (NCG, POP)
- ERZBERGER H., and CHAPEL J.D. "Concepts and Algorithms for Terminal-Area Traffic Management",
AC 84, San Diego, USA, 1984 (TCS)
- FRICKE M. & HOERMANN A. "Simulation analysis of future terminal procedures with respect to the required navigation accuracy",
ICAS Proceedings 1984, Vol. 2, Toulouse, France, September 1984 (Avail AIAA) (NCG)
- FRICKE M. & HOERMANN A. "Simulation Analysis of Future Terminal Procedures with Respect to the Required Navigation Accuracy",
14th ICAS Congress, Toulouse, September 1984
- FRON X. "Altitude Prediction Errors",
Appendix 13 to EUROCONTROL Div. E1 Document 842013 Proc. 11th SPACDAR Meeting, Sept. (MEQ, TCS)
- FROST W. "Wind shear terms in the equations of aircraft motion",
JA, Vol. 11, No. 11, p. 866, 1984 (WND-MEQ)
- FROST W. & BOWLES R.U. "Incorporation of wind shear terms into the governing equations of aircraft motion",
AIAA Paper 84-0275, Jan. 1984 (MEQ-WND)
- FROST W., CHANG H.P., ELMORE K.L. & MCCARTHY J. "Simulated flight through JAWS wind shear - In-dept analysis results ... Joint Airport weather studies",
AIAA Paper 84-0276, January 1984 (WND)
- FROST W., ELMORE K.L., MCCARTHY J. & CHANG H.P. "Simulated flight through JAWS wind shear ... Joint airport weather studies",
JA, Vol. 21, p. 797-802, Oct. 1984 (WND)
- GAUVRIT M., "Bayesian adaptive filtering for tracking with measurements of uncertain origin",
Automatica Vol. 20 (1984), pp. 217-224
- Goddard Space Flight Center "Research Review, 1983",
NASA-TM-86053 1984 (ATM)
- HAVE J.M. ten "Fuel saving by optimal integration of on-board avionics and air traffic control",
NLR Report MP 84035U 1984 (EMY-CST)
- HORNUNG H., and PERRY A.E. "Some Aspects of Three-Dimensional Separation Part 1, Streamsurface Bifurcations",
Z. f. Flugwiss. u. Weltraumforsch. 8 (1984), Heft 2
- HOTOP H.J. "Anwendung der Regressionsanalyse zur Ermittlung der Luftdaten-Sensorfehler mittels eines Trägheitsnavigationssystems. (Application of regression analysis to determining the air-data sensor errors by means of an inertial navigation system)",
DFVLR-Mitteilung 84-03, 1984 (ATM)
- JAMES R.L. Jr., MADDALON D.V. "The drive for Aircraft Energy Efficiency",
NASA Aerospace America, vol. 22, Feb. 1984 (EMY)

1984 (Suite)

====

- JOERCK H. "Design of wind shear filters",
NASA-TM-77460, May 1984 (ATM)
- KAUFMAN J. "Delco performance management system flight test evaluation",
DFVLR Proc. of 12th Symp. on Aircraft Integrated Data Systems, p. 369-394, Feb. 1984 (FOP)
- KELLY G.M., MCCONNELL J.G., FINDLAY J.T., HECK M.L., HENRY M.W.
"Final STS-II (41-B) Best estimate trajectory products: Development and results from the first
Cape landing",
Analytical Mechanics Associates. NASA-CR-172349 1984 (CST)
- KIM B.K. "Frequency-shaped estimation and robust controller design for aircraft flight control in wind
disturbances",
Washington Univ., Seattle. 1984 (WND)
- KINGSBURG J.A., MALTHOUSE N.S., SCHWAMB K.B. "Automated en route air traffic control algorithmic speci-
fications. Volume 2: Airspace probe",
FAA 1984 (CST-TCS)
- KINGSBURG J.A., POOL D.A., GHOSH S.K., MALTHOUSE N.S., ROUILLIER G.J.
"Automated en route air traffic control algorithmic specifications. Volume 1: Trajectory
estimation",
FAA 1984 (CST-TCS)
- KLEHR J.T. "A four-dimensional thunderstorm model for flight simulators",
American Defense Preparedness Association link Flight Simulation Div. 1984 (WND-ATM)
- KNOX C.E. "A flight management algorithm and guidance for fuel-conservative descents in a time-based
metered air traffic environment: development and flight test results",
AGARD-AG-262, Dec. 1984 (NCG-EMY)
- KNOX C.E., and IMBERT N. "Ground-Based Time Guidance Algorithm for Control of Airplanes in a Time-
Metered Air Traffic Control Environment",
NASA TP-2616, Nov. 1986 (NCG, TCS)
- KNOX C.E., VICROY D.D., and SIMMON D.A. "Planing Fuel-Conservative Descents in an Airline Environment
Using a Small Programmable Calculator",
NASA TP-2393, May 1985
- KUHN P.M., KURKOWSKI, R.L. "Airborne infrared low-altitude wind detection test",
NASA AIAA 1984 (ATM)
- LAMING J. "The last 500 feet - problems associated with aircraft landing approach",
International Journal of Aviation Safety, ISSN 0264-6803, Vol. 2, p. 51, June 1984 (GEN-LDG)
- LEE H.P., and LEFFLER M.F. "Development of the L-1011 Fou-Dimensional Flight Management System",
NASA CR-3700, February 1984
- LENSCHOW D.H. "Probing the Atmospheric Boundary Layer",
American Meteorological Society, Bosont, Massachussetts, 1984
- MCCARTHY J. "Recommendations for coping with microburst wind shear - An aviation hazard",
Journal of Air Law and Commerce, vol. 49, n° 2, 1984 (ATM)
- MCCARTHY J. "The Joint Airport Weather Studies Project - Current analysis highlights in the aviation
safety context",
AIAA (Jan 1984) (ATM-WND)
- McLEAN & SAMAKA M. "An airborne wind shear detection system",
AIAA Paper 84-1918, 1984 (ATM)

1984 (Suite)

- McLEAN D., SAMAKA M. "An airborne wind shear detection system",
AIAA (Aug 1984) (WND-ATM)
- MIELE A., and VENKATARAMAN P. "Optimal Trajectories for Aeroassisted Orbital Transfer",
Acta Astronautica, Vol. 11, Nos. 7-8, pp. 423-433, 1984
- MONAN W.P. "Cleared for the visual approach: Human factor problems in air carrier operations",
NASA-CR-166573 1984 (LDG)
- MOORE D.A., PETERSON R.E. "Air Force Air Weather Service's requirements for global meteorological data",
Applied Optics (Any 1984) (ATM)
- MOORE D.A. "Time Flies, An In-Service Evaluation of a 4-D Flight Mangement System",
Proceedings of 6th Digital Avionics System Conference, AIAA, December 3-6, 1984
- MYLER T.R. "NEMAR plotting computer program",
NASA-CR-165831 1984 (CST)
- NEUMAN F. & KREINDLER E. "Minimum-fuel, 3-dimensional flightpath guidance of transfer jets",
NASA-TP-2326, Sept. 1984 (NCG-EMY)
- O'BRIEN J.P. "Recent Advances in aircraft on-board weight and balance systems",
AIAA/IEEE 6th Digital avionics Systems Conference, December 1984
- Office of Management Systems (Federal Aviation Adminsitration) and Office of Aviation Information Manage-
ment (Research and Special Programs Administration) "Airport Activity Statistics of Certified
Route Air Carriers",
December 1984
- OOSTGAARD M.A. "Guidance & Control Technology for the 1990's",
AGARD Guidance and Control Panel Symposium on "Cost Effective and Affordable Guidance and
Control Systems", Cesme, Ismir, Turkey, 16-19 October 1984 (NCG)
- OSTROFF A.J., HUESCHEN R.M. "Reconfigurable multivariable control law for commercial airplane using a
direct digital output feedback design",
NASA-TM-85759 1984 (LDG-CST)
- PRICE C.B. "Feedback Control for Fuel-Optimal Descents Using Singular Perturbation Techniques",
ACC 84, San Diego, USA, 1984 (POP, EMY)
- PSIAKI M.L., and STENGEL R. "Analysis of Aircraft Control Strategies for Microburst Encounter",
Paper No. AIAA-84-0238, AIAA 22nd Aerospace Sciences Meeting, Reno, Nevada, 1984
- RUNO St.C. "Automated software test system for the 737-300 flight management computer",
6th Digital Avionics System Conference, December 1984, Baltimore, Maryland, Proceedings,
p. 319-324, AIAA/IEEE, New York 1984 (NCG)
- SCHAENZER G. "Influence of windshear on flight safety",
AGARD Flight Mech. and Systems Design Lessons from Operational Experience." 1984 (WND)
- SCHÄNZER G. "Einführung in die Flugphysik",
Vorlesungsscript am Institut für Flugführung der TU Braunschweig, 1984
- SMITH P.D. & MEYER G. "Aircraft automatic digital flight control system with inversion of the model in
the feed-forward path",
AIAA/IEEE 6th Digital Avionics Systems Conference, December 1984
- SORENSEN J.A. "The Flight Planning - Flight Management Connection",
ACC 84, San Diego, USA, 1984 (NCG, TCS)

1984

====

- STENGEL R.F. & PSIAKI M.L. "Analysis of aircraft control strategies for microburst encounter low altitude wind shear",
AIAA Paper 84-0328, January 1984 (HSC-WND-LDG)
- STEVENSON L.E. "Thunderstorm impact on Denver air traffic control operations and the role of NEXRAD (Next Generation Weather Radar)",
Transportation Systems Center, Cambridge, Mass. 1984 (ATM-WND)
- SWOLINSKY M. & KRAUSPE P. "Wind determination on the basis of data measured during the flight of an airliner",
Meteorologische Rundschau, Vol. 37, p. 72-81, June 1984 (in German) (Avail. Technische Universität Braunschweig, West Germany) (ATM-WND)
- TEEGAN U. & MITTENDORF M. "Pilot-aircraft interaction concerning a wind shear indication system",
DFVLR, Proceedings of 12th Symp. on Aircraft Integrated Data Systems, p. 555-577, Febr. 1984 (WND)
- UCKERMANN R., JAGAU A., TEEGAN U., SCHICK F.V. "Evaluation and analysis of experience reports concerning wind shear problems",
DFVLR-FB-83-19 Anthropotechnik and Simulation, 1984 (WND)
- URBATZKA E. "The route structure in the commercial air traffic of the Federal Republic of Germany",
DFVLR-Nachrichten (ISSN 0011-4901), June 1984 (TCS)
- VORSMANN, P. "An on-line realization for precise wind vector measurements on board the DO 28 Research Aircraft",
14th Congress of the International Council of the Aeronautical Sciences, September 9-14, 1984, Toulouse, France
- VORSMANN P. "Ein Beitrag zur bordautonomen Windmessung",
Dissertation am Institut für Flugführung der TU Braunschweig, 1984
- WESTDIJK J.A. "Construction and Evaluation of a Smoother for a Discrete Time Jump-Diffusion Model",
NLR Memorandum VG-84-028, 1984

1985

====

- ANONYMOUS N.N. "Flight Path Control in Windshear",
Boeing Airliner, pp. 1-12, January-March 1985
- ATTWOOLL V.W., LISTER A., and GRIEVE B.S. "Extended Range Operation of Twin-Engined Public Transport Aircraft",
J. Navig. Vol. 38, No. 3, September (RRP)
- BARNES A.G. & YAGER T.J. "Simulation of Aircraft Behaviour on and Close to the Ground",
AGARD AG-285, January 1985 (SIM)
- BENOIT A. "Accurate Aircraft Time-of-Arrival Control for ATC Utilisation in Present and Future Communications Environments",
Seminar in Aerospace Sciences, Institute for Aerospace Studies, University of Toronto, Toronto, Canada, 15th October 1985
- BENOIT A. "4-D Control of Current Air Carriers in the Present Environment - Objectives, Status, Plans",
Paper presented at the Consiglio Nazionale dell Ricerche, Progetto Finalizzato "Trasporti", Capri, Italy, October 1985
Also EUROCONTROL Report 682013, March 1986
- BIANCO L., RICCIARDELLI S., RINALDI G., SASSANO A. "Sequencing Tasks with Sequence Dependent Processing Times",
TIMS XXVI International Meeting, Copenhagen, 1985. To appear also on Naval Research Logistic Quarterly
- BIANCO L. "A Multilevel Approach to the ATC Problem: the On-Line Strategic Control of Flights",
Seminar CEE-CNR-PFT on Informatics in Air Traffic Control, Capri, October 1985
- BLOM H.A.P. "Sophisticated Tracking Algorithm for ATC Surveillance Radar Data",
NLR Report MP 84004 (SUR)
- BLOM H.A.P. "An Efficient Decision-Making-Free Filter for Processes with Abrupt Changes",
Proc. 7th IFAC Symp., Identification and System Parameter Estimation, York U.K., July 1985, pp. 631-636
- BLOM H.A.P. and KRAKER P.C. de "A Method to Measure the Operational Quality of Tracks and to Evaluate Trackers for ATC",
Proc. of the Int. Seminar "The ATC Radar of the Future", October 1985, EUROCONTROL, Luxembourg
- BRAY R.S. "A Method for Three-Dimensional Modelling of Wind-Shear Environments for Flight Simulator Applications",
NASA TM 85969, 1985
- BROCKHAUS R. "Ein Vorschlag für die Wahl der Zustandsvariablen in den Bewegungsgleichungen von Flugzeugen unter Windeinfluss",
Z. Flugwiss. Weltraumforsch. 9, 1985, p. 376-382
- CHAKRAVARTY A. "Four-Dimensional Fuel-Optimal Guidance in the Presence of Winds",
Journal of Guidance, control, and Dynamics, Vol. 8, No. 1, January-February 1985
- ERZBERGER H., and CHAPEL J.D. "Ground Based Concept for Time Control for Aircraft Entering the Terminal Area",
Proc. AIAA Guidance and Control Conference, Snowmass, CO, August 1985
- ETKIN B., and ZHU S. "Model of the Wind Field in a Downburst",
AIAA Journ. of Aircraft, Vol. 22, No. 7, July 1985
- FARINA A., STUDER P.A. "Radar Data Processing Vol. 1 - Introduction and Tracking",
Research Studies Press, Leitchworth, England (SUR)

