

## Preface

The 11th Congress of the International Council of the Aeronautical Sciences (ICAS), of which this volume is the Proceedings, is being held in the superb conference centre of the Calouste Gulbenkian Foundation Headquarters in Lisbon, Portugal, from September 10 - 16, 1978, under the distinguished patronage of His Excellency, The President of the Republic, and under the auspices of the Grupo Português De Aeronáutica, our host society. All the arrangements for the Congress in Lisbon have been under the direction of the Organizing Committee of the Grupo Português De Aeronáutica whose Chairman, Prof. Dr.-Ing. Arthur Varela Cid, is a member for many years of the Council of ICAS. Thus ICAS begins its third decade of operations with a return to the European Continent, after holding its first congress on the North American Continent (Ottawa, Canada, 1976).

The Opening Session, commencing at 9.00 am on Monday, September 11, will feature a number of welcoming addresses by distinguished Portuguese officials and the President of ICAS, Dr. J. J. Green. Dr. A. V. Cid will present the opening lecture, and there will be a short presentation by Mr. Winfield H. Arata of the American Institute of Aeronautics and Astronautics, in celebration of the 75th anniversary of the Wright brothers' historic first flight. The session will close with the presentation of the Daniel and Florence Guggenheim Memorial Lecture on "The Role of Wind Tunnel Testing in Future Aircraft Development", by Mr. R. Smelt, Vice President & Chief Scientist (ret.), Lockheed Aircraft Corporation.

A total of 67 papers from 16 countries are scheduled for delivery in the five days of the Congress, with a break for a field trip on the Wednesday afternoon. This is a significantly greater number of papers than in past congresses and indicates, perhaps, an intensification of the problems in aeronautics and ICAS's concern with them. At the 1976 congress, it was gratifying to note that five of the papers were jointly authored by men from different countries. This fine spirit of international co-operation continues to manifest itself in the program of this Congress, which contains six papers with joint authors from Federal Republic of Germany, France, India, Netherlands, Sweden, United Kingdom and United States of American. The stimulation of truly co-operative international programs in aeronautics continues to be a firm objective of ICAS.

An important facet of ICAS's objectives is to focus its attention on those specific problems which have seemed, from time to time, to bar the further progress of aviation. A review of the programs of past congresses reveals quite clearly how, over the last 20 years, ICAS has arranged the various sessions to spotlight these critical problem areas and has drawn on the world's outstanding experts in the appropriate fields to lecture on and discuss in a fundamental scientific manner these basic problems.

The program for this 11th Congress continues this tradition. Beginning on day one of the Congress, ICAS addresses itself to the challenge of the fuel crisis - a problem equal to, if not greater than, any problem ever faced by aviation in the past. In both the aerodynamic and aircraft structure sessions, the papers are manifestations of this challenge. In the latter case, the theme of composite structures continues the analysis of this area of materials technology which ICAS began to look at some years ago, when the possibilities were first being apprehended.

The modern computer, a powerful development from electronic technology, is profoundly influencing every aspect of our lives. It was adopted in the field of aircraft design almost from the beginning. It should not be surprising, therefore, that at this Congress we are devoting four sessions (two full days) to Computational Aerodynamics.

In the field of aircraft structures the everlasting problems of fatigue life and fracture mechanics are appearing again at this Congress, made more serious, perhaps, as the pressure increases on structural weight reduction to help meet the fuel crisis. Modern methods for optimization of design and automated design are seen as important developments reflected in the various papers to be given in the Aircraft Structures sessions, so is the question of better integration of engine and airframe.

New frontiers of aviation are explored from V/STOL and short haul aircraft at the lower end of the speed range, to hypersonic cruise vehicles at the extreme upper end. A session is devoted to each of these subjects.

The ICAS spotlight on Aviation as a Transport System continues our exploration of earlier congresses into the noise and environmental problems associated with aviation, surely two areas of obvious major concern to both the public and the specialists.

Last, but by no means least, in the dynamic technology of aeronautics a constant drive is maintained for new research and development tools (the modern computer is an example), new ways to use, or interpret the results from, the tools we already have, and new ways to approach old tasks. Especially active in this regard is the field of wind tunnel design and utilization, to which one whole day of the Congress is devoted, in addition to Mr. Smelt's Guggenheim Lecture which should set the tone and theme for the discussions which follow later in the week. One session is to be devoted to Flight and Ground Testing, which reflects new approaches to a subject which is at least as old as aviation itself, if not older.

In addition to the Guggenheim Lecture, there are four other lectures which are deemed to be of sufficiently wide interest and importance to warrant the title of 'General Lecture', which can be attended by all delegates to the Congress, in plenary session. The remaining, specialist lectures will be given, as in the past, in parallel simultaneous sessions.