TRANSPORT RESEARCH AND THE OPERATION OF REGULAR AIR SERVICES TO ISOLATED AREAS

F.D. GALLAGHER

ABSTRACT: *Operators of regular air services to remote areas have not responded well to the change in their economic environment wrought by the phasing out of Federal subsidies. The survival of many of these services, at least in their present form, is threatened. In this paper regular local air services are analysed. Subsidisation is critically examined. Then, after an illustrative analysis of schedules, costs, prices and capacities, a strategy for rationalisation of the industry is revealed. The objective of the strategy is to develop a network of services which will respond to users' demands and come as near as possible to economic viability. In the light of this rationalisation the subsidy situation is reviewed. Throughout the paper, air services within the Kimberley Region of Western Australia are used in developing and illustrating our approach to solving a transport problem.*

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INTRODUCTION

The Problem

If it continues the policy established by its predecessors, the present Federal Government will cease payment of direct subsidies to the operators of regular air services to isolated communities in Australia on 30 June 1977.

Operators had tailored the scale and style of the services they supplied to suit the subsidised climate in which they found themselves; rational enough behaviour in an economic sense. As would be expected in such circumstances, the progressive phasing out of subsidy support for these services has revealed their economic vulnerability under normal market conditions. Operators have found it difficult to re-style their services to suit the change in economic climate, even though it has been brought on them gently.

It is difficult to envisage more than one of the eleven regular local air services which have been operated in Western Australia with direct subsidy assistance from the Federal Government surviving for more than two or three more years. In the near future, the prospects for generation of enough additional traffic to fill the void left by subsidy withdrawal seems bleak. Therefore, to provide services which at least meet present demands, one or a combination of three course of action will have to be taken.
These are:

(a) to reintroduce some form of direct subsidy support for the services;

(b) for operating firms to cross-subsidise the services from within their own organisational

structure;
or

(c) to develop networks of services which are economically efficient[1].

Provided they can achieve long term stability in profitable markets, operating firms would probably be indifferent in their choice of these three alternatives. However, at the Office of the Director-General of Transport, our primary research aim is to seek more efficient allocation of the transport resources available to the Western Australian community: simplistically, to pursue greater economic efficiency without causing undue social disruption or individual hardship in the process. Therefore, confronted with this problem we had to direct our initial research at the third course of action, (c) above.

This did not mean we immediately rejected the present networks as inefficient or that we discarded the possibility of future subsidy support for regular air services to remote areas. Indeed, social welfare and/or developmental justifications for subsidies could not be ignored. However, it did mean that we could not avoid making some exploration, albeit on an a priori basis, of the economic efficiency of direct subsidisation and cross subsidisation of regular air services to remote areas.

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1. An explanation of economic efficiency as an economy wide concept is contained on page 11 of a paper by Xavier and Affleck (1975). Their interpretation is that relevant to this paper. In their explanation these two authors also distinguish between demand dependant "economic efficiency" and what they call "technical efficiency" or producing at least cost without relevance to demand.

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While it is tailored to the general theme of the 1976 ATRF, this paper is a condensed version of a more complete report on our research into this problem which was completed by the author in October 1975.

Existing Services

Our research was necessarily concerned with all regular domestic air services to remote areas of Western Australia except those for which jet aircraft are supplied. Most of the services we were concerned with could be described as local, feeder and/or pick up type air services supplied regularly to low density, short haul markets. For the sake of clarity and consistency, these are referred to in this paper as regular local air services[1].

At present, eighteen air services operating on about 29 routes in Western Australia we regard as regular local air services to remote areas[2]. Six of these services are authorised under Air Navigation Regulation 203 and known

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1. A number of sometimes misleading and often confusing labels are attached to air services of this type in Australia. The most common of these are, "commuter air services" and "third level air services". Each of these has different connotations within the air transport industry itself.