1985

- FARINA A., STUDER F.A., "Radar data processing, Vol. 1, Introduction and tracking", Research Studies Press/Wiley, 1985
- FUJITA T.T. "The Downburst",
Department of Geophysical Sciences, University of Chicago, Chicago, Illinois, 1985
- HORMANN A. "Ein Verfahren zur Bewertung und Analyse der operationellen Praktikabilität und Effektivität automatisierter Verkehrsflusssteuerungsverfahren für den Flughafenbereich",
TU Berlin, February 1985
- HORMANN A. "Accuracy Requirements for Terminal Area Navigation",
Seminar on "Informatics in Air Traffic Control", Capri, October 1985
- HULL, D.G., GILTNER, J.M., SPEYER, J.L., and MAPAR, J., "Minimum-Energy-Loss Guidance for Aeroassisted Orbital Plane Change",
Journal of Guidance, Control, and Dynamics, Vol. 8, N° 4, pp. 487-493, 1985
- ICAO "Airborne Collision Avoidance Systems",
ICAO Circular 195-AN/118 (CAS)
- ISO International Standards ISO 1151",
International Organization for Standardization, 1985
- KAYLOR J.T., SIMMONS H.I., NAPTEL P.B., HOUCK J.B., and GRAVE R.D. "The Mission Oriented Terminal Area Simulation Facility",
NASA TM-87621, October 1985
- KNOX C.E., VICROY D.D., and SIMMONS D.A. "Planning Fuel-Conservative Descents in an Airline Environment Using a Small Programmable Calculator",
NASA- TP-2393, May 1985
- LEFAS C.C. "Algorithms for improved, Heading assisted, Maneuver tracking",
ibid, Vol AES-21, No. 3, p. 351, 1985
- LILJA G., FERNKRANS L., and HASSELROT A. "Fuel Conservation in Air Transport-Work During Fiscal year 1983-1984",
PFA-TN-1984-50, PFA, 1985 (EMY)
- McLAUGHLIN M.P. "Experimental Detection of Anomalous Mode C Reports Using Radar Data",
ICAO SICASP Working Group 2, November (SUR)
- MEASE K.D., and VINH N.X. "Minimum-Fuel Aeroassisted Coplanar Orbit Transfer Using Lift Modulation",
Journal of Guidance, Control and Dynamics, Vol. 8, No. 1, pp. 134-141, 1985
- MIELE A., AND VENKATARAMAN P. "Minimax Optimal Control and Its Application to the Reentry of a Space Glider",
Recent Advances in the Aerospace Sciences, Edited by L. Casci, Plenum Publishing Corporation, New York, New York, pp. 21-40, 1985
- MIELE A., AND BASAPUR V.K. "Approximate Solutions to Minimax Optimal Control Problems for Aeroassisted Orbital Transfer",
Acta Astronautica, Vol. 12, No. 10, pp. 809-818, 1985
- MIELE A., and WANG T. "An Elementary Proof of a Functional Analysis Result Having Interest for Minimax Optimal Control of Aeroassisted Orbital Transfer Vehicles",
Rice University, Aero-Astronautics Report No. 182, 1985
- RATCLIFFE S. "Devices for the Avoidance of Collision in the Air",
Electronics and Power, July 1985 (CAS)

1985

=====

- SCHÄNZER G. "Abschätzung von stochastischen Böenlasten unter Berücksichtigung instationärer Luftkräfte",
Z. f. Flugwiss. u. Weltraumforsch. 9, Heft 3, S. 167-178, 1985
- TOBIAS L., ERZBERGER H., LEE H.Q., and O'BRIEN P.J. "Mixing Four-Dimensional Equipped and Unequipped Aircraft in the Terminal Area",
J. Guidance, Control, and Dynamics, vol. 8, May-June 1985, pp. 296-303
- TRIVIZAS D. "Optimization of Runway Operations",
Working Paper. FLIGHT Transportation Laboratory, MIT, Cambridge 1985
- VINH N.X., and HANSON J.M. "Optimal Aeroassisted Return from High Earth Orbit with Plane Change",
Acta Astronautica, Vol. 12, No. 1, pp. 11-25, 1985
- WALBERG G.D. "A Survey of Aeroassisted Orbit Transfer",
Journal of Spacecraft and Rockets, Vol. 22, No. 1, pp. 3-18, 1985
- ZHU S., and ETKIN B. "Model of the Wind Field in a Downburst",
AIAA Vol. 22, No. 7, July 1985 (WND)
- ZHU S. "Automatic Landing Through the Turbulent Planetary Boundary Layer",
University of Toronto, UTIAS Report No. 289, Nov. 1985

1986

ANONYMOUS N.N. "Aircraft Accident Report: Delta Airlines, Lockheed L-1011-3851, N726DA, DALLAS Fort Worth International Airport, Texas, August 2, 1985",
Report No. NTSB-AAR-8605, National Transportation Safety Board, Washington, DC, 1986

BENOIT A. "Air Traffic Management: Development of Techniques and Procedures for the Control of Individual Flight and Air Traffic in an advanced TMA",
Seminar on "Air Navigation Aids", Associazione Elettrotecnica e Elettronica Italiana, Milano, Italy, 27 February 1986. Summary of viewgraphs: EUROCONTROL Report, February 1986

BENOIT A., and SWIESTRA S. "A Simulation Facility for assessing the Next Generation of 4-D Air Traffic Control Procedures"
15th International Council of the Aeronautical Sciences Congress, London, U.K., September 7-12, 1986 (124b). Conference proceedings (ICAS-86-3.4.1 531a-h) (124b). Also EUROCONTROL Report 862017, June 1986

BENOIT A. (Program Chairman and Editor) "Efficient Conduct of Individual Flights and Air Traffic - An Optimum Utilisation of Modern Technology. (Guidance, Control, Navigation, Surveillance and Data Processing) - for the Overall Benefit of the Airspace Civil and Military Users Community",
42nd Symposium of the Guidance and Control Panel of AGARD, Brussels, Belgium 10-13 June 1986. AGARD-CP-410, December 1986

BENOIT A., and SWIERSTRA S. "Real-Time Simulation of an Operational Procedure suitable for the Accurate 4-D Control of Aircraft Trajectories",
EUROCONTROL Report 862018, in preparation

BENOIT A., SWIERSTRA S., and DE WISPELAERE R. "Next Generation of Control Techniques in Advanced TMA: Automatic Assistance for the Controller/Pilot Dialogue",
42nd Symposium of the Guidance and Control Panel of AGARD on "Efficient Conduct of Individual Flights and Air Traffic", Bruxelles, Belgium, 10-13 June, 1986. AGAD-CP-410, Paper 55E December 1986. Also EUROCONTROL Report 862016-R, June 1986

BENOIT A. "4-D Control of Current Air Carriers in the Present Environment. Objectives - Status - Plans",
Paper presented at the Seminar on "Informatics in Air Traffic Control" organised by the Consiglio Nazionale della Ricerche and the Commission of the European Communities

BENOIT A., SWIERSTRA S. et DE WISPELAERE R. "Contrôle du trafic aérien dans les TMA modernes. Techniques de la prochaine génération. Assistance automatique au dialogue contrôleur-pilote",
Communication au 42ème symposium de la commission Guidage et Contrôle du Groupe Consultatif pour la Recherche et le Développement aérospatiaux (AGARD) sur le thème "Conduite du vol et de la circulation aérienne", Bruxelles, Belgique, 10-13 juin 1986. AGARD-CP-410, Paper 55F, December 1986. Egalement Document EUROCONTROL n° 862016-F, juillet 1986

BENOIT A., and SWIESTRA S. "Ground-Air Coordinated Control of Time of Arrival. Part II: Integration of Final Descent, Approach and Landing (Tests conducted using the SABENA DC-10 aircraft flight simulator)",
EUROCONTROL Report 862022, August 1986

BENOIT A., and SWIESTRA S. "Accurate 4-D Control of Inbound Trajectories: a prerequisite for the efficient management of air traffic",
Lecture delivered at the Carl Cranz Lecture, P 5.03, on "Automatisation in Air Traffic Control and Flight Guidance", DFVLR, Braunschweig, FRG, 13-17 October 1986

BLOM H.A.P., "Overlooked potential of systems with Markovian coefficients",
Proc. 25th Conf. on Decision and Control, Athens, Greece, December 1986, pp. 1758-1764.

BLOODWORTH M., "Speed Control of aircraft by ATC"
Navigation News, Vol. 1 N° 4 July (TCS, MEQ)

BLACKMANN S.S., "Multiple target tracking with radar applications",
Artech Book Company, London, 1986

BLACKMAN S.S. "Multiple-Target Tracking with Radar Applications",
Artech Book Company, London, 1986, Athens, Greece, December 1986, pp. 1758-1764

1986

- BRAY R.S., "Aircraft Performance and Control in kdownburst Windshear",
Paper N° SAE-86-1698, Society of Automotive Engineers, Aerospace Technology Conference and
Exposition, Long Beach, California, 1986.
- BUCKHAM C.A., "Computational Enhancements to a 4D Algorithm", 1986
American Control Conference, Seattle, WA, June 18-20, 1986.
- CREDEUR L., WILLIAMS D.H., HOWELL W.E., and SPITZER C.R. "Advanced ATC: An Aircraft Perspective",
AGARD CP-401, November 1986
- DEAR R.G. "The Dynamic Scheduling of Aircraft in the Near Terminal Area",
FTL Report T. 76, 9 M.I.T., Cambridge, Mass. USA, September 1986
- ERZBERGER H., and TOBIAS L. "A Time Based Concept for Terminal Area Traffic Management",
AGARD CP-401, November 1986
- ETKIN B., "Comment on (Ref. 14)",
AIAA Jour. of Aircraft, Vol. 23, N° 9, Sept. 1986.
- FARINA A., and STUDER F.A. "Radar Data Processing, Vol 1: Introduction and Tracking, Vol. 2: Advanced
Topics and Applications",
Wiley, 1986
- FARINA A., STUDER F.A., "Radar Data Processing, Vol. 2: Advanced topics and applications", Research
Studies Press/Wiley, 1986.
- FORD R.L. "The Definition of an Unnecessary Alert",
ICAO SICASP Panel Working Group 2, WP/112 March (CAS)
- FUJITA T.T., "DFW Microburst",
Department of Geophysical Sciences, University of Chicago, Chicago, Illinois, 1986
- FORD R.L. "The Protected Volume of Airspace Generated by an Airborne Collision Avoidance System",
J. Navgn. Vol. 39, No. 2, p. 139, May (CAS)
(For corrections to printers errors in algebra, see J. Navgn. Vol. 39, No. 3, p. 446)
- GERLOFS J.F., "Technical feasibility of the multi-radar Jump-Diffusion tracker",
NLR Memorandum IR-86-030L, National Aerospace Laboratory NLR, Amsterdam, 1986.
- GROCE J.L., IZUMI K.H., MARKHAM C.H., SCHWAB R.W., and TAYLOR J.A. "An Investigation of TNAV-Equipped
Aircraft in a Simulated En Route Metering Environment",
NASA CR-178031, May 1986
- HAHN K.U. "Take-Off Flight Paths along a Lee Side of a Flat Mountain Ridge under Flight Safety
Aspects",
2nd International Symposium on Aviation Safety, Toulouse, Nov. 1986
- HAHN K.W. "Take-Off and Landing in a Downburst",
Paper No. ICAS-86-562, 15th Congress of the International Council of the Aeronautical Sciences,
London, England, 1986
- ICAO "Scheduled Airline Passenger-Traffic Growth Increase in 1985",
ICAO Bulletin, June 1986
- IVAN M. "A Ring-Vortex Downburst Model for Flight Simulations",
AIAA Jour. of Aircraft, Vol. 23, No. 3, March 1986
- IZUMI K.H., SCHWAB R.W., GROCE J.L., and COOTE M.A. "An Evaluation of Descent Strategies for TNAV-
Equipped Aircraft in an Advanced Metering Environment, ATOPS",
NASA Contractor Report 178093, December 1986

