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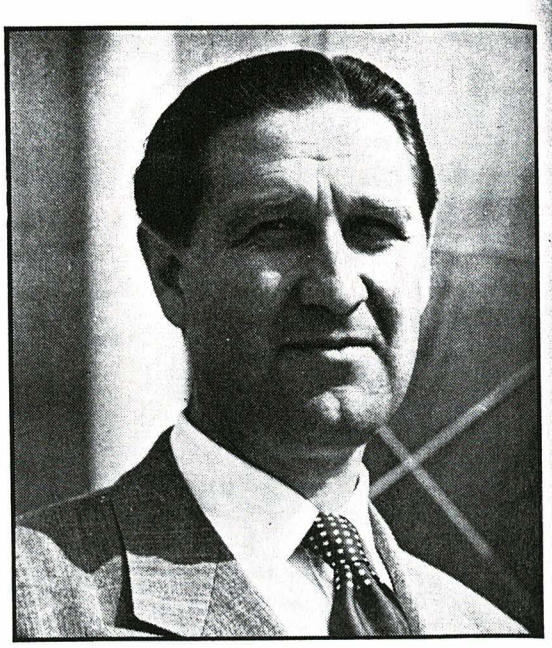
Patterson Heads CAI; Floyd Wins McCurdy Award

Meeting hears fifteen technical papers on production engineering, computers applications, ground equipment and VTOL STOL developments.



DR. GORDON PATTERSON

DR. GORDON PATTERSON was elected president for 1958-59, of the Canadian Aeronautical Institute at the technical organization's annual meeting, held this year in Toronto's King Edward Hotel, May 26 and 27. Dr. Patterson, who is director of the University of Toronto's Institute of Aerophysics, succeeds Group Captain H. R. Foottit, Assistant for Arrow Weapon System at AFHQ. As past president, G/C Foottit continues as a member of the CAI council.

Vice president of the CAI for 1958-59 is Dr. D. C. MacPhail, director of the NRC's Mechanical Engineering Div., and also of the National Aeronautical Establishment.

Honors and Awards: The meeting also provided the stage for the awarding of the McCurdy Award, which went this year to James C. Floyd, vice president, engineering for Avro Aircraft Ltd. The citation accompanying the award said of Mr. Floyd that . . .

JAMES C. FLOYD

"His sustained leadership over several years, in co-ordinating the activities of a very large and competent engineering team, has been a dominant factor in the creation of the CF-100 and the Arrow, two outstanding first-line fighters designed and manufactured in Canada. He has carried his responsibilities not only with efficiency but with vision and enterprise."

Honorary fellowships were announced for James Young, chairman of the board of Canadian Pratt & Whitney Aircraft Co. Ltd.; J. H. Parkin, consultant to, and formerly director of, the NRC's Mechanical Engineering Div. and the National Aeronautical Establishment; Air Vice Marshal T. N. Cowley, retired DoT Director of Air Services and now de Havilland Canada's general representative for British Columbia; Lt. Gen. D. L. Putt, formerly commanding general of the USAF's Air Research & Development Command and, more recently, Deputy Chief of Staff, Development, USAF.

Winner of the F. W. (Casey) Baldwin Award for the best paper published in the *CAI Journal* in 1957 went to C. I. Soucy, author of a paper titled "Reliability Control of Electronic Equipment in Aircraft and Weapon Systems; General and Management Aspects". The paper appeared in the September, 1957, edition of the Journal. Mr. Soucy is attached to the RCAF's Air Materiel Command.

The W. Rupert Turnbull Lecture was given by Dr. A. E. Russell, director and chief engineer of Bristol Aircraft Co. Ltd., whose subject was "Some Recent Aids to Aircraft Design."

Principal speaker at the CAI annual dinner was Dr. A. H. Zimmerman, chairman of the Defence Research Board, who outlined "The Role of Science in Defence".

