2s per movement for a journey from, say, London to Paris That is all that is required on the ground in order to operate these services

You will see that if my other thesis is true—namely, that the helicopter flying costs can be kept down—then the future for helicopter services is vast It means that we have discovered a way of moving from the centre of one city to the centre of another city which costs the city virtually nothing and that the helicopter is the instrument to achieve this improvement in communications

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2

PROPOSALS FOR A HELICOPTER ROOF STATION

By COLIN ST JOHN WILSON, M A (Arch) cantab , A R I B A

An architect is bound to view the helicopter as part of the overall complex of a city and the intercommunication between cities The group with whom I work (architect Peter Carter and structural engineer Frank Newby) have always envisaged this extension of communications (and sensations) as an organic element of the desirable city and it has been extremely interesting to concentrate for a while upon this particular aspect of planning with Mr SHAPIRO and Mr WARD

I shall assume that we are agreed upon the general desirability to the public of an inter-city helicopter service and reserve judgment on the dilatory attitude adopted by the majority of County and County Borough Development plans on this question As far as London is concerned Mr Masefield's proposed BEALINE BUS routing for Great Britain and three continental stations should quite easily accommodate itself to six or seven main centres already existing on the London Passenger service grid

Imagining ourselves approaching such a roof station from ground or underground or air, we will necessarily be made aware of it as part of a larger complex and so I wish to start by showing a panorama based upon a research project we have done for a C I A M Congress

Briefly we have tried to eliminate the sprawl of dormitory town and dormitory residential estates and taking advantage of modern structural capacities to propose a stratified city in which multiple use is once again re-asserted without congestion and without loss of amenity The residential areas with their promenades and cafes look across and down into broad squares where offices, commercial, theatre, stores, etc , are distributed In central zones some office use would break up into the Residential zone, *i e* , above the 80′ mark

Accepting from Mr SHAPIRO the limits of operational efficiency and the consequent broad requirements for flight deck size, transmitter equipment, etc , we found that it was possible to take as the basis for such a station a building of multiple use , (referring again to the C I A M project) which we already had in mind, namely an hotel mounted on office floors 50 floors high the disposition and structure (which is quite normal) permitting considerable variation in use over and above those mentioned The selection of a 50 floor building is quite arbitrary in this context generally we would suggest a lowermost limit of about 15 floors for height of flight deck I will

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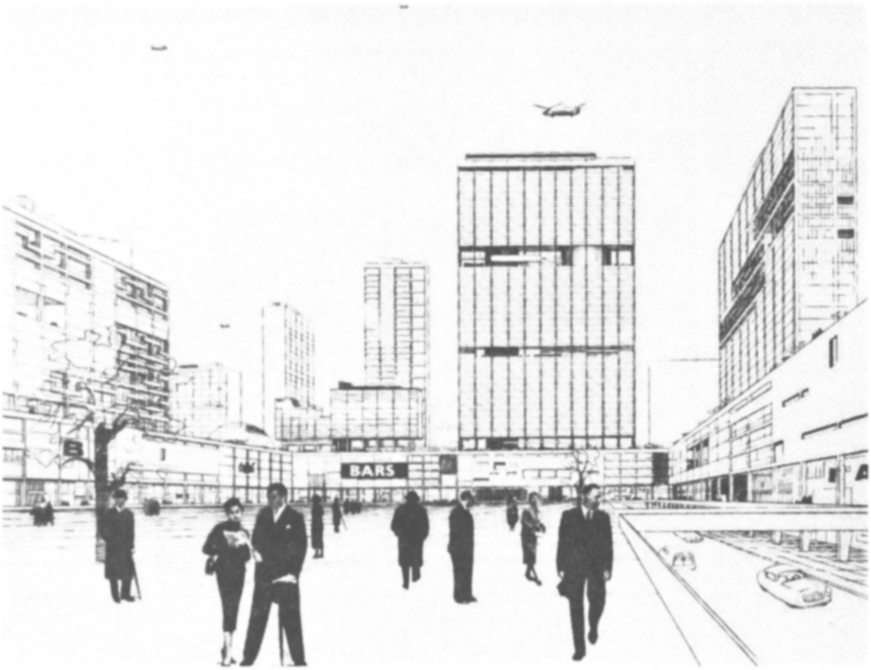

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say somethıng shortly on the possıble adaptatıon of exıstıng buıldıngs for the moment let us proceed on an " ıdeal " arrangement

1 Startıng at bottom Sources of passengers
tube-traın underground,
bus, car, taxı, foot, at ground ,

Two of the necessary battery of lıfts for such a buıldıng set asıde solely for journeys from ground to receptıon level , namely, two 15-person lıfts—doors worked automatıcally on a tıme basıs (as at Goodge Street underground statıon) Each lıft delıvers 15 persons every 5 mınutes = 15 every $2\frac{1}{2}$ mınutes

2 *Arrıval* at maın cırculatıon area

Inspectıon of tıme-table and routes Seatıng—drınk tea, buy paper, waıt for wıfe (Area just under 5,000 sq ft)

3 *Tıcket Kıosk*

Here we have provıded for two lanes of tıcket buyers where ın most cases one wıll be suffıcıent