1986

=====

- KAUFMANN B. "Atmospheric Turbulence and Unsteady Aerodynamics in Aircraft Simulation",
2nd Int. Symposium on Aviation Safety, Toulouse 1986
- KNOX E., and IMBERT N. "Ground Based Time-Guidance Algorithm for Control of Airplanes in a Time Metered
Air Traffic Control Environment",
NASA Technical Paper 2616, November 1986 (TCS, NCG)
- MEREDITH J.F. "Exploiting the capabilities of flight management systems in solving the airport arrival
problem",
AGARD CP-401, November 1986
- MIELE A., WANG T., and MELVIN W.W. "Optimal Take-Off Trajectories in the Presence of Windshear",
Journal of Optimization Theory and Applications, Vol. 49, No. 1, pp. 1-45, 1986
- MIELE A., BASAPUR V.K., and MEASE K.D. "Nearly-Grazing Optimal Trajectories for Aeroassisted Orbital
Transfer",
Journal of the Astronautical Sciences, Vol. 34, No. 1, pp. 3-18, 1986
- MIELE A., WANG T., and MELVIN W.W. "Guidance Strategies for Near-Optimum Take-Off Performance in a
Windshear",
Journal of Optimization Theory and Applications, Vol. 50, No. 1, p. 1-47, 1986
- MIELE A., and WANG T. "Primal-Dual Properties of Sequential Gradient-Restoration Algorithm for Optimal
Control Problems, Part 1, Basic Problem",
Integral Methods in Science and Engineering, Edited by F.R. Payne et al; Hemisphere Publishing
Corporation, Washington, DC, pp. 577-607, 1986
- MIELE A., and WANG T. "Primal-Dual Properties of Sequential Gradient-Restoration Algorithms for Optimal
Control Problems, Part 2, General Problem",
Journal of Mathematical Analysis and Applications, Vol. 119, Nos. 1-2, pp. 21-54, 1986
- MIELE A., WANG T., and BASAPUR V.K. "Primal and Dual Formulations of Sequential Gradient-Restoration
Algorithms for Trajectory Optimization Problems",
Acta Astronautica, Vol. 13, No. 8, pp. 491-505, 1986
- MORELLO S.A. "Flight Management Concepts compatible with Air Traffic Control",
Paper ICAS-86-3.3.4, 15th ICAS Congress, London, U.K., 7 - 12 September 1986
- PORITZKY S.B. "FANS - A U.S. Perspective",
AGARD CP-410, pp. 12-1 to 12-7, December 1986
- PSIAKI M.L., and STENGEL R.F. "Optimal Flight Paths through Microburst Wind Profiles",
Journal of Aircraft, Vol. 23, No. 8, pp. 629-635, 1986
- PSIAKI M.L., and STENGEL R.F. "Optimal Flight Paths Through Microburst Wind Profiles",
AIAA Jour. of Aircraft, Vol. 23, No. 8, Aug. 1986
- RLD "SARP II programmatuur specificaties",
(in Dutch, release 16 included), 1986
- RENTUEUX J.L. "Aircraft Performance Data for ATC needs",
EUROCONTROL Report 862021, July 1986 (CST, SIM)
- SCHÄNZER G. "Influence of Wind Shear, Downdraft and Turbulence on Flight Safety",
2nd International Symposium on Aviation Safety, Toulouse, Nov. 1986
- SCHLICKENMAIER H. "Integrated Wind Shear Program",
2nd International Symposium on Aviation Safety, Toulouse, Nov. 1986
- SEIFERT R. "MLS: Its Technical Features and Operational Capabilities",
AGARD CP-410, pp. 42-1 to 42-10, December 1986

1986

- SHAW J.M. "Review of Data-Processing Methods for ATC",
RSRE Report 86010, October (SUR)
- SIMPSON R.W., ODONI A.R., SALAS-ROCHE F. "Potential Impacts of Advanced Technologies on the ATC Capacities of High Density Terminal Areas",
NASA Contract Report 4024, October 1986
- SPENCER N.A., and FEE J. "Classification of ACAS Resolution Advisories",
ICAO SICASP Panel Working Groupe 2 WP3/114 April (CAS)
- STEINMETZ G.G. "Development and Evaluation of an Airplane Electornic Display Format Aligned with the Inertial Velocity Vector",
NASA TP-2648, 1986
- STENGEL R.F. "Optimal Control Laws for Microburst Encounter",
15th ICAS-Congress, ICAS-86-5.6.3, London 1986
- SWOLINSKY M. "Beiträge zur Modellierung von Scherwind für Gefährdungsuntersuchungen",
Thesis, Techn. Univ. Braunschweig, 1986
- SWOLINKSY M. "Wind Shear Models for Aircraft Hazard Investigation",
2nd International Symposium on Aviation Safety, Toulouse, Nov. 1986
- VACHIERY V. "La navigation aérienne et l'avion à l'horizon 2000",
AGARD CP-410, pp. 13F-1 to 13F-8, December 1986
- VANDENBROUCKE A. "Belgium Moves Ahead in Air Traffic Control",
AGARD CP-410, pp. K-1 to K-10, December 1986
- VOELCKERS U. "Computer Assisted Arrival Sequencing and Scheduling with the COMPAS System",
AGARD CP-401, November 1986
- WILLIAMS D.H. "Impact of Mismodeled Idle Engine Performance on Calculation and Tracking of Optimal 4-D Descent Trajectories",
1986 American Control Conference, Seattle, WA, June 18-20, 1986

1987
 ===

- ABBOTT T.S., and STEINMETZ G.G. "Integration of Altitude and Airspeed Information into a Primary Flight Display Via Moving-Tape Formats",
 NASA TM-89064, 1987
- ANONYMOUS N.N. "Windshear Training Aid, Vols. 1 and 2",
 Federal Aviation Administration, Washington, DC, 1987
- BIANCO L., RINALDI G., and SASSANO A. "A Combinatorial Optimization Approach to Aircraft Sequencing Problem",
 Flow Control of Congested Networks (Odoni A.R., Bianco L., Szego G.; Eds) Springer Verlag, 1987
- BENOIT A. & SWIERSTRA S. "Fuel Conservation: Air Transport",
 Systems & Control Encyclopedia - Theory, Technology, Applications
 Pergamon Press, Oxford, U.K., 1987
- BENOIT A. "On-Line Management and Control of Air Traffic",
 Paper presented at the Advanced Workshop on "Flow Control of Congested Networks: The case of Data Processing and Transportation" organized by the Consiglio Nazionale delle Ricerche (Research Project on Transportation) in cooperation with the Scientific Affairs Division of NATO. Capri, Italy, 12-17 October 1986
 Proceedings published by Springer-Verlag, NATO ASI Series F: Computer and System Sciences, Vol. 38, Berlin, Heidelberg, New York, October 1987
 Also EUROCONTROL Report 872005, April 1987
- BENOIT A., SWIERSTRA S., and DE WISPELAERE R. "The Air Traffic Controller facing Automation: Conflict or Co-operation",
 Conference of the Royal Institute of Navigation, "NAV 87", on "DATA Dissemination and Display - Electronics in Navigation", London, U.K., 29-30 September and 10 October 1987 (131a).
 Proceedings published by the Royal Institute of Navigation
 1, Kensington Gore, London, SW7 2AT, U.K., September 1987
 Also EUROCONTROL Doc. 872008, July 1987
- BENOIT A., SWIERSTRA S., and DE WISPELAERE R. "Le contrôleur de la circulation aérienne et l'automatisation: conflit d'intérêts ou convergence ?",
 The Royal Institute of Navigation, NAV 87, London, U.K., 29, 30 Sept. - 1 Oct. 1987.
 Also EUROCONTROL Doc. 872008-F, July 1987
- BENOIT A., and SWIERSTRA S. "Ground-Based 4-D Guidance of Flights in Strong Wind",
 EUROCONTROL Report 872010, August 1987
- BENOIT A., GARCIA C., and SWIERSTRA S. "Illustration of the role of data link in the future computer/controller/aircraft dialogue",
 EUROCONTROL Report 872009, August 1987
- BENOIT A., and LEMAITRE J. "Traffic Density at Brussels National Airport",
 EUROCONTROL Report 872011, September 1987
- BENOIT A. "New Horizons in Air Traffic Control",
 Course on "Air Traffic Flow Management", The Institut of Air Navigation Services
 EUROCONTROL, Luxembourg, 18 November 1987 (137)
- BLOM H.A.P. "Hybrid State Markov Processes obtained from Stochastic differential equations",
 NLR Report, to be published in 1987
- BOGLER P. , "Tracking a maneuvering target using Input Estimation",
 IEEE Tr. Aerospace and Electronic Systems, Vol. 23 (1987), pp. 298-310
- BROCKHAUS R. "A Mathematical Multi-point Model for Aircraft Motion in Moving Air",
 Z. Flugwiss. Weltraumforsch. 11, 1987, p. 174-184
- CHU P.Y., and BRYSON A.E. Jr. "Control of Aircraft Landing Approach in windshear",
 Paper No. AIAA-87-0632, AIAA 25th Aerospace Sciences Meeting, Reno, Nevada, 1987

1987

=====

- FORD R.L. "The Conflict Resolution Process for TCAS2 and Some Simulation Results",
J. Navig. Vol. 40, No. 3, p. 283, September (CAS)
- GORNEY J.L. "An Analysis of the Delta 191 Windshear Accident",
Paper No. AIAA-87-0626, AIAA 25th Aerospace Sciences Meeting, Reno, Nevada, 1987
- HAHN K.U. "Take-off and Landing in a Downburst",
Journal of Aircraft, Vol. 24, No. 8, 1987
- HART S.G., and STAVELAND L.E. "Development of a NASA-TLX (Task Load Index): Results of Empirical and Theoretical Research",
In P. A. Hancock and N. Meshkati (Eds.), Human mental workload. Amsterdam: Elsevier, 1987
- HEINTSCH T. "Windmessung mit dem Forschungsflugzeug DO 128 im Leebereich von Hügeln",
DFG Abschlussbericht, Braunschweig, 1987
- HUNT V.R., and ZELLWEGER A. "Strategies for Future ATC Systems",
Computer Vol. 20, No. 2, February
- ICAO Future Air Navigation Systems (FANS) Working Group 5 (ADS) Final Report of Brussels Meeting,
May (SUR, TCS)
- ICAO "Wind Shear",
ICAO Circular 186-AN/122, Montreal, 1987
- IEEE Tr. Aerospace and Electronic Systems, Vol. 23 (1987), pp. 298-310.
- IMBERT N. "Traffic Control in Terminal Area - Encyclopedia on System",
Pergamon 1987 (TCS, NCG, LDG)
- LANGSTON M.A. "A Study of Composite Heuristic Algorithms",
J. Opl. Res. Soc. Vol. 28, No. 6, June (TCS)
- MIELE A., WANG T., and MELVIN W.W. "Quasi-Steady Flight to Quasi-Steady Flight Transition in a Windshear: Trajectory Optimization and Guidance",
Journal of Optimization Theory and Applications, Vol. 54, No. 2, pp. 203-240, 1987
- MIELE A., WANG T., MELVIN W.W., and BOWLES R.L. "Maximum Survival Capability of an Aircraft in a Severe Windshear",
Journal of Optimization Theory and Applications, Vol. 53, No. 2, pp. 181-217, 1987
- MIELE A., WANG T., and MELVIN W.W. "Optimization and Acceleration Guidance of Flight Trajectories in a Windshear",
Journal of Guidance, Control, and Dynamics, Vol. 10, No. 4, pp. 368-377, 1987
- MIELE A., WANG T., TZENG C.Y., and MELVIN W.W. "Optimal Abort Landing Trajectories in the Presence of Windshear",
Journal of Optimization Theory and Applications, vol. 55, No. 2, pp. 165-202, 1987
- MIELE A., BASAPUR V.K., and LEE W.Y. "Optimal Trajectories for Aeroassisted, Noncoplanar Orbital Transfer",
Acta Astronautica, Vol. 15, Nos. 6-7, pp. 399-411, 1987
- MIELE A., BASAPUR V.K., and LEE W.Y. "Optimal Trajectories for Aeroassisted, Coplanar Orbital Transfer",
Journal of Optimization Theory and Applications, Vol. 52, No. 1, pp. 1-24, 1987
- MOHLEJI S.C., "Operational Data Analysis for Evaluating Benefits of Transition/Terminal Automation",
MITRE Corporation briefing to Federal Aviation Administration's Terminal ATC Automation Concept Advisory Group meeting at NASA, Ames Research Center, April 30, 1987.