2. These eighteen regular local air services are operated by the following organisations:
   - MacRobertson Miller Airline Services (MMA) and
   - Connair,

   which hold RPT licences;
   - Civil Flying Services (CFS),
   - Trans West Air Charter, and
   - Tropic Air Services,

   which operate services under ANR 203 exemptions; and
   - Ord Air Charter, and
   - Aerial Enterprises,

   which operate regular services under charter arrangements.

as ANR 203 exemption services[1], five are operated by the holders of Regular Passenger Transport Airline licences (RPT licences)[2], and the remaining seven are provided under arrangements between air charter operators and the owners/managers of pastoral properties or mineral developments[3].

The eighteen services referred to above connect small and/or isolated communities[4] with administrative and commercial centres. Most of these centres are located on the coast and all are nodes or hubs in regional transport networks. Consequently, most of them are included on more important domestic airline routes. Almost without exception, therefore, regular local air services to remote areas of Western Australia can be regarded as feeder type air services.

As a glance at Map 1, attached, reveals these

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1. Commonwealth Air Navigation Regulations are set under Section 26 of the Air Navigation Act 1920-1974. Air Navigation Regulation 203 (ANR 203) states that the Secretary of the (Commonwealth) Department of Transport (formerly the Director-General of Civil Aviation) may, if he considers that the particular circumstances of the case so warrant, exempt a person who holds a charter licence and who proposes to operate a service from the necessity of obtaining an airline licence, and may approve of the operation of the service for such period and subject to such conditions as the Secretary considers necessary.

2. Two of these services are performed by charter operations under contract to MMA and Connair.

3. Strictly, regular charter services are not public transport services. However, some of them, particularly those operated in the Kimberley region, are accessible to members of the public. It can be taken for granted that these are economically viable operations. In that sense, therefore, they are not relevant to this paper. However, for reasons which will become apparent later they are not ignored altogether.

4. In some instances these are single homesteads and a few are merely isolated airstrips.

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eighteen services operate in three distinct regions:

(i) the Kimberleys;
(ii) the Pilbara; and
(iii) that between Perth and the Meekatharra-Wiluna area which is referred to in this paper as the Murchison.

There is a complete network of local air services within each of these regions and no overlap between them. Therefore, it was possible for us to treat each regional system as a separate entity. This was fortunate as, to some extent, the problems facing both users and operators in each region are different.

The Kimberley Region: on only 4 of the 13 routes used for existing regular local air services in the Kimberley Region would operators have any claim to profitability. These are the 3 regular charter routes and the Connair route from Alice Springs to Darwin via Kununurra. On the remaining 9 routes, as will be illustrated more forcibly later, operators appear to have little hope of profitability. Operators of the services offered on 10 of the routes in this Region have been subsidised directly by the Federal Government.

The Pilbara Region: only one of the existing local air services in the Pilbara Region is at present subsidised. This is the Trans West service to the Marble Bar, Nullagine and Hillside area. Trans West will continue to operate this service whether subsidised externally or not.

MMA have recently withdrawn an unprofitable DHC-6-Twin Otter from service from the Pilbara Region, serving mainly Wittenoom and Tom Price. The short airstrip and the rugged

nature of the terrain around Tom Price prevent it from being included on regular jet service routes.

The Murchison Region: as is evident from Map 1, all existing air service to the Murchison Region radiate from Perth. They are round trip routes supplied by one operator, CFS, under an ANR 203 exemption. The air services or the whole of this network of routes have been subsidised for some years by both Federal and State Governments. Losses sustained by the operator are increasing each year.

To avoid tedious repetition later in the paper, the influence of our analyses and methodology on air service routes is illustrated only in relation to the Kimberley Region; as in it the problems are greatest. The regular local air services in the Kimberley Region are identified and summarised in Table 1 in the Appendix to this paper. This table reveals where operators give the most frequent services and facilitates comparison of the distribution of frequency of service and the distribution of direct subsidy payments. Thus, it gives some insight into the relationship between demand for regular local services and the influences on the supply of them.

SUBSIDIES

Existing Subsidies

During 1974/75, the Commonwealth Government paid about $90,000[1] and the Western Australian Government about

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1. In Australia as a whole, during 1973/74 the Commonwealth spent about $2 million on direct subsidisation of regular local air services.
   Source: Commonwealth Department of Transport, Air Transport Group.

