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Memorandum M-2021

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Air Traffic Control Project
Servomechanisms Laboratory
Massachusetts Institute of Technology
Cambridge, Massachusetts

SUBJECT: BI-WEEKLY REPORT, OCTOBER 28, 1949

1.0 GENERAL

(W. G. Welchman)

I should have mentioned in the last bi-weekly that Mr. Gabelman told us that the objective of our project has been modified. We are no longer expected to contribute to the interim system of air traffic control that is to be in operation by 1952. Instead we are expected to demonstrate the feasibility of techniques intended for the ultimate system.

Work has started on the third Summary Report, covering the period July 25 to October 25, 1949. The main contents of this report will be:

- 1) A discussion of different types of approach patterns leading to a tentative approach system based on azimuth controlled descent.
- 2) A discussion of aircraft guidance and private line communications.
- 3) A brief explanation of the study problems that were chosen for programming.
- 4) An extension of the Introduction to Coding that was given in Summary Report 1.
- 5) The coded program for the Private Line that appeared as E-2003.

The coded programs that have been prepared by Orden and Perlis will be issued as supplementary R reports.

(C. R. Wieser)

Consideration of the closed-loop system of aircraft guidance shows that coordinate conversion will probably be necessary in the loop. The aircraft position will be measured in the coordinates of the navigation

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(C. R. Wieser) - continued

system, say (r, θ) , but the instructions (right, left, up, down) given to the pilot must be referred to coordinates determined by the heading of the aircraft. Also, if aircraft rates are measured by airborne gyros, the rate information will be referred to the aircraft axes and, since the deviations are referred to the navigation system axes, a conversion must be made before the quantities can be added.

Airborne Instruments Laboratory was visited and air traffic control discussed with Dyer, White, and Comstock of AIL and Gabelman of Watson Labs. Methods of obtaining rate data for stabilization of the guidance system were discussed, and we were referred to Mr. Roe of the Flight Test Group at Sperry for further information.

In talking about private-line communications, it was noted that delays of 20 microseconds per pulse may be necessary to ensure complete freedom from spurious signals caused by multi-path transmission. White mentioned a system of parallel digit transmission using a frequency-modulated subcarrier for each digit. This system would be faster, but might have prohibitively large and expensive terminal equipment in the aircraft.

(P. Franklin)

For a simplified model, a method of approach sequencing was worked out by Orden. I considered the question of whether clear paths could always be found by this system, and showed that with certain minor modifications and mild restrictions on entering cruising speed, clear paths could always be found.

(D. R. Israel)

E-2003, A Coded Program for the Private Line, was completed and has been distributed. Work is now progressing on preparing parts of E-2003 for Summary Report 3. An introduction and explanation of the orders omitted from Summary Report 1 has been prepared.

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