1987

====

- MONNICH W. "Ein Zweipunkt-Aerodynamikmodell für die Identifizierung",
SFB 212 - Symposium Braunschweig 1987, DFVLR-Mitt. 87 - 22, p. 193-208
- PROSKAWETZ K.O. , "Identification of the longitudinal motion of a Dornier DO 28 airplane",
IFAC Congress München 1987, Paper Nr. 1053
- RENTEUX J.L. "Aircraft Performance Models for present and future ATC needs",
EUROCONTROL Report 872002, January 1987 (CST, SIM)
- RENTEUX J.L. "Aircraft modelling standards for future ATC systems",
EUROCONTROL Report 872003, July 1987 (CST, SIM)
- SADOUNE M. "An Expert System for Generating Terminal Area Flight Paths for Arriving Aircraft",
MIT, Flight Transportation Laboratory Report, R87-10, 1987
- SCHANZER G., HEINTSCH T., HOYER H., TETZLAFF G.
"Untersuchung der Scherwindverhältnisse an der Weidacher Höhe",
Gutachten, 10.07.1987, Braunschweig
- TOBIAS L., and SCOGGINS J.L. Jr. "Time-Based Air Traffic Management Using Expert Systems",
IEEE Control Systems Magazine, April 1987
- TRIVIZAS D.A. "Parallel Parametric Combinatorial Search - Its Application to Runway Scheduling",
MIT, Flight Transportation Laboratory Report, R87-4, 1987
- WILLIAMS D.H. "Fuel Penalties and Time Flexibility on 4-D Flight Profiles Under Mismodeled Wind
Conditions",
NASA TM-89128, March 1987
- WINGROVE R.C., and BACH R.E. Jr. "Severe Winds in the DFW Area Measured from Two Aircraft",
Paper No. AIAA-87-2340, AIAA Guidance, Navigation, and Control, Monterey, California, 1987
- YAVIN Y., and PACHTER M. "Pursuit-Evasion Differential Games",
Intl. J. Computers and Mathematics Vol. 13, No. 1-3 (TCS)
- ZHU S., and ETKIN B. "Model of the Wind Field in a Downburst",
Journal of Aircraft, Vol. 22, No. 7, July 1985
- Wind Shear
ICAO Circular 186-AN/122, Organization, Montreal, 1987

1988

- BAR-SHALOM Y., CHANG K.C., BLOM H.A.P., "Tracking a maneuvering target using Input Estimation versus the Interacting Multiple Model algorithm",
IEEE Tr. on Aerospace and Electronic Systems, Vol. 24, October 1988
- BAR-SHALOM Y., FORTMANN T.E., "Tracking and data association",
Academic Press, 1988.
- BAUSCHAT M. "Entwicklung eines dreidimensionalen, mathematischen Gewittermodells zur Untersuchung des Flugverhaltens in Gewitterstürmen",
Diplomarbeit am Institut für Flugführung der TU Braunschweig, Januar 1988
- BENOIT A. and SWIERSTRA S. "Régulation temps réel optimale du trafic aérien en Europe occidentale",
Séminaire international "ATC 2000", Institut de la navigation aérienne,
EUROCONTROL, Luxembourg, 23, 24, 25 février 1988.
Aussi Rapport EUROCONTROL 882004-F, février 1988.
- BENOIT A. and SWIERSTRA S. "Optimum On-Line Handling of Air Traffic Over Western Europe",
International Seminar on "ATC 2000", The Institute of Air Navigation Services,
EUROCONTROL, Luxembourg, 23-25 February 1988
Also EUROCONTROL Report 882004, March 1988
- BENOIT A. "Efficient on-line Air Traffic Handling : Vindication of a co-operative effort
on a European scale"
EUROAVIA, Delft, The Netherlands, 1st and 2nd December 1988.
Also EUROCONTROL Report 882015, December 1988.
- CALISE A.J. "Singular Perturbation Analysis of the Atmospheric Orbital Plane Change Problem",
Journal of the Astronautical Sciences, vol. 36, Nos. 1-2, pp. 35-43, 1988
- GAMBLE J.D., CERIMELE C.H., MOORE T.E., and HIGGINS J. "Atmospheric guidance Concepts for an Aeroassist
Flight Experiment",
Journal of the Astronautical Sciences, Vol. 36, Nos. 1-2, pp. 45-71, 1988
- HAHN K.U., HEINTSCH T., KAUFMANN B., SCHÄNZER G., SWOLINSKY M. "Wind Models for Flight Simulation",
AGARDograph No. 301, 1988
- HOGENDOORN R.A., BLOM H.A.P., "Bayesian track initiation by time-reversion of trajectory models",
NLR MP, 1988.
- HULL D.G., MCLENDON J.R., and SPEYER J.L. "Aeroassisted Orbital Plane Change Using an Elliptic Drag
Polar",
Journal of the Astronautical Sciences, Vol. 36, Nos. 1-2, pp. 73-87, 1988
- HULL D.G., MCLENDON J.R., and SPEYER J.L. "Improved Aeroassisted Plane Change Using Successive
Approximation",
Journal of the Astronautical Sciences, Vol. 36, Nos. 1-2, pp. 89-101, 1988
- MEASE K.D., LEE J.Y., and VINH N.X. "Orbital Changes during Hypersonic Aerocruise",
Journal of the Astronautical Sciences, Vol. 36, Nos. 1-2, pp. 103-137, 1988
- MEASE K.D. "Optimization of Aeroassisted Orbital Transfer: Current Status",
Journal of the Astronautical Sciences, Vol. 36, Nos. 1-2, pp. 7-33, 1988
- MIELE A., WANG T., and MELVIN W.W. "Quasi-Steady Flight to Quasi-Steady Flight Transition for Abort
Landing in a Windshear: Trajectory Optimization and Guidance",
Journal of Optimization Theory and Applications, Vol. 58, No. 2, pp. 165-207, 1988
- MIELE A., WANG T., MELVIN W.W., and BOWLES R.L. "Gamma Guidance Schemes for flight in a Windshear",
Journal of Guidance, Control, and Dynamics, Vol. 11, No. 4, 1988

1988

- MIELE A., WANG T., WANG H., and MELVIN W.W. "Optimal Penetration Landing Trajectories in the presence of Windshear",
Journal of Optimization Theory and Applications, Vol. 57, No. 1, pp. 1-40, 1988
- MIELE A., WANG T., and MELVIN W.W. "Optimization and Guidance of Landing Trajectories in a Windshear",
Paper No. ICAS-88-332, 16th Congress of the International Council of the Aeronautical Sciences,
Jerusalem, Israel, 1988
- MIELE A., WANG T., and MELVIN W.W. "Penetration Landing Guidance Trajectories in the Presence of Windshear",
Paper No. AIA88-4069, AIAA Guidance, Navigation, and Control Conference, Minneapolis,
Minnesota, 1988
- MIELE A., and WANG T. "Optimal Trajectories for Flight in a Windshear: Take-Off, Abort Landing, and Penetration Landing",
Paper No. IMACS-88-314, 12th IMACS World Congress on Scientific Computation, Paris, France,
1988
- MIELE A., Editor "Special Issue on Hypervelocity Flight",
Journal of the Astronautical Sciences, Vol. 36, Nos. 1-2, January-June, 1988
- MIELE A., LEE W.Y., and MEASE K.D. "Nearly-Grazing Optimal Trajectories for Aeroassisted, Noncoplanar Orbital Transfer",
Journal of the Astronautical Sciences, Vol. 36, Nos 1-2, pp. 139-157, 1988
- OBERLE H.J. "Numerical Treatment of Minimax Optimal Control Problems with Applications to the Reentry Flight Path Problem",
Journal of the Astronautical Sciences, Vol. 36, Nos. 1-2, pp. 159-178, 1988
- PROSKAWETZ K.O., and WANG W. "ML-Data-Compatibility-Check of General Flight-Test-Data by use of a non-linear Six Degrees of Freedom Model",
IFAC-Symposium Beijing, 1988
- RAWLINGS R. "The Future Air Navigation in European Regions",
The 1988 International Conference
The Royal Institute of Navigation, London, U.K., 22-24 March 1988
- VINH N.X., and LU P. "Chebyshev Minimax Problems for Skip Trajectories",
Journal of the Astronautical Sciences, Vol. 36, Nos. 1-2, pp. 179-197, 1988

PART X-C - INDEX

B I B L I O G R A P H Y

I n d e x o f A u t h o r s ' n a m e s

This index presents in alphabetical order the names of the authors of publications referred to in the bibliography. For each author, it gives the year of publication and in each year, the number of publications listed.

A

A'HARRAH R.C., 1979
 ABBOTT T.S., 1987
 ACHTEMEIER G.L., 1982
 ADAM V., 1979, 1981, 1982, 1984
 ADAMS H.W., 1968
 ADAMS M.B., 1983
 AGGARWAL R., 1975, 1977, 1979
 AIKEN W. Jr., 1975
 ALEXANDER M.B., 1983, 1984
 ALLEN H.J., 1957
 ALLES W., 1978, 1980
 AMBLARD P., 1977
 AMOEDO F.A., 1979
 ANDERSON G.M., 1975, 1976
 ANDREUSI G., 1981
 ANDREWS J.W., 1981
 ANONYMOUS N.N., 1983, 1985, 1986, 1987
 ANTHES R.A., 1978
 ARDENA M., 1970, 1974, 1979, 1983
 ARMSTRONG J.H., 1979
 ASHFORD N., 1979
 ASSAD A.A., 1976
 ASSEC S.J., 1983
 ASSEO S.J., 1971
 ATIAS M., 1974
 ATTWOOL V., 1974, 1976, 1983, 1984,
 1985

B

BACH R.E., 1982, 1987
 BADNER J., 1979
 BANNISTER J.D., 1980
 BAR-SHALOM Y., 1988
 BARBOZA G., 1981
 BARMAN J.F., 1975 (2 x), 1976
 BARNES A.G., 1985
 BARONI A., 1971
 BARR M.M., 1974
 BASAPUR V.K., 1985, 1986 (2 x), 1987 (2 x)
 BASSANI M., 1983
 BAUSCHAT M., 1988
 BEALE G.O., 1978
 BEATTY A.J., 1979
 BECKMAN D.L., 1972
 BEDARD A.J., 1984

BEDDOES T.S., 1980
 BEERS J.N.P., 1981, 1984
 BEHNKE K.W., 1971
 BENEDICT T.R., 1962
 BENHOW R.L., 1972
 BENNETT L., 1983, 1984
 BENOIT A., 1970 (2 x), 1971, 1972 (2 x), 1973(3 x),
 1974 (2 x), 1975 (2 x), 1976 (5 x), 1977
 (2 x), 1980 (7 x), 1981 (2 x), 1982 (7 x),
 1983 (8 x), 1984 (3 x), 1985 (2 x),
 1986 (8 x), 1987 (8 x), 1988 (3 x)
 BENSCH R.R., 1978
 BENTLEY G.K., 1969
 BEPPU G., 1975
 BERGER E., 1977, 1982
 BERNERT J.H., 1970
 BERT C.W., 1981
 BERTONE C.M., 1967
 BEST M.R., 1982, 1983
 BIANCO L., 1978, 1979, 1980, 1981 (2 x), 1985, 1987
 BIELLI M., 1980, 1981, 1982
 BIEN Z., 1975
 BILIMORIA K.D., 1984
 BIRD M., 1980, 1983
 BISIAUX M., 1982
 BLACKADAR A.K., 1957
 BLACKMANN S.S., 1986
 BLANK D., 1980, 1982
 BLICK E.F., 1978
 BLISS G.A., 1946
 BLOM H.A.P., 1983, 1984, 1985, 1986, 1987, 1988
 BLOODWORTH M., 1986
 BLYTHE J.H., 1984
 BOCHEM J.H., 1977
 BOCHIS V., 1984
 BOEHRET H.H., 1974
 BOER W.P. de, 1972, 1974
 BOGDANOFF S.M., 1971
 BOGLER P., 1987
 BOLTYANSKI V.G., 1962
 BOLZA O., 1961
 BOOTHE E.M., 1972
 BOSSI J.A., 1983
 BOUCEK G.P., 1983
 BOWES R.C., 1982
 BOWLES R.L., 1979, 1980, 1984, 1987, 1988
 BOX G.E.P., 1970
 BRASUNAS J.C., 1984
 BRAY R.S., 1984, 1985, 1986
 BREAKWELL J.V., 1977, 1978
 BREDT I., 1944
 BREEMAN J.H., 1984
 BRINKLEY C.W., 1977

BRITTING K.R., 1973
 BROCKHAUS R., 1977, 1978, 1979, 1985,
 1987
 BROKOF U., 1979, 1981, 1982
 BROMLEY G.R., 1980
 BROOKER P., 1983, 1984
 BROUSSARD J.R., 1984
 BROWN A.D., 1971, 1972
 BROWN H.A., 1983
 BROWN J.E., 1967
 BROWN P., 1973
 BROWN S.C., 1984
 BRUCKNER J.M.H., 1974, 1977, 1978, 1980
 BRUENING G., 1973, 1974, 1978
 BRUSCH R., 1970
 BRUSH E.G., 1966
 BRYSON A.E., 1961, 1962, 1964, 1967,
 1968, 1969, 1977, 1987
 BUCHOLZ F.G., 1970
 BUCKHAM C.A., 1986
 BUHRMAN J., 1984
 BULL J.S., 1974, 1976
 BUNDICK W.T., 1981
 BURDESS S.B., 1982
 BURNHAM J., 1970
 BURNS H.C., 1969
 BURROWS J.W., 1971, 1981, 1982, 1983
 BUSEMANN A., 1980