Technical Papers

FOR THOSE who attended the meeting to broaden their knowledge of the aeronautical and ancillary sciences, there were 15 technical papers from which to choose. These cover such varied areas as engineering administration, production engineering, computers, ground equipment, and VTOL/STOL. Brief abstracts from most of these papers follow. Missing are "Computer Application to Fuel System Design & Development", by J. M. Tusiewicz, Lucas-Rotax Ltd., and "Experimental Techniques in the Development of STOL Aircraft", by Dr. G. W. Johnston and Dr. D. H. Henshaw, The de Havilland Aircraft of Canada.

The Arrow Weapon System and Organization for Service Management—Wing Commander D. W. Goss, RCAF.

The increasing complexity of the Arrow Weapon System, along with the history of experience with CF-100 development, made it apparent about a year ago that the RCAF method of development control needed to be re-examined. Prior to this, responsibility for the Arrow project was divided between numerous separate directorates within AFHQ and several in AMC; considerable difficulty was being experienced in producing the weapon system in which the various components were compatible in schedule and size, neither

over nor under designed. It was, therefore, considered desirable that one agency should be primarily responsible for co-ordinating all aspects of the Arrow Weapon System. The outcome was the formation of an organization known as the Office of the Assistant for the Arrow Weapon System (AAWS).

Some Applications of Parkinson's Law—S. L. Britton, Orenda Engines Ltd.

One of the major factors in the growth of modern industry has been its receptiveness to new technological developments. To keep abreast of these developments, whose complexity has increased and is increasing at a geometric rate, industry has been crying incessantly for more and more engineers and technicians to cope with design, development and manufacturing problems. However, today the skills and training of engineers are needed just as much in the direction of control as they are in the direction of the purely technical operations.

Tooling Approach to the Avro Arrow Aircraft—E. B. Bragg, Avro Aircraft Ltd.

The Arrow is an extremely high performance aircraft necessitating a high degree of envelope accuracy and surface smoothness to achieve the required aerodynamic efficiency. For this reason, Avro management established a basic policy which governs the whole engineering and manufacturing approach to production. An important part of this policy was that production tooling would be provided for an agreed production rate from the first aircraft. The reasons here are obvious, since such a highly complex piece of equipment requires a degree of tooling sufficient to ensure the product quality in itself, regardless of quantity, and also that a prototype program requiring extensive tooling readjustment for production would involve a prohibitive addition to flow time.

Problems of Precision Production—F. W. Taggart, Aviation Electric Ltd.

A decision to enter the precision production field means a decision that normal production problems of supplies, manpower, equipment, prices and customer reaction, etc., are too mundane. The fact has been accepted that it is preferable to make a dollar the hard way. The problems of precision production are illustrated by the case history of Aviation Electric's experience in the production of a ball resolver.

The Birth of a STOL Landing Gear—Leo Vadeboncoeur, Jarry Hydraulics.

Paper deals with the production point of view in relation to the landing gear for the de Havilland DHC-4 Caribou. Jarry Hydraulics had 14 months to finalize design, release production drawings, conduct a certain amount of development, procure the forgings and raw material as well as purchased parts, manufacture, assemble and production test the first set of gear before delivery. In view of the fact that the initial order was more a pre-production quantity rather than a number of prototypes, the first sets of gear were manufactured with production tooling.

Electronic Computers in the Aviation Industry—G. S. Glinski, ElectroData Div., Burroughs Adding Machine of Canada Ltd.

The first step in the solution of an engineering problem is the description of the problem in mathematical form. This usually involves a considerable idealization of the original problem. The result of this first step is known as the mathematical model or mathematical analogue of the original problem. This analysis step will be the same whether or not the computers are used later. The computers enter the second step of the solution when, instead of performing manual computations, a physical system (computer) is set up which ideally will obey the same mathematical relationships as the mathematical model of the first step. The result of this second step is known as the physical model or physical analogue of the mathematical model. It can also be said that the physical analogue simulates, or is a simulator, of the original problem. The simulation step is the principal subject of this paper.