$25,000[1] in direct subsidies to operators of regular local air services in Western Australia. During the same year subsidies amounting to about $145,000 were paid by the State for the air transport of perishable goods and students to and from remote areas of the State[2].

For some years, eleven of the sixteen regular local air services to remote areas, which are not operated under charter, have been subsidised by the Commonwealth for "developmental" reasons. Two of these eleven services are also subsidised by the Western Australian Government.

Recent Commonwealth subsidy payments to Western Australian operators of regular local air services are set out in Table 1.

At the Federal level, the recent Labour Government's policies on subsidies for air services were influenced by the recommendations of the Coombs Taskforce Committee of Enquiry. Broadly, that Government's policies were: (a) to phase out subsidies paid direct to operators; and (b) to move towards the recovery of 80% of costs of providing infrastructure essen-

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1. In 1973/74, the Transport Commission paid $51,900 out of its own funds in subsidies to air services in Western Australia: $25,300 to regular local air services, and $26,700 as grants for landing grounds and buildings at aerodromes. In the same year, the Transport Commission received $167,200 in revenue from aircraft licencing. There is neither an intended nor a rational relationship between revenue raised from and subsidies paid by the Transport Commission to the air transport industry. Source of figures: Transport Commission, Annual Report (1974).

2. Some of this money would have ended up as revenue for jet services on MMA's more important domestic routes. The remainder would have been revenue for operators of regular local air services, including MMA.

TABLE 1: COMMONWEALTH SUBSIDY PAYMENTS TO OPERATORS OF REGULAR LOCAL AIR SERVICES IN WESTERN AUSTRALIA.

($'000)

Air Service Operator	Commonwealth Subsidy Payment			
	1971/72	1972/73	1973/74	1974/75
MMA	73	73	55	41
Trans West	12	33	30	22
Murchison Air (a)	16			
CFS	-	51	35	26
Totals	101	157	120	89

(a) Absorbed into Trans West in 1972.

Note: Connair, based in Alice Springs, also operates in Western Australia. However, the figures for its subsidy for Western Australian operations are not included in this table as they cannot be separated from the figures relating to its Northern Territory and Queensland operations.

Source: Commonwealth Department of Transport, Air Transport Group (Perth).

tial for the operation of airway systems[1][2][3].

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1. In giving evidence before the Western Australian Royal Commission into Airline Services conducted by the Hon. Sir Reginald Scholl, during the last year, Mr. C.J. Smith, First Assistant Secretary, Air Transport Policy in the Commonwealth Department of Transport stated, inter alia:
   "..... Civil Aviation was rather a main target of the Coombs Taskforce right across the board; and it has resulted in the twin policies of phasing out the subsidy, and the movement towards the recovery of 80% of costs attributable to the operation of our airway system."
   Royal Commission Report (1975) page 97.

2. One effect of this policy and the tougher line taken by the Commonwealth in implementing its local ownership (of aerodromes) scheme are the subject of another of our reports: Gallagher (1975) (DGT 141).

3. If making efficient use of available resources is an appropriate economic objective, it by no means follows that pricing based on cost recovery is an appropriate economic policy.

The present Federal Government has given no real indication that it will change these policies. Thus, it must be presumed that the phasing out of Commonwealth subsidies to operators of regular local air services in Western Australia, which commenced in 1973/74, will continue till June 1977. Then, except where it is obliged to continue them under contractual arrangements, Commonwealth subsidies will cease.

Since MMA withdrew its feeder services from the Meekatharra-Wiluna area, as part of their rationalisation programme in 1968/69, the State Government has been paying a small direct subsidy to the operators of air services to and from that area. The present operator is CFS. The subsidy is different in form to that which was paid by the Federal Government. As it is paid as a fixed amount per passenger ticket, it is related to demand for the service rather than the operator's economic or financial viability. Two other State Government subsidies are related to demand for air services to remote areas of the State. These relate to students' travel and to the transport of fresh fruit and vegetables to remote areas.