C

CAHIR J.J., 1978
 CAIGER B., 1966
 CALICCHIO G., 1980, 1981, 1982
 CALISE A.J., 1975, 1976, 1977, 1979,
 1981, 1982, 1984, 1988
 CAMP D.W., 1982 (2 x), 1983 (3 x), 1984
 CAMPBELL C.W., 1981, 1982, 1984
 CAMPBELL G.S., 1974
 CAMPOS L.M.B.C., 1984
 CANAVOS G.C., 1968
 CANNON D.G., 1979, 1980
 CARPON W.R., 1981
 CARRO A., 1982
 CARSTOIV J., 1960
 CASPARI M., 1981
 CAVALCANTI S.G., 1984
 CERIMELE C.H., 1988
 CHAFFIN D.E., 1981
 CHAKRAVARTY A., 1981, 1982, 1983, 1985
 CHAMBER E. 1959
 CHANDLER C.L., 1982
 CHANG C.B., 1984

CHANG H.P., 1984 (2 x)
 CHANG K.C., 1988
 CHAPEL J.D., 1984, 1985
 CHAPMAN D.R., 1958, 1960
 CHAPMAN G.T., 1970
 CHARVET Y., 1970
 CHELINI J., 1981
 CHINAPPI U., 1980
 CHONG C.Y., 1982
 CHU P.Y., 1987
 CICOLANI L.S., 1983
 CINI M., 1978, 1979, 1980, 1981
 CLEMENT R.D., 1979
 CLIFF E.M., 1984
 CLOUTIER J.R., 1974
 CLYMER D.J., 1973
 CODOBAN A., 1970
 COFFIN M.R., 1979
 COLLIN S., 1983
 COLLINS B.P., 1979
 COMES M., 1979
 COOK G., 1971, 1973, 1978
 COOPER F.L., 1972
 COOTE M.A., 1986
 CORMIER P., 1973
 COUNIHAN J., 1975
 COVERY R.R., 1979, 1980
 COX M.E., 1976, 1977, 1978, 1979, 1982
 CRAIG A., 1972
 CRAWFORD D.J., 1975
 CREDEUR L., 1981, 1986
 CREEDON J.F., 1981, 1983
 CRUZ M.I., 1983
 CULBERTSON J.D., 1971
 CULP R.D., 1980
 CUNNINGHAM F.L., 1977
 CURRIE G.N., 1974
 CURTIS P.E.M., 1978
 CZECHOWSKY R., 1978

D

DAGNINO P., 1972
 DALY K.C., 1981
 DAMOULAKIS J.N., 1970, 1972, 1974
 DANESI A., 1980
 DAVIES P.D., 1967
 DAVIS C.M., 1981
 DAYTON A.D., 1974
 DEAR R.G., 1976, 1986
 DECKER D.M.T., 1983
 DECUYPER M., 1981
 DEJERNETTE F.R., 1984

DELAGE Y., 1974
 DELVIN B.T., 1976
 DENARO R.P., 1977
 DENERY D.G., 1974
 DENHAM W.F., 1961, 1962, 1964
 DENHARD W.G., 1971
 DENTON R.V., 1983
 DESAI M.N., 1968, 1969, 1973
 DEUTSCH J., 1981
 DEVRY H., 1981
 DE WISPELAERE R., 1986, 1987 (2 x)
 DIBLEY H., 1973, 1974, 1981
 DICKY R.W., 1974
 DIEUDONNE J.E., 1976
 DIMARZIO D.A., 1983
 DLOUNY R., 1983
 DONALDSON COLEMAN du P., 1972
 DOVIAK R.J., 1982, 1983
 DRAKE H.M., 1968
 DREW A.D., 1982
 DRINKWATER F.J., 1974
 DRUMMOND A.M., 1972
 DRYDEN H.L., 1943
 DUCLOS R., 1974
 DUKE E.L., 1983
 DUNHAM R.E. Jr., 1971, 1982, 1984
 DUSHMAN A., 1979
 DUTTON J.A., 1976

E

EADDY N.O., 1978
 EARNSHAW K.B., 1983
 EBNER R.E., 1984
 ECKERT K.D., 1978
 EGGERS A.J., 1957
 EICHENBERGER W., 1962
 ELKINS H.C., 1971
 ELLIS D.W., 1978
 ELMORE K.L., 1984 (2 x)
 ELZER P., 1980
 EMPFINGER J.E., 1984
 ENEVOLDSON E.K., 1983
 ENGLAND J., 1980
 ERKELENS L.J.J., 1980, 1984
 ERWIN R.L., 1974, 1975, 1976, 1979
 ERZBERGER H., 1971, 1972, 1974, 1975,
 1976, 1978, 1979 (2 x),
 1980, 1981, 1983 (2 x),
 1984, 1985, 1986
 ETKIN B., 1945, 1947, 1958, 1961, 1972,
 1974, 1980, 1981, 1983 (2 x),
 1985, 1986, 1987

EVERS E., 1974

F

FABER B., 1977, 1978, 1982
 FAGAN J.H., 1969
 FAGE J.M., 1981
 FALCO M., 1973
 FARINA A., 1985, 1986
 FARMER R.H., 1980, 1981
 FAZI C., 1976 (2 x)
 FEE J., 1986
 FERGUSON D.R., 1981
 FERNKRANS L., 1985
 FICH G.H., 1981
 FIELDLER F., 1974
 FILECCIA G.L., 1982
 FINDLAY J.T., 1984
 FITZJARRALD D.E., 1983
 FLORA C.C., 1966, 1973
 FOERESTER P., 1973
 FOGARTY L.E., 1969
 FORD R.L., 1982, 1986, 1987
 FORRESTER D.A., 1979, 1982
 FORTMANN T.E., 1988
 FOSSARD A.J., 1979
 FOSTER J.D., 1974
 FODRIAT E.C., 1974, 1975
 FOXWORTH T.G., 1976
 FRANKLIN J.A., 1972, 1973, 1974
 FREEMAN, 1947
 FREIDEL H., 1978
 FRICKE M., 1983, 1984
 FRIEDEL H., 1973
 FRIEDEL R., 1983
 FRON X., 1984
 FROST W., 1973, 1982, 1983, 1984
 FUCHTER C., 1978
 FUJITA T.T., 1980, 1983, 1985, 1986
 FOLLINGER O., 1977

G

GAI E., 1981
 GAINER C.A., 1967
 GAMBLE J.D., 1988
 GAMKRELIDZE R.V., 1962
 GANDELMAN J., 1980
 GARCEAU T.V., 1974
 GARCIA C., 1983 (2 x), 1987
 GAUVRIT M., 1984
 GENT H., 1974
 GEORGE L., 1969

GERA J., 1971
 GERLING W., 1983
 GERLOFS J.F., 1986
 GHOSH S.K., 1983, 1984
 GIFFARD CH., 1976
 GILBERT E.G., 1976
 GILBERT J.W., 1976
 GILES R.F., 1972
 GILTNER J.M., 1985
 GOFF C., 1981, 1982
 GOLDBERG J.H., 1982
 GOLDSTEIN F., 1977
 GONZALEZ S., 1978
 GOODWIN E.M., 1975
 GORDON C.N., 1983
 GORNEY J.L., 1987
 GOTO N., 1980
 GRACEY C., 1983
 GRAHAM W., 1970
 GRANZER V.M., 1974
 GRAVE R.D., 1985
 GREENE R.W., 1982
 GREGORY T.J., 1970
 GREPPER P.O., 1979
 GREY J., 1974
 GRIEM H., 1980
 GRIEVE B.S., 1985
 GRIPPO L., 1978, 1979, 1980, 1981
 GROCE J.L., 1986
 GROVE R.D., 1976
 GRUNDY P.M., 1982
 GUIRAUD F.O., 1983
 GUSTAFSSON A.L. 1977, 1979

H

HAFER X., 1973
 HAGUE D.S., 1970
 HAHN K.U., 1986, 1987, 1988
 HAHN K.W., 1986
 HAHN P., 1978
 HAINES A.L., 1978
 HAINES P., 1982, 1983
 HAIWES R.F., 1978
 HALEM M., 1983
 HALL A.W., 1983
 HALL D.L., 1979
 HALL G.W., 1972
 HALVERSON A.G., 1973
 HALYO N., 1983, 1984
 HAMEL P., 1970, 1975
 HAMILTON F.W., 1980
 HANSON J.M., 1985
 HARDY G., 1981
 HARDY G.G., 1975

HARDY G.M., 1984
 HARDGRAVES CH., 1981
 HARRISON J.V., 1981
 HART S.G., 1987
 HASSELROT A., 1980, 1985
 HATFIELD J.J., 1971
 HAVE J.M. ten, 1973, 1975, 1978, 1979, 1980, 1984
 HAVEN J.M., 1977
 HECK M.L., 1984
 HEDRICK J.K., 1973, 1974
 HEIDEMAN J.C., 1975
 HEIMBOLD R.L., 1980, 1982
 HEINTSCH T., 1987, 1988
 HEISENBERG W., 1948
 HELD V., 1981
 HEMESATH N.B., 1974
 HENRY M.W., 1984
 HEROD P.L., 1980
 HERSHMAN L.W.,
 HESTENES M.R., 1966
 HICKS R., 1980
 HIGGINS J., 1988
 HINDSON W.S., 1984
 HINZE J.O., 1959
 HO Y.C., 1969
 HODGKINSON J., 1979
 HOERMANN A., 1983 (4 x), 1984 (2 x), 1985
 HOFFMAN W.C., 1969, 1973
 HOFMAN C.F.G.M., 1976
 HOGENDOORN R.A., 1988
 HOGG D.C., 1983
 HOGGE J.E., 1972
 HOLDEN R., 1980
 HOLLAND F.C., 1974
 HOLLEY W.E., 1977
 HOLLISTER W.M., 1973
 HOOTON E.N., 1969
 HOOVER J.H., 1967
 HORNUNG H., 1984
 HOROWITZ B.M., 1978
 HOTOP H.J., 1979, 1984
 HOUBOLD J.C., 1973
 HOUCK J.B., 1985
 HOWE R.M., 1969
 HOWELL W.E., 1986
 HOYER H., 1987
 HUBER R.R. Jr., 1973
 HUESCHEN R.M., 1981, 1983, 1984
 HUGUENIN F.E., 1979 (2 x)
 HUGUET M.P., 1981
 HULL D.G., 1974, 1978, 1985, 1988
 HUNT B.A., 1982
 HUNT V.R., 1987
 HUNTLEY E., 1974
 HURET M., 1984
 HURRASS K.H., 1979, 1980, 1981, 1982

I

ICAO/OACI, 1964, 1970, 1979
 ILLARIONOV V.F., 1972
 IMBERT N., 1977, 1978, 1979, 1984,
 1986, 1987
 INNIS R.C., 1973, 1974
 IOZZIA S., 1981
 ISAACS R., 1965
 ISHIHARA T., 1969
 ISRAEL D., 1976
 IVAN M., 1986
 IYER R.R., 1970, 1971 (2 x)
 IZUMI K.H., 1986

J

JACOB H.G., 1982
 JACOBSON I.D., 1981
 JAGAU A., 1984
 JAKOB H., 1972
 JAMES R.L. Jr., 1984
 JAZWINSKI A.H., 1970
 JENKINS G.M., 1970
 JOERCK H., 1984
 JOHNSON C.D., 1971
 JOHNSON F., 1981
 JOHNSON T.L., 1980
 JOLITZ G., 1973
 JONES J.E., 1983
 JOOSTEN B.K., 1981
 JOPPA R.G., 1974, 1976

K

KANNING G., 1983
 KARMAN TH.V., 1938
 KARMARKER J., 1980
 KAUFMAN J., 1984
 KAUFMANN B., 1980, 1986, 1988
 KAUL R., 1983
 KAYLOR J.T., 1985
 KECHICHIAN J.A., 1983
 KEENAN M.G., 1978
 KELLEY H.J., 1959, 1960, 1962, 1971,
 1973, 1984
 KELLY G.M., 1984
 KHAN MOHAMMADI S., 1983
 KIM B.K., 1983, 1984
 KINGSBURG J.A., 1983, 1984

KIRK D.B., 1970
 KISHI F.H., 1971
 KLEHR J.T., 1983, 1984
 KLEIN R.H., 1970, 1971 (2 x)
 KLENNER J., 1979
 KLOPPSTEIN G., 1977
 KLOSTERMEYER J., 1978
 KNAPP L., 1981
 KNORR W., 1982
 KNOX C.E., 1977, 1978, 1979, 1980, 1983,
 1984, 1985, 1986
 KOENIG R., 1979, 1980, 1981, 1982
 KOLMOGOROFF A.N., 1941
 KOPP F., 1983
 KOTTMEIER C., 1982
 KRAFT D., 1977, 1980
 KRAICHNAN R.H., 1962
 KRAKER P.C., 1985
 KRAUSE P., 1979
 KRAUSPE P., 1980, 1981, 1982, 1983, 1984
 KREINDLER E., 1981, 1982, 1983, 1984
 KRICKE D., 1981 (2 x)
 KRIPPNER R.A., 1974
 KROTOV V.F., 1963
 KUHN P.M., 1984
 KUNCIW B.G., 1977, 1978
 KURKOWSKI R.L., 1984
 HUSSNER H.G., 1940
 KUYPERS P., 1970
 KZUCHZY ANDREW J., 1968