Passıng through a turnstıle the passenger automatıcally stands on a weıghıng platform whıle buyıng hıs tıcket—the normal weıght 200 lbs ınclusıve In any one flıght $33\frac{1}{3}\%$ of passengers may be excess weıght to a total of 250 lbs Dıfferent coloured tıcket for these

4 *Pre-flıght waıtıng area* approx 2,500 sq ft adequate for three flıght loadıngs of thırty persons to waıt at peak perıods

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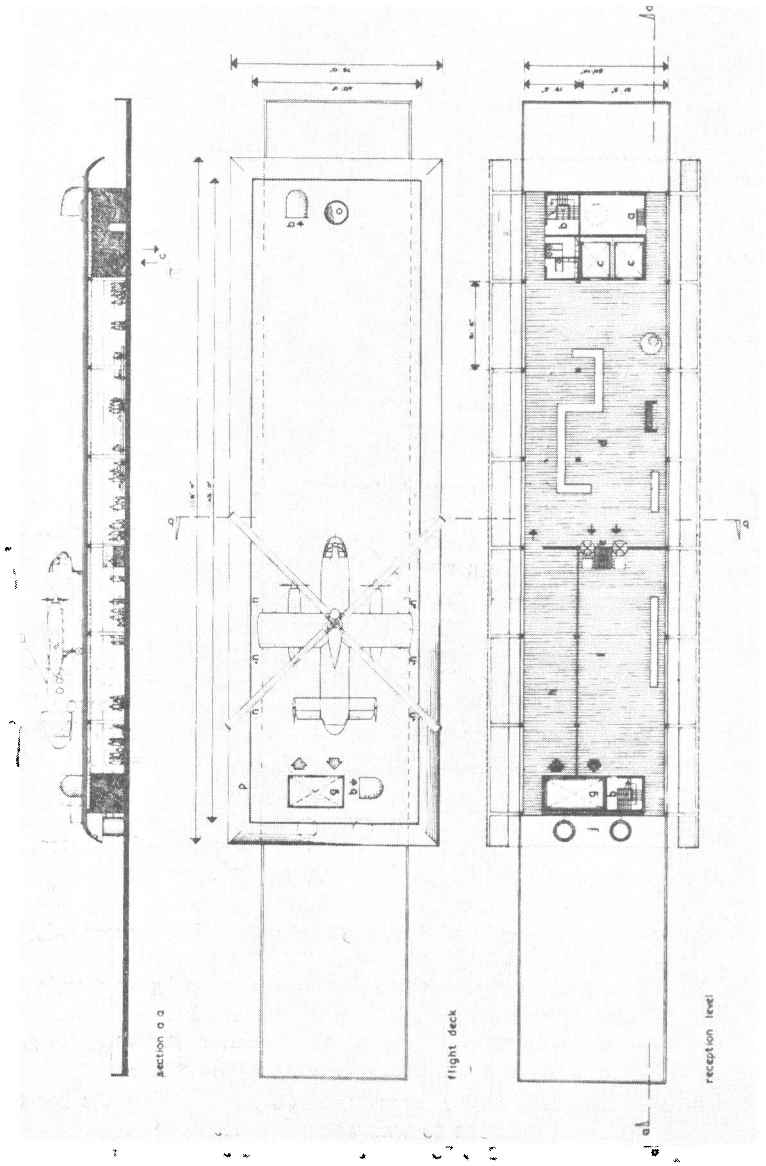
5 *Flight lift*

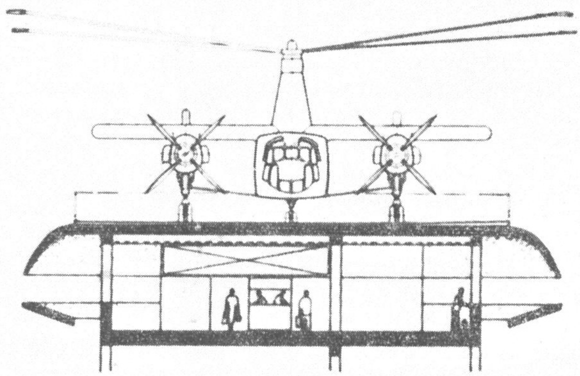
Hydraulic lift on principle of aircraft carrier for 30 persons and attendant and mechanic. Lift was chosen rather than stair as most convenient means of controlling flight numbers, this lift rises to flight deck at 5 minute intervals at peak periods at moment of touch down of arrived helicopter. Out-passengers moving across to exit door permit in-passengers (leaving helicopter by ramp at rear of machine which is facing lift) to enter



Reproduced by kind permission of The Architect's Journal entrance-door of lift In-passengers enter craft for'ard on port side Mechanic refuels craft from 4″ pressure pipe at rate of 600 gallons per minute from two 1,200 gallon tanks of fuel at reception level which in turn are fed by 50,000 gallon basement store in 2″ pipe at rate of 125 gallons per minute (Pumps of 12 and 6 h p respectively)

Flight Deck Emergency Precautions

Foam extinguisher jets operated from control room are built in at 20′ centres on either side of deck—two permanent escape stairs at each end