Neither of the last two subsidies were paid directly to operators of air services. Nevertheless, they do have two important and relevant characteristics. Firstly, while these have more of a social welfare quality about them than subsidies paid direct to aircraft operators, the rationale for their existence is similar. Both stem, at least in part, from the thinking that it is in the national (or State) interest to encourage people to live and work in, and thus develop remote areas particularly in the North. Secondly, all of these subsidies influence demand. Paid as they are to air service users, the subsidies, must generate at least some demand for both regular local air services and MMA's trunk route services, and

they must have some, albeit indirect, influence on prevailing fares and freight rates.

The Royal Commission

Sir Reginald Scholl, who conducted the recent Royal Commission[1] into Airline Services in Western Australia, looked closely at the subsidies paid to regular local air services in Western Australia. Sir Reginald went to considerable pains, in his Report (1975), to distinguish between direct or external subsidies paid to an organisation such as an airline and the practice of cross-subsidisation or subsidisation from within the organisation. Following this, he discussed Commonwealth policy on "developmental" subsidies for airlines, and then, questioned both the wisdom and the motivation of the recent Labour Government in withdrawing direct Commonwealth subsidies to regular local air services.

There are important and fundamental differences in approach to the philosophy of subsidisation between the Royal Commissioner and ourselves. Unlike him we see subsidisation as an underlying cause of, rather than a solution to the problems now facing the operators of regular local air services in the Kimberley and Murchison Regions of Western Australia. Nevertheless, we agree with him that it is an important issue. Also, like him, we think a distinction should be drawn between cross-subsidisation and direct subsidisation and that the two issues should be discussed separately. Both are fundamental issues and a great deal of confusion can arise from either failing to distinguish between them or talking about both together.

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1. The prime purpose of the Royal Commission was to examine the proposition that TAA compete with MMA on intrastate routes in Western Australia.

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Cross Subsidisation

Many transport organisations which operate services over a whole network of routes espouse what is known as the "total service concept". Where the "total service concept" is adopted by an airline, such as MMA, it would claim that, because its network consists of a number of regular local air services which feed into one or two main trunk routes, the system must be looked at as an economic whole rather than an aggregate of separate parts(1).

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1. When a transport firm adopts the "total service concept", it regards all of its services as being produced by the one process. Thus, they would argue, the costs of producing a single service, say a passenger journey from Perth to Hall's Creek are in practice and in concept inseparable from the costs of producing any of their other services. Therefore, their reasoning would continue, allocating costs to one particular service or group of services is invalid.

   In fact, rarely would all of a transport firm's costs be inseparable. For instance, with MMA as with many other transport organisations, some costs can be regarded as separable (both fixed and variable costs), some as joint costs and some as common costs. Therefore, the "total service concept" approach to costing and pricing is rarely valid when internal cross-subsidisation is not justifiable.

   It is the presence of joint and common costs that gives rise to the "total service concept". And, it is what is known to economists as the joint and common costs problem which arises when one production process produces more than one good or service. Distinguishing between joint and common costs is often a somewhat hair splitting and sterile academic exercise. However, without getting too esoteric, common costs are usually regarded as system wide costs which can legitimately be allocated to different services or different sections of the organisation while joint costs are system wide costs which cannot be arbitrarily allocated to different services or sections and, therefore, relate only to the total service. Thus, only for joint cost items is the "total service concept" a valid economic approach.

   The "total service concept" justification for total or across the board costing and pricing has probably been leant on too heavily by operators of both public and private transport systems and has undoubtedly lead to misallocation of economic resources in the transport sector. Refer to W.J. Baumol et al, (1968).

The basic economic philosophy behind the total system approach (or "total service concept") is that high costs of operating feeder routes are tolerated because it is only through the accumulation of traffic from feeder routes that economies of scale and, thus, low unit costs can be achieved on trunk or arterial routes. In addition, it would be claimed that the costs of operating such a transport network cannot be arbitrarily allocated to any section of it, let alone to an individual service.