L

LADEMAN J., 1973, 1974
 LAMBREGTS A.A., 1983
 LAMING J., 1984
 LANGE W.R., 1971
 LANGSTON M.A., 1987
 LANIER P.D., 1977
 LARGE E., 1981
 LASTMAN G.J., 1968, 1969
 LATYPOV A.F., 1981
 LAX F.M., 1975, 1976
 LAYENDECKER H., 1979
 LEAN D., 1973
 LECHNER W., 1979, 1982 (3 x), 1983, 1984
 LECOMPTE P., 1982
 LEE H., 1978, 1979
 LEE H.P., 1980, 1982, 1984
 LEE H.Q., 1971, 1972, 1975, 1977,
 1980 (2 x), 1983, 1985
 LEE J.T., 1981
 LEE J.Y., 1988

LEE W.Y., 1987 (2 x), 1988
 LEFAS C., 1981, 1982
 LEFAS C.C., 1985
 LEFFLER M.F., 1980, 1982 (2 x), 1984
 LEITMANN G., 1962, 1981
 LEMAITRE J., 1987
 LEMANNA W.J., 1979
 LENSCHOW D.H., 1972, 1984
 LENTZ R.H., 1981
 LEVY A.V., 1971, 1975
 LEWALLEN J.M., 1971
 LEWIS W., 1981
 LEYENDECKER H., 1981
 LICHTFORD G.B., 1971
 LIEVENS V., 1973
 LILJA G., 1977, 1979, 1980, 1985
 LINA L.J., 1968
 LING C.K., 1970
 LISTER A., 1985
 LITCHFORD G.A., 1976
 LITTLE C.G., 1983
 LOGAN H.K., 1982
 LOH W.H.T., 1963
 LONDON H.S., 1962
 LOTZ M., 1978
 LOVERING P.B., 1982
 LOWE J.R., 1978, 1980, 1983
 LU P., 1988
 LUERS J.K., 1972, 1973, 1974, 1982,
 1983
 LUKINS J.W., 1977
 LUMLY J.L., 1964
 LUSH K.J., 1954
 LYKKEN L.O., 1972

M

MACCARTHY J., 1983
 MACKINNON D., 1971, 1973
 MACKO D., 1970
 MADDALON D.V., 1984
 MADDEN P., 1971
 MAGGS R., 1983, 1984
 MAHAPATRA P.R., 1982, 1983
 MALTHOUSE N.S., 1983 (2 x), 1984 (2 x)
 MAPAR J., 1985
 MARCUS F.J., 1976
 MARKHAM C.H., 1986
 MARKOV A.B., 1981, 1982, 1983
 MARKS B.L., 1963
 MARMISOLLE-DAGUERRE E., 1972
 MARS J.H., 1976, 1978
 MARTIN D.A., 1968

MARTIN D.W., 1978
 MARTIN R., 1976
 MARTIN R.H.G., 1970, 1972 (2 x)
 MARVILLET J.P., 1976
 MASCETTI G.J., 1979, 1980
 MATCALC, 1975
 MATHENY N.W., 1974
 MATTHEWS R.J., 1979
 MAUS J.R., 1973
 MC CARTHY J. 1978, 1982, 1984 x 3
 MC CONNELL W.J., 1979, 1984
 MC CLENDON J.R., 1988 (2 x)
 MC DONALD W.T., 1969
 MC DONNELL J.D., 1979
 MC KENZIE R.B., 1981
 MC LAUGHLIN M.P., 1985
 MCLEAN J.D., 1972, 1975 (2 x), 1980, 1981,
 1984
 MC NAMARA J.E., 1974
 MC RUER D.T., 1970, 1971
 MEASE K.D., 1985, 1986, 1988
 MEDINAH E.M., 1980
 MEHRA R.K., 1967, 1979
 MELTON R.G., 1981, 1982
 MELTS I.O., 1972
 MELVIN W.W., 1982, 1986 (2 x), 1987 (4 x),
 1988 (5 x)
 MENGA G., 1978
 MERARI A., 1980
 MEREDITH J.F., 1986
 MERONEY R.N., 1979
 MERRICK R.B., 1971
 MERRITT D.A., 1983
 MESAROVIC M.D., 1970
 MEYER D., 1979
 MEYER G., 1984
 MEYERSBURG R.B., 1966
 MIDDLETON P., 1973
 MIELE A., 1961, 1962, 1965, 1968, 1970,
 1972, 1974, 1975, 1978,
 1984, 1985, 1986, 1987,
 1988 (8 x)
 MILLER H.H., 1980
 MISHCHENKO E.F., 1962
 MITTENDORF M., 1984
 MOAGLAND M.R., 1982
 MOERDER D.D., 1982
 MOHLEJI S.C., 1978, 1982, 1987
 MONAN W.P., 1984
 MONIN A.S., 1958
 MONROE R.D., 1967
 MOOJI H.A., 1974, 1982, 1983
 MOORE D.A., 1984
 MOORE T.E., 1988
 MORAN K.P., 1983

MORELLO S.A., 1978, 1979, 1981, 1983, 1986
 MORI S., 1982
 MORREL J.S., 1956, 1958
 MORRISON J.A., 1977
 MOSSMAN D.C., 1976, 1977
 MOYER H.G., 1979
 MUSZYNSKI F., 1981
 MYLER T.R., 1984
 MONNICH W., 1987

N

NADKARNI A.A., 1980, 1982
 NAFTEL P.B., 1985
 NAGARAJAN N., 1974, 1976
 NAQVI S., 1971
 NASA, 1976
 NEIGE S.E., 1957
 NEMEREVER W.J., 1969
 NEUMAN F., 1974, 1975, 1977, 1981, 1982,
 1983, 1984
 NEWBERY R.R., 1982
 NEWMAN T.J., 1973
 NICHOLS D.W., 1967
 NICHOLS M.A., 1973, 1974
 NICOLETTI B., 1978, 1980, 1981, 1982
 NIEUWPOORT A.M.H., 1984

O

O'BRIEN J.P., 1980, 1984, 1985
 OBERLE H.J., 1988
 OBUCHON A.M., 1958
 ODONI A.R., 1969, 1986
 OFFI D.L., 1981
 OLIVER J.G., 1982
 OLIVER R.J., 1979
 ONKEN R., 1982
 OOSTGAARD M.A., 1984
 ORNELAS J.R., 1983
 OSDER S.S., 1976
 OSTOSLAVSKI J.V., 1971
 OSTROFF A.J., 1984
 OTHLING W.L. JR., 1976
 OVERESCH E., 1963

P

PACHTER M., 1987
 PAILEN W., 1979
 PAINE J.P., 1967
 PAINTER J.A., 1973
 PANOFKY H.A., 1978
 PANOWSKY H.W., 1964
 PARIS ST., 1981
 PARK S.K., 1972, 1973
 PARKER R.H., 1968
 PARSONS M.G., 1976
 PASHINTSEV V.T., 1972
 PATMORE L.C., 1983
 PATTERSON G.A. JR., 1968
 PATTIPATI K.R., 1983
 PECKHAM D.H., 1973
 PECSVARADI T., 1975
 PELEGRIN M., 1975, 1976, 1977, 1978
 PERFITT T.E., 1982
 PERGUSON D.R., 1981
 PERRY A.E., 1984
 PETERSON R.E., 1984
 PETRIE D.M., 1968
 PFAFF T.A., 1983
 PFEFFER I., 1971
 PHILIPS CH.L., 1983
 PHILIPS F.C., 1942
 PIATELLI M., 1972
 PIERSON B.L., 1981
 PINTY B., 1983
 POLHEMUS W.L., 1963
 PONTRYAGIN L.S., 1962
 POOL D.A., 1983, 1984
 POPPLETON E.D., 1969
 PORITZKI S.B., 1971, 1986
 POSNER E.C., 1941
 POWERS W.F., 1969
 PRANDTL L., 1965
 PRICE C.B., 1984
 PRICE CH.F., 1968
 PRICE D.B., 1983
 PRICE W.L., 1974
 PRINTEMPS A., 1977
 PRITCHARD F.E., 1965, 1970
 PRONGAY D.M., 1968
 PROSKAWETZ K.O., 1987, 1988
 PSARAFTIS H.N., 1978, 1980
 PSIAKI M.L., 1984, 1986
 PYRON E., 1972

Q

QUANBECK D.B., 1982, 1983

R

RADER J.E., 1980
 RAJAN N., 1983
 RALAITISIZAFY A.M.C., 1983
 RALSTON A., 1960
 RAMLOW H.D., 1971
 RANGO A., 1978
 RATCLIFFE S., 1974, 1982, 1985
 RAWLING A.G., 1968
 RAWLINGS R., 1988
 REEVES J.B., 1972, 1973, 1974
 REEVES P.M., 1974
 REICH P.G., 1966
 REICHARDT K., 1951
 REID J.G., 1981
 REID L.D., 1978, 1981
 RENTEUX J.L., 1982, 1986, 1987
 RETTLE I., 1981
 RICCIARDELLI S., 1978, 1979, 1980 (2 x),
 1981, 1982, 1985
 RICH P.M., 1980
 RICHARDSON D.W., 1980
 RICHARDSON J., 1978
 RICKMAN D., 1984
 RINALDI G., 1979, 1985, 1987
 RINDERLE E.A., 1983
 RIVRON V., 1984
 ROBINSON A.C., 1969
 ROESSLER W.U., 1979, 1980
 ROSENEAU G., 1971
 ROSENBAUM H., 1972
 ROSSLER M., 1967
 ROUILLIER G.J., 1983, 1984
 ROYAL AERONAUTICAL SOCIETY, 1981
 ROZEMA D.J., 1977, 1978
 RUCKER R.A., 1978, 1982
 RUETENIK J.R., 1971
 RUNO ST. C., 1984
 RUSSEI M.H., 1951
 RUTOWSKI E.S., 1954
 RZEMEK K., 1974
 ROTTGER J., 1978

S

SADOUNE M., 1987
 SADOWSKY J.S., 1980
 SAINTS S., 1983
 SAJAN S., 1979
 SALAS-ROCHE F., 1986
 SALMIRS S., 1978
 SAMAKA M., 1984 (2 x)
 SAMMS K.H., 1981
 SANDELL N.R. Jr., 1983
 SANGER E., 1944
 SARABUDLA N.R., 1978
 SARGENT D., 1971
 SARTORIUS H., 1977
 SASSANO A., 1979, 1985, 1987
 SAUER P., 1981, 1983 (2 x)
 SAUNDER A.F., 1983
 SAWYER R.H., 1971
 SCHAEENZLER G., 1974, 1984
 SCHAFRANEK D., 1973, 1974
 SCHAPELLE R.M., 1970
 SCHLICHTING M., 1982
 SCHLICKENMAIER H., 1986
 SCHMID H., 1977
 SCHMIDT G., 1978
 SCHMIDT S.F., 1983
 SCHNEBLE R., 1983
 SCHOONMAKER P.B., 1972
 SCHROETER H., 1982
 SCHROPEL H., 1979
 SCHUBERT M., 1979, 1981
 SCHULTZ R.L., 1971, 1972, 1974
 SCHUST A.P. Jr., 1973
 SCHWAB R.W., 1986 (2 x)
 SCHWAB K.B., 1983, 1984
 SCHWAUSCH O.A., 1971
 SCHANZER G., 1969, 1973, 1977, 1980,
 1983, 1985, 1986, 1987,
 1988
 SCOGGINS J.L., 1987
 SEIFERT R., 1986
 SHAH N.M., 1972
 SHANGXIANG Z., 1983
 SHANNON J.A., 1982
 SHANNON J.H., 1973
 SHAPIRO N., 1975
 SHARPE T.G., 1978
 SHAU G.C., 1977
 SHAW J.M., 1986
 SHAW P.D., 1983