Applications of a Large-Scale Digital Computer in Aircraft Design & Development—A. O. Downing, Avro Aircraft Ltd.

The digital computer, in slightly more than a dozen years, has advanced from the experimental state to become a dependable essential for science, business and industry. This short period has seen computing speeds increase by a factor of 100,000, memory capacity and reliability by a factor of several hundred. The potential computer user has a multitude of proven machines of varying capacity to choose from and a wealth of experience to guide him. Nowhere has the appearance of the computer been more welcome than in the aircraft industry. Digital computation became essential for the airframe and aircraft engine designers at an early stage of computer development.

The Application of Analogue Computers to Guided Missile Design—W. S. Kozak, Canadian Westinghouse Co. Ltd.

This paper's almost overriding concern with the analogue computer's contribution in this regard is not meant to boost its singular importance over other fields but, by inference, accentuate the necessity for a full appreciation of these fields for successful analogue simulation. The analogue computer, on account of its inherent capability of providing contin-

(Continued on page 90)

680 SUPER ON SURVEY

The Department of Mines & Technical Surveys has leased an Aero Commander 680 Super from Commander Aviation Ltd., to be used on a Decca-controlled survey project in the Maritimes. The aircraft will be flown this summer by crews of Spartan Air Services Ltd. Spartan's technical people have converted the aircraft for survey work.

Purpose of the survey is to build up geological information of the Maritime area through the use of airborne magnetic instruments. Plans call for the Aero Commander to fly more than 700 hours this summer, covering more than 110,000 line miles with the magnetometer and aerial camera. Main operating bases will be St. John and Moncton in New Brunswick, and Sydney and New Glasgow in Nova Scotia.

Areas to be covered are: all of P.E.I. and north to Anticosti Island and the Magdelines; east-central New Brunswick, and central Nova Scotia and the Bay of Fundy.

Two three-man crews made up of pilot, navigator and electronics technician, backed up by ground crews, will man the aircraft. The executive passenger seating has been removed to make room for magnetometer instrumentation.

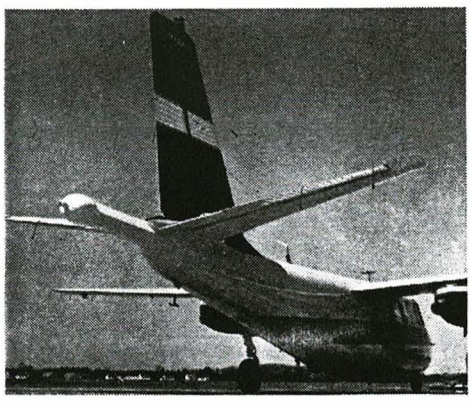
Most striking of the modifications to the aircraft is the tail boom magnetometer. The existing tail cone was cut, reinforced and fitted with a metal housing for the survey instrument. A sensitive bulb completes the installation.

The program to be handled this year by the Aero Commander has been flown for the past eight years by Spartan crews with a Canso aircraft. The Canso being much larger and slower than the Commander, this year's program is in the line of an experiment at cutting costs with a smaller and faster aircraft with its smaller crew and easier maintenance.

A Mark 8 Decca navigation system was installed in the aircraft as an aid to accurate air survey navigation, using the newly opened Quebec-Maritimes Decca chain.

The Decca information is presented on four Decca dials and the characteristic Decca map and pen setup. The Decca dials in the Commander will be continuously photographed by a 16 mm recording camera for future use.

Other flight aids incorporated in the aircraft are: Sperry Gyrosyn C-4 compass; Hamlyn HTR-10 radio; dual ARC-21 radio compasses; a Narco Sapphire VHF radio; and an APN-1 radio altimeter. In addition, a continuous strip film camera shoots the ground recording flight path on film.



Magnetometer installation was made by Spartan on Aero Commander leased from Commander Aviation for Government survey.