Despite the merits of these arguments, cross-subsidisation of feeder services, which is implicit in the "total service concept", can usually be justified only when it is necessary for the operator of the service network to maintain control over feeder services in order to reap the economies of scale needed on the trunk routes to make his whole operation profitable. Such control may be required where the operator has one or more competitors on the trunk routes[1]. A similar case can be advanced for cross-subsidisation when control of feeder or branch routes is required in order to stave off intermodal competition which may affect the viability of a total operation[2]. Cross-subsidisation can also be justified where it is carried out in order to gain control of feeder services which offer sound prospects of future profitability[3]. Provided a firm is not forced into it by legislation, it is

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1. The relevance here to the proposal to introduce TAA on intrastate routes in Western Australia should be apparent.

2. For instance, the operators of a railway system may be willing to hand over branch line operations to road hauliers if they could be sure that the latter would not compete also with their main line operations and eat into the economies of scale which main line capacity offers.

3. This policy is being pursued by Trans West Airlines in the Pilbara on routes serving Nullagine, Marble Bar and Hillside.

difficult to envisage any other circumstances where cross-subsidisation is justified.

Difficulties and uncertainties encountered in the allocation of joint and/or common costs among various parts of an operator's organisation may make the issue of cross-subsidisation less cut and dried than it has been made to appear, above. Nevertheless, cross-subsidisation of feeder services cannot be justified on commercial grounds if an alternative method of operating them can be found, through for instance a local charter service operator, which in no way affects the volume of traffic on the operator's trunk routes. In such circumstances, it is also unlikely that cross-subsidisation of feeder services could be defended on social or even developmental grounds[1].

Direct Subsidies

Government cannot pursue all of its policies through the actions and subtle manipulations of its departments and agencies. Direct subsidisation within the private sector is one of a number of other legitimate devices governments use in pursuit of its social or even overall economic policies. And, from the point of view of the community as a whole, it is at least conceivable that direct subsidisation may lead to a more desirable allocation of economic and social resources. However, it does not follow from this, no matter how desirable the policy being pursued, that direct subsidies are a panacea for all resource distribution deficiencies.

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1. Under any circumstances, it is almost inconceivable that cross-subsidisation could be economically justified where a feeder service is operating at below short run and separable marginal costs.

In relation to air transport, Goodrich (1960) has given a tacit but quite definite warning that there is more to granting direct subsidies than sound policy motivation.

> "The proper course is for the Government to pay a direct subsidy in recognition that these services are performing an essential transportation function which cannot be undertaken as economically or conveniently in any other way." (pages 62-63).

The keys to Goodrich's warning on subsidies are that the necessity of the transport function and the alternatives available cannot be ignored in assessing the value of a direct subsidy.

In his Royal Commission Report, Sir Reginald Scholl does not seem to have heeded Goodrich's warning. His somewhat subjective judgement in favour of the previous Federal Government's direct subsidies to air services is based on agreement with their general policies related to development of the north and primary industry. Nowhere has he critically examined whether the transport being subsidised was essential to this development. Nowhere in the relevant sections of the Report, Chapter X, has Sir Reginald examined the Commonwealth subsidy to ascertain whether it was an effective method of implementing the policies he so emphatically espouses.

Transport is not usually an end in itself. It is merely a service which can facilitate greater economic and social welfare in the community. Therefore, the community rarely benefits directly from provision of a transport service. Benefits are usually derived indirectly from transport in the form of time savings, cost savings, greater accessibility, cheaper goods and so on. The existence of a transport service

does not necessarily imply that there is sufficient or, indeed, any demand for it. Thus, from the mere provision of a transport service it does not necessarily follow that benefits from it flow on to the community, and there is no guarantee that the provision of technically better transport facilities will bring gains in economic and social welfare to the community.

There is no guarantee, therefore, that a subsidy paid to an operator of an air service will benefit either the whole community, or the particular segment of it the service is supplied to. The subsidy may do no more than ensure that the air service which is supplied is technically or in capacity superior to what would otherwise have been supplied.