SHELKOVNIKOV M.S., 1983
 SHEPTUNOV V.N., 1981
 SHERMAN W.L., 1977
 SHINAR J., 1980, 1982
 SILVERTHORN J.T., 1981
 SIMMONS D.A., 1984, 1985
 SIMMONS H.I., 1985
 SIMPSON C.H., 1983
 SIMPSON R.W., 1983, 1986
 SIMPSON W.R., 1973
 SINGER R.A., 1971
 SKELTON R.E., 1971
 SKRIPNICHENKO S., 1973, 1975
 SLATER A.G.L., 1976
 SLIWA S.M., 1980
 SMITH F.D., 1984
 SMITH J.D., 1969
 SMITH J.M., 1972
 SMITH S.R., 1981
 SMITH W.D., 1983
 SMOLKA A., 1980
 SOBOCINSKI R., 1983
 SORENSEN J.A., 1979, 1981, 1983, 1984
 SOROKA B.N., 1981
 SOULAGE R.G., 1983
 SPENCER N.A., 1986
 SCHICK F.V., 1984
 SPEYER J.L., 1967, 1973, 1976, 1985,
 1988 (2 x)
 SPITZER C.R., 1986
 STARKS S.A., 1983
 STAVELAND L.E., 1987
 STEIN K.J., 1979, 1983
 STEINER J.E., 1975
 STEINMETZ G.G., 1976, 1980, 1986, 1987
 STENGEL R.F., 1976, 1982, 1983, 1984,
 1986 (2 x)
 STEVENS M.C., 1981
 STEVENS V.C., 1987
 STEVENSON L.E., 1984
 STIELER B., 1979, 1982
 STIKLE J.W., 1983
 STOREY J., 1974, 1975, 1977 (2 x), 1982
 STRASTER T.A., 1972, 1973
 STRAUCH R.G., 1983
 STRIUKOV B.A., 1980
 STUDER F.A., 1985, 1986
 SULLIVAN R.D., 1972
 SUNDERMEYER P., 1978
 SUSSMAN M.B., 1975
 SWANN M.R., 1983
 SWEDISH W.J., 1979
 SWEET W.B., 1983

SWIERSTRA S., 1974, 1975, 1976, 1977 (2 x),
 1978 (2 x), 1980 (5 x),
 1981 (2 x), 1982 (7 x),
 1983 (8 x), 1984 (4 x),
 1986 (5 x), 1987 (5 x),
 1988 (8 x)
 SWOLINSKY M., 1980, 1981, 1982, 1983,
 1984, 1986, 1988

T

TABACZYNSKI J.A., 1984
 TAPLEY B.D., 1969, 1971
 TATOM F.B., 1981
 TAYLOR G.I., 1938
 TAYLOR J.A., 1986
 TEEGAN U., 1984
 TEMPLEMAN J.E., 1968
 TERHUNE G.J., 1982
 TETZLAFF G., 1987
 THATCHER R.M., 1971
 THELANDER J.A., 1970
 THOMAS H.W., 1982
 THOMAS J., 1982
 THOMASSON F.Y., 1971, 1973
 THOMPSON J.H., 1971
 THORNE B., 1980
 THORPE A.S., 1980
 THRASHER G.J., 1969
 THRIFT P.R., 1981
 TIANO A., 1972
 TIETZE J.L., 1974
 TOBIAS L., 1972, 1974, 1980, 1983, 1985, 1986,
 1987
 TOKAMATA Y., 1970
 TRIVIZAS D.A., 1985, 1987
 TROMBLEY, 1960
 TSE E., 1982
 TURKEL B.S., 1982
 TURNER R.E., 1983
 TZENG C.Y., 1987

U

UCKERMANN R., 1984
 ULBRICHT H., 1980
 URBAN L.J., 1980
 URBATZKA E., 1984
 USAF, 1976
 USKOV G.V., 1972
 USRY J.W., 1984

V

VACHIERY V., 1986
 VAGNERS J., 1981, 1982, 1983
 VAN DE MOESDIJK G.A.J., 1975
 VAN DINE C.P., 1969
 VAN GOOL M.F.C., 1981, 1982, 1983
 VANDENBROUCKE A., 1986
 VANDER VELDE W.E., 1969
 VENKATARAMAN P., 1984, 1985
 VERNET J.F., 1969
 VERNON M.D., 1962
 VICROY D.D., 1984, 1985
 VINCENT T.L., 1966
 VINH N.X., 1980, 1981, 1983, 1985, 1988
 VIVIER C., 1973
 VOELCKERS U., 1979, 1981, 1983, 1986
 VOERSMANN P., 1980, 1981, 1982, 1984
 VOIGT J., 1979

W

WAHI K.M., 1977
 WALBEER G.D., 1985
 WALDMAN R.H., 1969
 WALSH TH.M., 1978
 WANG H., 1988
 WANG T., 1985, 1986 (5 x), 1987 (4 x), 1988 (6 x)
 WANG W., 1988
 WANNEER J.C., 1969
 WARKSON M.A., 1969
 WARNER D.N., 1974
 WARNOCK A., 1975
 WASHBURN R.B. Jr., 1979
 WATERS M.H., 1970, 1981, 1983
 WAUER J.C., 1981
 WEDEL D., 1976
 WEENER E.F., 1978
 WEIHS D., 1974
 WEINGARTEN N.C., 1981
 WEIR D.H., 1970, 1971
 WEIR D.J., 1971
 WEISS H.G., 1968
 WEIZSACKER C.F., 1948
 WELL K.H., 1977, 1982
 WELLING O., 1941
 WESTDIJK J.A., 1984
 WESTON J.L., 1981
 WESTWATER E.R., 1983
 WHITE F.M., 1974
 WHITE J.A., 1975
 WHITE K.C., 1974
 WHITE W.F., 1978
 WHITON R.C., 1980
 WIE S.Y., 1984
 WIGGS J.F., 1982
 WILLEMS P.Y., 1981
 WILLETT F.M., 1968, 1980
 WILLIAMS C.H., 1966
 WILLIAMS D.H., 1986, 1987
 WILLIAMS J., 1973
 WILLIAMS J.E.D., 1969
 WILLIAMSON W.E., 1975, 1979, 1982
 WILLOUGHBY W., 1981
 WILSON J.W., 1983 (2 x)
 WILSON R.F., 1983
 WILT M.V.D., 1977
 WILZ R.R., 1975
 WINGROVE R.C., 1987
 WINN M.W., 1971
 WINTER H., 1980, 1982
 WINTERMOYER H.C., 1979
 WISHNER R.P., 1982
 WISMOR D.A., 1971
 WOLF T.D., 1983
 WOOD J.F., 1983
 WOODFIELD A.A., 1983
 WRIGHT F.F., 1979
 WRIGHT P.H., 1979
 WUEST W., 1978, 1980
 WUST P., 1977
 WOERSMANN P., 1983

Y

YAER T.J., 1985
 YAVIN Y., 1987
 YOUNG J.C., 1981
 YOUNG W.L., 1982

Z

ZAGALSKY N.R., 1971, 1972
 ZANELLI R., 1981
 ZARETT H., 1971
 ZELLWEGER A., 1987
 ZHU S., 1981, 1983, 1985, 1987
 ZRNIC D.S., 1982, 1983
 ZVARA J., 1973

PART XI

List of Contributors

A — Contributors and Affiliations

B — Index

PART XI-A - CONTRIBUTORS AND AFFILIATIONS

BELGIUM (B)

=====

Benoît, André, Ir., Dr.,
(Programme Director and Editor)

Université Catholique de Louvain
Faculté des Sciences Appliquées (MEMA)
Place du Levant, 2
B-1348 Louvain-La-Neuve.

Delnatte, Yves, Commandant, Ir.
(Author)

SABENA, Belgian World Airlines
Direction des Opérations
Aéroport de Bruxelles-National
B-1930 Zaventem.

Haus, Frédéric, Pr. Emeritus
(Author)

Universités de Liège et de Gand
Rue Colonel Chaltin, 99
B-1180 Bruxelles.

Willems, Pierre-Yves, Pr.
(Author)

Université Catholique de Louvain
Faculté des Sciences Appliquées (AUTO)
Place du Levant, 2
B-1348 Louvain-La-Neuve.

CANADA (CDN)

=====

Etkin, Bernard, Pr.
(Author)

University of Toronto
Institute for Aerospace Studies
Dufferin Street, 4925
Downsview, Ontario M3H 5T6.

Etkin, David A.
(Author)

Canadian Climate Center
Atmospheric Environment Center
Downsview, Ontario M3H 5T6.

EUROCONTROL (EU)

=====

EUROPEAN ORGANISATION FOR THE SAFETY OF AIR NAVIGATION
ORGANISATION EUROPEENNE POUR LA SECURITE DE LA NAVIGATION AERIENNE

Benoît, André, Ir., Dr.,
(Author)

EUROCONTROL HEADQUARTERS
Engineering Directorate
Rue de la Loi, 72
B-1040 Bruxelles.

Cox, Maurice
(Author)

EUROCONTROL HEADQUARTERS
Engineering Directorate
Rue de la Loi, 72
B-1040 Bruxelles.

Garcia Avello, Carlos, Ir.
(Author)

EUROCONTROL HEADQUARTERS
Engineering Directorate (consultant)
Rue de la Loi, 72
B-1040 Bruxelles.

Kraan, P. van der, Ir.
(Author)

EUROCONTROL HEADQUARTERS
Engineering Directorate
Rue de la Loi, 72
B-1040 Bruxelles.

Swierstra, Sip
(Author)

EUROCONTROL HEADQUARTERS
Engineering Directorate
Rue de la Loi, 72
B-1040 Bruxelles.

Vachiéry, Victor, Ir.
(Author)

EUROCONTROL HEADQUARTERS
Engineering Directorate
Rue de la Loi, 72
B-1040 Bruxelles.

FRANCE (F) =====

Baud, Pierre
(Co-ordinator)

Airbus Industrie
Division des Vols
Rond-Point M. Bellonte, 1
F-31707 Blagnac Cedex.

Camus, Paul
(Author)

Airbus Industrie
Group Manager Flight Controls
Rond-Point M. Bellonte, 1
F-31707 Blagnac Cedex.

Carel, Olivier, Ir.
(Author)

S.T.N.A.-3
Rue Lecourbe, 246
F-75015 Paris.

Fouillot, J.P., Dr.
(Author)

Laboratoire de Physiologie
Faculté de Médecine, Cochin,
Rue du Faubourg St Jacques, 24
F-75104 Paris.

Huynh, H.T.
(Author)

O.N.E.R.A.
Av. de la Division Leclerc, 29
F-92320 Chatillon-sous-Bagneux.

Imbert, Nicole, Ir.
(Author)

C.E.R.T.
B.P. 4025
Av. E. Belin, Complexe Aérospatial
F-31055 Toulouse.

Monteil, C., Ir.
(Author)

Airbus Industrie
Operations Engineering, Flight Division
Rond-Point M. Bellonte, 1
F-31707 Blagnac Cedex.

Pélegrin, Marc, Dr., Ing. Général
(Author, Co-ordinator, GCP)

C.E.R.T.
Complexe Aérospatial, BP 4025
Avenue E. Belin, 2
F-31055 Toulouse Cedex.

Speyer, Jean-Jacques, Ir.
(Author)

Airbus Industrie
Rond-Point M. Bellonte, 1
F-31707 Blagnac Cedex.

GERMANY (G)

=====

Brockhaus, Rudolf, Pr. Dr.- Ing.
(Author)

Institut fuer Flugfuehrung Braunschweig
Technische Universitaet Braunschweig
Hans-Sommer-Strasse, 66
D-3300 Braunschweig.

Fricke, M., Pr. Dr.-Ing.
(Author)

Technische Universitaet Berlin (Sekt F3)
Institut fuer Luft-und Raumfahrt
Marchstrasse, 14
D-1000 Berlin 10.

Gunther, F.,
(Co-ordinator)

Bundesministerium der Verteidigung
RuFo 4
Postfach 13 28
D-5300 Bonn.

Hörmann, Andreas, Dr.-Ing.
(Author)

Technische Universitaet Berlin
Fachgebiet Flugfuehrung und Luftverkehr
Marchstrasse, 14
D-1000 Berlin 10.

Schänzer, G., Pr.
(Author)

Institut fuer Flugfuehrung Braunschweig
Technische Universitaet Braunschweig
Hans-Sommer-Strasse, 66
D-3300 Braunschweig.

Winter, Heinz, Dr.-Ing.
(Co-ordinator, GCP)

D.F.V.L.R.
Flughafen
D-33 Braunschweig.

GREECE (GR)

=====

Lefas, Chris C., Dr.
(Author)

NRC Democritos, Dept. of Electronics
P.O. Box 60228
153, 10 A Paraskevi
G-Athens.

ITALY (I)

=====

Bianco, Lucio, Pr.
(Author)

Consiglio Nazionale delle Ricerche
Viale Manzoni, 30
I-00185 Roma.

NETHERLANDS (NL)

=====

Beers, J.N.P., Ir.
(Author)

National Aerospace Laboratory (NLR)
Anthony Fokkerweg, 2
NL-1059 CM Amsterdam.

Blom, H.A.P., Ir.
(Author)

National Aerospace Laboratory (NLR)
Anthony Fokkerweg, 2
NL-1059 CM Amsterdam.

Dalm, T.B., Ir.
(Author)

National Aerospace Laboratory (NLR)
Anthony Fokkerweg, 2
NL-1059 CM Amsterdam.

Have, J.M. ten, Ir.
(Author)

National Aerospace Laboratory (NLR)
Anthony Fokkerweg, 2
NL-1059 CM Amsterdam.

Hogendoorn, R.A., Ir.
(Author)

National Aerospace Laboratory (NLR)
Anthony Fokkerweg, 2
NL-1059 CM Amsterdam.

