Letters to the Editor

SIMPLIFIED FLIGHT PLANNING

SIR,

W. G. Hamer's paper on Simplified Flight Planning (Vol. IV, No. 3, pp. 248–259) touches on a subject of major importance to all airlines engaged in long-distance flying. While many of his suggestions are sound others have fundamental disadvantages, or stop short of the real solution.

There has been a tendency in almost all published papers to relate the problems and their solution to the North Atlantic route. This results in little progress in the overall problem for two reasons. First, the North Atlantic operators are now well entrenched in their own pet methods and are understandably reluctant to undertake the necessary expense involved in any large changes; and second, the North Atlantic is one of the only two trans-oceanic routes in the world (the other being San Francisco to Honolulu) on which meteorological forecasts *are* prepared with a sufficient degree of accuracy or reliability to ensure the success of some of the techniques adopted.

It is a demonstrable fact that, among other factors, the degree of reliability of aviation route forecasts is in direct proportion to the density of air traffic and to the quality of the crews, particularly navigators, flying those routes. Reports of accurately found winds are essential for locating centres of air circulations, and failing such reports the location of the centres in mid-ocean depends on 'guestimation'.

To deal with the specific points raised by Mr. Hamer, the minor disadvantage involved in using zones of varying length can be largely overcome by the preparation of track and distance tables designed to present the required information at a glance. This disadvantage is, moreover, completely outweighed by the advantage of having a universally accepted standard of preparing route forecasts.

Most airlines these days use very similar presentations of power control charts. However, if a graph of cumulative fuel consumption is used for flight planning the need for zone-by-zone calculation of fuel requirements can be eliminated. Power settings in the air can be regulated at regular intervals (e.g. every two hours) and since these times can be made to coincide with the time of transmission of the position report the whole fuel control programme can be simplified. Slight departures from theoretical accuracy due to aircraft weight will be found to have a negligible effect in practice.

The proposed modification of the Dalton E6B computor is an advance, but even further simplification could be achieved if the Meteorological Office could be persuaded to provide head- (or tail-) and beam-wind components in addition to the normal statement of wind speed and direction. The addition of the track component to the T.A.S. then gives the groundspeed in the zone and the beam-wind component can be converted to drift by means of a simple graph. This means, of course, that a little extra work has to be done by the Met. Office, but by use of a special computer or tables it is a simple operation and removes some of the burden from the aircrew.

Ignoring the true airspeed component (DE) mentioned in the article does prevent theoretical accuracy being achieved when applying the track component to the T.A.S. to find groundspeed, but since it is normally so small with modern

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aircraft, having a maximum value of 3 knots in one zone only of Mr. Hamer's sample flight plan, and since it depends on the assumption that the forecast chart is perfect, the effect of ignoring it will be found to be negligible in practice.

In the design of the flight plan form lies much of the secret of simplification and the examples shown seem to me far from simple. To solve such a problem it is sometimes best to go back to basic requirements.

The information required from all operators who adhere to I.C.A.O. standards is defined in Doc. 4444-RAC/501, page 107, and Doc. 7030, page 2-1-4. Many of the fixed quantities of such requirements can be kept off the flight plan form by publishing them in the companies' schedules and operations manual. Once these requirements have been satisfied the next problem is to provide the remainder of the information in as few columns and with as few calculations as possible.

With these thoughts in mind I would like to offer my own criticisms of the form illustrated in Mr. Hamer's paper.

In the headings the total distance would be more conveniently placed at the foot of the zone distance column.

Scheduled departure and arrival times and frequencies are superfluous.

P.N.R. spaces are given but no space for their calculations. (Are P.N.R.'s and P.E.T.'s really necessary anyhow?)

Fuel temperature is of importance only when fuel calculations are performed in gallons. If all fuel figures are worked in pounds this can be eliminated.

While it may be desirable to show the operating crew, there is virtually no point in putting, for example, stewards' or stewardesses' names on the flight plan.

In the body of the form it is not necessary to have columns for both From and To; one will suffice in conjunction with the zone numbers.

Accumulated distance is unnecessary if the track and distance tables indicate it.

Accumulated time can be replaced by a more useful E.T.A. column to be filled in after setting course.

The wind columns can be reduced to two and the wind correction angle eliminated as an entry.

Magnetic headings can be filled in once airborne.

Indicated airspeed is unnecessary on the flight plan if the cruise control charts are properly prepared.

The remainder of the columns can be eliminated and further time savings will accrue if the columns are rearranged closer to their order of completion.

At the base of the form it is unnecessary to list crew and passengers since these are shown on their respective manifests and on the load sheet.

Sunrise figures are of no practical value on scheduled operations since they are beyond the control of anyone on Earth, and presumably the schedules have been arranged bearing in mind the hours of darkness.

Six different methods of cruise control appear to offer an extravagant number of choices; (though this is of minor importance).

Price of fuel seems to be an impertinent entry on a flight plan, and even if price differentials seem to indicate economy in taking on full tanks at some particular point, the cost of carriage inherent in greater weight and therefore decreased performance should enter into the calculations.

Space has to be provided for fuel calculations but such a nebulous figure as

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heater fuel is probably best omitted. On pressurized aircraft the air temperature rise through the cabin blowers is often sufficient to maintain comfort without operating the heaters. The assumption that the heaters will operate for any specific period is usually badly in error.

If the operator is concerned with only one type of aircraft and only one route, the fuel reserve requirements with the exception of fuel-to-alternate can be built right into the flight planning fuel graph, including, if desired, fuel for 50 per cent (?) heater operation. In addition it is also possible to print many of the standard entries right on the form.

To facilitate comparison between flight plan and flight log it has been found that an actual time of arrival (A.T.A.) column on the flight plan fulfils this duty admirably.

Finally there is the question of comparing flight times on various tracks. This is completely useless unless the forecast chart is absolutely reliable. Planned circumnavigation of pressure centres becomes detrimental in practice unless the centres actually are in the position forecast. A more consistent method of reducing flight time is to base all navigation on the great circle and to use the single drift (single heading) technique whenever practicable.

I hope that these observations on Mr. Hamer's useful paper may be of some interest to your readers.

Yours truly,

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RADAR USAGE AND SPEED IN FOG

SIR,

A voyage to Australia has kept me out of touch with things for rather a long time, but I return to an interesting situation which Captain Wylie's letter (Vol. IV, No. 4, p. 430) on my paper has produced. May I, in turn, be allowed to comment on his letter?

Undoubtedly, as Captain Wylie writes, a steady and predictable course (and speed) on the part of pedestrian or ship gives motorist and radar navigator something to work on. 'Radar Usage and Speed in Fog', which confined itself entirely to the aspect of speed, was an attempt to bring that something into the realm of practical politics—an attempt to find a means by which each individual ship can assess a speed for herself which will permit all radar-using ships to maintain course and speed whilst the outermost third of detection range is being used up. The paper endeavours to shed a little light on the mystery which permeates the instruction that '. . . *in fog* . . . (every vessel shall) *go at a moderate speed*. . . .' Concepts of moderate speed may be promulgated, but the proof of the pudding lies always in the eating, and, to the misfortune of the seaman, the eating is done by an Admiralty Court. Let us endeavour to keep our cookery away from Admiralty lawyers.

Like the Collision Regulations, the paper makes no attempt to give precise instruction on how a ship should be manoeuvred. Basic principles of seamanship are taught in the navigation schools, but the timely helm action which so often

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