Air Traffic Control Project
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SUBJECT: BI-WEEKLY REPORT, JULY 8, 1949

1.0 GENERAL

(W. G. Welchman)

At present, C. R. Wieser and I are trying to collect background information on all matters that affect the problem of air traffic control. Visits (in fine weather) to central control and tower control at Boston and La Guardia Airports have been very helpful, as was a discussion with a representative of American Airlines. We are beginning to discover where to go for further information but at present the picture is somewhat confused, and it is too early to attempt an analysis. The general theory of the present method of en route control is becoming fairly clear but it only becomes fully operative under bad weather conditions and we have not yet seen how it works out in practice. Tower control is not nearly so easy to understand because it seems to depend on the ingenuity of an experienced controller more than on a theoretical system. The communications picture is complicated by the fact that except in the tower control areas the controllers do not have direct communication with aircraft. Each airline handles en route communications with its own aircraft, while contact with other aircraft has to be made by means of the voice facilities of the radio ranges that are used for navigation. The method of collection and distribution of weather data and the way in which the data are applied require further study. At present, we understand that the airlines have their own weather reporting organizations because the central reporting system is too slow. This may well be a field for a computer. So far, we have come across three main conceptions of traffic control systems based on:

1. Estimated time of arrival at certain fixes.
2. Occupancy of fixed blocks.
3. Enabling an aircraft to see neighboring aircraft and to be seen by them.

From what we have heard so far it rather seems that, although various systems suitable for en route control have been suggested, no satisfactory system of sequencing aircraft in the final approach area has yet been proposed that would be capable of landing aircraft at half-minute intervals on a single runway.

1.0 GENERAL (continued)

(P. Franklin)

Worked on timing schedules for arrival at a single glide path. A method of controlling the variable velocity of a rotating beam emitting signals over a narrow sector was described in M-2010.

(C. R. Wieser)

Visits have been made to the air traffic control centers and airport control towers at East Boston Airport and La Guardia. The principal functions of en route control are carried out by human operators with the aid of posting boards, which are used to record the identity, altitude, destination, speed, and estimated time of arrival of an aircraft at a fix. Since the routes generally involve many intersections, a complete check on the safe routing of an aircraft requires an interchange of information between operators. This situation makes the safe routing problem difficult and prevents the effective use of an increased number of operators in speeding up control.

In the case of La Guardia Tower, the control functions are divided among several controllers, who handle ground (taxi) traffic, final (visual) approach, initial approach, and GCA radar. Here again, close coordination among these operators is required.

Simulated approaches by ILS and GCA were observed. These systems, while valuable navigation aids, do not contribute directly to the problem of control.

The La Guardia Tower is equipped with an approach control interlock system and computer built by the General Railway Signal Company. The interlock system presents through a system of lights a picture of the assigned and occupied altitude levels in the stack. This presentation, which is shown in the tower and in the control center, assists in handling traffic by supplementing the overloaded channels of aural communication with visual communication. In addition, the machine keeps an up-to-date record of stack and approach occupancy and is used to compute the flight pattern from the lower stack level to the ILS beam.

The General Railway Signal Company fixed block system for traffic control has been encountered, but not yet studied. This system will be studied further, particularly in regard to its application in the terminal area.

1.0 GENERAL

(Alan J. Perlis)

Detailed coding is in progress of a "non-cooperative aircraft" surveillance system for obtaining aircraft positions in an air traffic net. This will be followed by consideration of, first the "co-operative" system, and then by arbitrary mixed systems.

(A. Orden)

A study was begun on scheduling the approach of aircraft to an airport. Several models of airlane geometry near the airport were set up and discussed with other members of the group. A method of scheduling using a digital calculator is being worked out for one of the geometrical models.

(D. R. Israel)

I have studied the physical problems and considerations of a "private line". Part of my time has been spent in reading various reports on phases of the air traffic control problem. Some work has been done on the coding of a radar information correlation problem. The variable speed antenna for the "private line" (see M-2010) is now being coded.