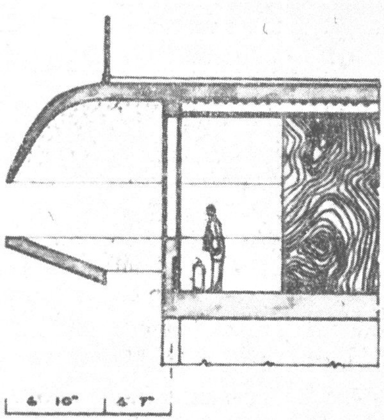
section b b

Reception Level

a station master and offices
b escape stair
c main lifts
d circulation area
e tickets and weighing
f pre flight waiting
g flight lift—30 persons
h exit lane
j petrol storage 2 × 1200 gals

Flight Deck

k grnd stabil
l ranging transmitter
m set-down transmitter
n fire extinguisher jets
o observation dome
p guard rail



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of deck—Passenger guard rail capable of withstanding horizontal impact of 250 lbs but falling flat at greater impact (by helicopter) around perimeter of deck

In-passengers, lift-man and mechanic now in lift

Lift doors close lift descends as helicopter starts up again

Time schedule (A) Helicopter descent from 500 ft ceiling of landing cone 1 minute

(B) Lift ascent, passenger turn-round, re-fuel, lift descent 2 minutes

(C) Helicopter ascending clear of landing cone $\frac{3}{4}$ minute

This allows $1\frac{1}{4}$ minute margin to maintain a five minute turn-round at peak periods $1\frac{3}{4}$-2 minutes for lift to empty and fill again at reception level

Flight Deck Details Dimensions —Overall 258′ × 78′ of which 243′ × 60′ is clear for landing and parking except for stair heads 186′ apart Surface anti-skid tarmac to draining falls sufficient to obviate reflection from surface water White band full width of overhang round perimeter white cross to mark landing Perimeter marking lights Ground stability, ranging and set down transmitters built in along line of this cross Snow dispersed by salt Space adequate for emergency parking of one helicopter

Turbulence Anti-turbulence section to deck overhang as shown cut to permit viewing strip from reception area Curved roofs to escape stairs as permanent excrescences assumed permissible although hatches always possible

Noise I have Mr Shapiro's assurance that silencers can be designed quite adequate to the task, the sole factor being the amount of extra weight carried by the machine, and that in helicopters of the size we are discussing this weight factor is comparatively low

Size considerations It is particularly interesting that we have enlarged Shapiro's original deck sizes not in the interests of the helicopter but in order to accommodate peak-period passenger flow When we started we thought the space under the deck would be largely void We found, however, that the two space requirements (assuming emergency parking space for 1 helicopter) to be very closely equivalent

Structure Loading at 4G a maximum point loading of 15 tons on each of 4 wheels set on a 35′ square

This loading with columns at 35′ centres does not exceed normal office floor loading , so that in the case of the adaptation of an existing structure the addition of such a flight deck would (together with its self-weight) be roughly equivalent to 2 floors

I hope Mr Newby will comment on this fact in relation to the revision of permissible stresses in existing structures that are due to come into effect within a matter of weeks

In our particular case the structure is as follows 7 Bays of 12″ × 12″ columns on longitudinal grid of 31′ 5″ centres and cross-grid of 31′ 5″ × 19′ 5″ centres with 2 $3\frac{1}{2}$″ beams and structural slab of 12″

Control Station-master in observation office with dome controls helicopter arrival and departure

If through-flight, Station master communicates number of vacant seats to flight-lift operator

Woman flight-announcer can act as attendant in cases of sickness, etc

COSTS

A	INITIAL OUTLAY			
	Mechanical Equipment			
	Lifts		£10,000	
	Transmitters		£12,000	
	Fire extinguishing		£2,000	
	Petrol and Pumps		£2,500	
		TOTAL	£26,500	
	Building 234,500 *cu ft*			
	Superstructure at 1/3d cu ft		£12,000	
	Finishes and General services		£40,000	
	15% for all fees, etc		£7,800	
		TOTAL	£59,800	
		GRAND TOTAL		£86,300
B	RUNNING COSTS			
	Renewal, maintenance, ins interest			
	Building at 10%		£7,800	
	Equipment at 25%		£6,500	
	Staff		£8,000	
	Power, light, rates		£2,700	
	Contribution traffic control		£2,000	
		TOTAL	£27,000	

3

SOME PROPOSALS FOR HELICOPTER APPROACH AIDS

By L J WARD, B Sc (TECH), A M I E E

I am going to describe some proposals for landing helicopters on restricted areas under conditions of zero visibility, using radio techniques

There is a natural tendency when considering a problem of this kind to extrapolate from earlier techniques In this case, say for those techniques evolved for fixed wing aircraft This is not necessarily the best approach I consider it important that one should start without too many pre-conceived ideas based on current techniques

The particular problem which I am going to discuss was originally put to me as follows —

Would it be possible to devise a vertical radio beam such that a helicopter fitted with a suitable receiver and indicating device, could be guided vertically down the beam, to land ultimately on a very restricted area The answer