Schaik, F.J. van, Ir.
(Author)

National Aerospace Laboratory (NLR)
Anthony Fokkerweg, 2
NL-1059 CM Amsterdam.

Visscher, H.
(Author)

The Netherlands Department of
Civil Aviation (RLD)
PO Box 7601, Havenmeesterweg
NL-1118 ZJ Schiphol.

UNITED KINGDOM (UK)

=====

Attwool, Victor
(Author)

Civil Aviation Authority House
D PA3 Room T 1311
Kingsway 45-59
GB-LONDON WC2 B6TE.

Forrester, D.A.
(Author)

Regional Meteorological Office
London Road
GB-Bracknell, RG12 2SZ.

Hollington, John.
(Co-ordinator, GCP)

Smiths Industries
Aerospace and Defence Systems
Bishops Cleeve
GB-Cheltenham, Glos. GL5 24SF.

McLean, D., Pr.
(Author)

Westland Professor of Aeronautics
University of Southampton
GB-Southampton SO9 5NH.

Ratcliffe, Stanley
(Author)

ATC System Analyst
Mason Close, 2
GB-Malvern WR14 2NF.

U.S.A. (US)
=====

Blomberg, R. D.
(Author)

Dunlap & Associates, Inc.
17, Washington Street,
USA-Norwalk, Connecticut 06854

Capron, R.
(Author)

NASA
Advanced Transport Operating
System Program Office
USA-Hampton, Virginia 23665.

Credeur, Leonard
(Author)

NASA Langley Research Center
Advanced Transport Operating
System Program Office
USA-Hampton, Virginia 23665.

Davis, Thomas J.
(Author)

NASA Ames Research Center
MS 210-9
USA-Moffett Field, CA94035.

Erwin Jr, Ralph L.
(Author)

Boeing Commercial Airplanes
Mailstop 9W-38, P.O. Box 3707
USA-Seattle, Washington 98124-2207.

Erzberger, Heinz, Dr.
(Author)

NASA
Ames Research Center
MS 210-9
USA-Moffett Field, CA 94035.

Green, Steven M.
(Author)

NASA
Ames Research Center
MS 210-9
USA-Moffett Field, CA 94035.

Howell, William E.
(Co-ordinator)

NASA
Langley Research Center
USA-Hampton, Virginia 23665.

Howells, Peter J.
(Author)

Smiths Industries
Aerospace Defense Systems, Mail Stop 240
4141 Eastern Avenue, S.E.
USA-Grand Rapids, MI49518-8727.

Izumi, K.H.
(Author)

Boeing Commercial Airplanes
Mail Stop 9W-38, PO Box 3707
USA-Seattle, Washington DC98124-2207.

Knox, Charles E.
(Author)

NASA Langley Research Center
Advanced Transport Operating System
Program Office
USA-Hampton, Virginia 23665.

McIver, Duncan E.
(Co-ordinator, GCP)

NASA Headquarters
Independence Avenue, 600 SW
USA-Washington, DC20546.

Miele, Angelo, Pr.
(Author)

Rice University
Aero-Astronautics Group
230 Ryon Building, P.O.B. 1892
USA-Houston, Texas 77251.

Simpson, Robert, Pr.
(Author)

Massachussets Institute of Technology
Dept.of Aeronautics and Astronautics
Building 33, Room 411
USA-Cambridge, MA02139.

Vicroy, Dan D.
(Author)

NASA Langley Research Center
Advanced Transport Operating
System Program Office
USA-Hampton, Virginia 23665.

Williams, David H.
(Author)

NASA Langley Research Center
Advanced Transport Operating System
Program Office
USA-Hampton, Virginia 23665.

PART XI-B - INDEX

INDEX OF CONTRIBUTORS' NAMES

This index presents in alphabetical order the names of the authors of contributions to this AGARDograph. For each author, it gives the reference of the paper (Ref.) and the affiliation as listed in Part XI-A (Loc.).

Attwooll, Victor, U.K., Author, Ref. 22, Loc. p. C-8

Baud, Pierre, France, Co-ordinator, Loc. p. C-6

Beers, J.N.P., Netherlands, Author, Ref. 16, Loc. p. C-8

Benoît, André, EUROCONTROL, Author, Refs. 12,17,20,23,29,30,32,38, Loc. p. C-5

Benoît, André, Belgium, Programme Director and Editor, Loc. p. C-5

Bianco, Lucio, Italy, Author, Ref. 18, Loc. p. C-7

Blom, H., Netherlands, Author, Ref. 34, Loc. p. C-8

Brockhaus, Rudolf, Germany, Author, Ref. 3, Loc. p. C-7

Camus, Paul, France, Author, Ref. 8, Loc. p. C-6

Capron, R., U.S.A., Author, Ref. 27, Loc. p. C-9

Carel, Olivier, France, Author, Ref. 36, Loc. p. C-6

Cox, M.E., EUROCONTROL, Author, Ref. 37, Loc. C-5

Credeur, Leonard, U.S.A., Author, Ref. 27, Loc. p. C-9

Dalm, T.B., Netherlands, Author, Ref. 16, Loc. p. C-8

Davis, Thomas J., U.S.A., Author, Ref. 31, Loc. p. C-9

Delnatte, Yves, Belgium, Author, Ref. 38, Loc. p. C-5

Erwin Jr, Ralph L., U.S.A., Author, Ref. 28, Loc. p. C-9

Erzberger, Heinz, U.S.A., Author, Ref. 31, Loc. p. C-9

Etkin, Bernard, Canada, Author, Ref. 5, Loc. p. C-5

Etkin, David A., Canada, Author, Ref. 5, Loc. p. C-5

Forrester, D.A., U.K., Author, Ref. 37, Loc. p. C-8

Fouillot, J.P., France, Author, Ref. 11, Loc. p. C-6

Fricke, M., Germany, Author, Ref. 39, Loc. p. C-7

Garcia Avello, Carlos, EUROCONTROL, Author, Ref. 19, Loc. p. C-5

Green, Steven M., U.S.A., Author, Ref. 31, Loc. p. C-9

Gunther, F., Germany, Co-ordinator, Loc. p. C-7

Haus, Frédéric, Belgium, Author, Ref. 1, Loc. p. C-5

Have, J.M. ten, Netherlands, Author, Ref. 16, Loc. p. C-8

Hollington, John, U.K., Co-ordinator, Loc. p. C-8

Howell, William E., U.S.A., Co-ordinator, Loc. p. C-9

Howells, Peter J., U.S.A., Author, Ref. 10, Loc. p. C-9

Huynh, H.T., France, Author, Ref. 4, Loc. p. C-6

Hörmann, Andreas, Germany, Author, Ref. 39, Loc. p. C-7

Imbert, Nicole, France, Author, Ref. 21, Loc. p. C-6

Izumi, K.H., U.S.A., Author, Ref. 28, Loc. p. C-10

Knox, Charles E., U.S.A., Author, Ref. 25, Loc. p. C-10

Kraan, P. van der, EUROCONTROL, Author, Ref. 33, Loc. p. C-6
Lefas, Chris C., Greece, Author, Ref. 35, Loc. p. C-7
McIver, Duncan E., U.S.A., Co-ordinator GCP, Loc. p. C-10
McLean, D., U.K., Author, Ref. 7, Loc. p. C-9
Miele, A., U.S.A., Author, Ref. 2, Loc. p. C-10
Monteil, C., France, Author, Ref. 11, Loc. p. C-6
Pélegrin, Marc, France, Co-ordinator GCP, Author, Ref. 21, Loc. p. C-6
Ratcliffe, Stanley, U.K., Author, Ref. 14, Loc. p. C-9
Schänzer, G., Germany, Author, Refs. 6,9, Loc. p. C-7
Simpson, Robert, U.S.A., Author, Ref. 26, Loc. p. C-10
Speyer, Jean-Jacques, France, Author, Ref. 11, Loc. p. C-7
Swierstra, Sip, EUROCONTROL, Author, Refs. 12,17,23,29,30,32,38, Loc. p. C-6
Vachiéry, Victor, EUROCONTROL, Author, Ref. 13, Loc. p. C-6
Vicroy, Dan D., U.S.A., Author, Ref. 24, Loc. p. C-10
Visser, H., Netherlands, Author, Ref. 16, Loc. p. C-8
Willems, Pierre-Yves, Belgium, Author, Ref. 15, Loc. p. C-5
Williams, David H., U.S.A., Author, Ref. 25, Loc. p. C-10
Winter, Heinz, Germany, Co-ordinator GCP, Loc. p. C-7

REPORT DOCUMENTATION PAGE

1. Recipient's Reference	2. Originator's Reference AGARD-AG-301 Volume 3	3. Further Reference ISBN 92-835-0563-8	4. Security Classification of Document UNCLASSIFIED
5. Originator	Advisory Group for Aerospace Research and Development North Atlantic Treaty Organization 7 rue Ancelle, 92200 Neuilly sur Seine, France		
6. Title	AIRCRAFT TRAJECTORIES — Computation — Prediction — Control VOLUME 3		
7. Presented at			
8. Author(s)/Editor(s) Various	Edited by André Benoit		9. Date May 1990
10. Author's/Editor's Address Various			11. Pages 158
12. Distribution Statement	This document is distributed in accordance with AGARD policies and regulations, which are outlined on the Outside Back Covers of all AGARD publications.		
13. Keywords/Descriptors Computation Prediction Control	Bibliography Abstracts Contributors to AG-301		
14. Abstract	This volume — part of a set of three — is composed of a short introduction, a Book of Abstracts of the 39 papers included in the overall work, an extensive Bibliography which incorporates, in particular, most of the references cited by the 56 authors and co-authors, and a List of Contributors ordered by countries alphabetically. Both the Bibliography and the List of Contributors are each completed by an adequate index. This AGARDograph has been sponsored by the Guidance and Control Panel of AGARD.		

AGARDograph No.301 Volume 3 Advisory Group for Aerospace Research and Development, NATO AIRCRAFT TRAJECTORIES: COMPUTATION — PREDICTION — CONTROL. VOLUME 3 Edited by André Benoit Published May 1990 158 pages This volume — part of a set of three — is composed of a short introduction, a Book of Abstracts of the 39 papers included in the overall work, an extensive Bibliography which incorporates, in particular, most of the references cited by the 56 authors and co-authors, and a List of Contributors ordered by countries alphabetically. P.T.O.	AGARD-AG-301 Vol.3 Computation Prediction Control Bibliography Abstracts Contributors to AG-301	AGARDograph No.301 Volume 3 Advisory Group for Aerospace Research and Development, NATO AIRCRAFT TRAJECTORIES: COMPUTATION — PREDICTION — CONTROL. VOLUME 3 Edited by André Benoit Published May 1990 158 pages This volume — part of a set of three — is composed of a short introduction, a Book of Abstracts of the 39 papers included in the overall work, an extensive Bibliography which incorporates, in particular, most of the references cited by the 56 authors and co-authors, and a List of Contributors ordered by countries alphabetically. P.T.O.	AGARD-AG-301 Vol.3 Computation Prediction Control Bibliography Abstracts Contributors to AG-301
AGARDograph No.301 Volume 3 Advisory Group for Aerospace Research and Development, NATO AIRCRAFT TRAJECTORIES: COMPUTATION — PREDICTION — CONTROL. VOLUME 3 Edited by André Benoit Published May 1990 158 pages This volume — part of a set of three — is composed of a short introduction, a Book of Abstracts of the 39 papers included in the overall work, an extensive Bibliography which incorporates, in particular, most of the references cited by the 56 authors and co-authors, and a List of Contributors ordered by countries alphabetically. P.T.O.	AGARD-AG-301 Vol.3 Computation Prediction Control Bibliography Abstracts Contributors to AG-301	AGARDograph No.301 Volume 3 Advisory Group for Aerospace Research and Development, NATO AIRCRAFT TRAJECTORIES: COMPUTATION — PREDICTION — CONTROL. VOLUME 3 Edited by André Benoit Published May 1990 158 pages This volume — part of a set of three — is composed of a short introduction, a Book of Abstracts of the 39 papers included in the overall work, an extensive Bibliography which incorporates, in particular, most of the references cited by the 56 authors and co-authors, and a List of Contributors ordered by countries alphabetically. P.T.O.	AGARD-AG-301 Vol.3 Computation Prediction Control Bibliography Abstracts Contributors to AG-301

Both the Bibliography and the List of Contributors are each completed by an adequate index. This AGARDograph has been sponsored by the Guidance and Control Panel of AGARD. ISBN 92-835-0563-8	Both the Bibliography and the List of Contributors are each completed by an adequate index. This AGARDograph has been sponsored by the Guidance and Control Panel of AGARD. ISBN 92-835-0563-8
Both the Bibliography and the List of Contributors are each completed by an adequate index. This AGARDograph has been sponsored by the Guidance and Control Panel of AGARD. ISBN 92-835-0563-8	Both the Bibliography and the List of Contributors are each completed by an adequate index. This AGARDograph has been sponsored by the Guidance and Control Panel of AGARD. ISBN 92-835-0563-8