As is revealed later in this paper, our analyses indicate strongly that there is excess capacity in the regular local air service industry in Western Australia, in terms of both aircraft available and the number of landing grounds serviced. This tendency is particularly noticeable in the Kimberley and Murchison Regions.

Supporters of direct subsidy payments to air service operators may claim that a subsidy with the development motive exists, not to ensure that existing demand is catered for, but to encourage "development" and perhaps the generation of future demand. For this, they may claim that it is necessary for an air service operator to be permanently established in remote areas operating at least a minimum sized fleet of aircraft.

Even these arguments are doubtful in substance. On its rationalised, relatively important and now profitable trunk routes, MMA supplies what we would consider to be

sufficient basic infrastructure to act as a springborad for either "development" or the generation of future demand. In addition, our analyses indicate that direct subsidisation has encouraged local air service operators, including MAA, to grow beyond whatever could be regarded as the minimum size required to provide this basic infrastructure. The analyses also indicate strongly that, in the past, the payment of subsidies to local air services have not been active or passive agent in encouraging "development".

In relation to an analagous situation in the U.S.A. Gansle (1974) stated:

> ".... there is simply insufficient evidence to show that scheduled air service stimulates economic development.... .... Federal (U.S.) Government aid to carriers for provision of service to small communities is not justified on the general argument of economic stimulus....".

It has been shown, above, that direct subsidy to an air service operator is not likely to lead to great increases in consumer satisfaction. In addition, a direct subsidy to an air service operator, which guarantees a mark-up on cost, may nullify any incentive he has to reduce costs. Operators must have known that, if they provided the service required, the Commonwealth would pick up the tab, however poorly they allocated their capital and other resource inputs. There is no real evidence to suggest that direct subsidy payments were made conditional on an operator seeking the least cost method of operating his service; an almost automatic reaction under open market conditions. Our analyses have revealed some obvious inefficiencies among regular local air service operators, particularly in relation to aircraft operating costs, the type

of aircraft used and scheduling.

To be fair it should be pointed out that not all of the problems of the local air services industry are rooted in the Commonwealth's superceded direct subsidy scheme. However, there is strong evidence to suggest that the subsidy scheme did little to encourage "development" and, from a resources allocation point of view, nurtured economic inefficiencies: weaknesses which were inherent not so much in the "development" motivation but in the method of implementing it, through direct subsidisation of a transport service. However sound, these arguments cannot be extended to the payment of direct subsidies to users rather than operators of a transport service. Without delving too deeply into economic rationale, it should be appreciated that, if direct subsidies are paid to users, then, at least, transport services would be supplied in response to an existing or potential demand.

A rational and practical approach to the issue of direct subsidisation of a transport system or network should take into account:

- whether, and on what grounds, a direct subsidy is warranted;
- the form such a subsidy should take; and
- the method of assessing and checking both the amount of subsidy paid and its utility in relation to policy achievement.

F.D. Gallagher

ANALYSES OF EXISTING SERVICES

Analysis of Aircraft Operating Costs

Customarily, air service operators keep the costs of operating their aircraft separate from all other costs. Most of the latter have definite joint cost characteristics and are lumped together as overheads and calculated on an annual basis. Aircraft operating costs, invariably calculated on a "block hour" basis, are usually referred to as direct operating costs[1][2].

Precisely the same itemised split up of direct operating cost data was not supplied by each operator. All of the data supplied did not apply to precisely the same period of time. In addition, it is possible that a few items which some operators regarded as overheads others regarded as aircraft

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1. Cost or speed of an aircraft per "block hour" includes, as well as actual flying time, time taken in moving on the tarmac both prior to take-off and after landing.

2. Some components of direct operating costs exhibit joint cost characteristics. Therefore, in the short run particularly, it would be difficult to justify allocation of all direct operating costs to specific routes on a per hour basis. Nevertheless, in this study, the concept of calculating and quoting all costs associated with aircraft operation on a per "block hour" basis has been regarded as economically acceptable.

   Another accounting procedure customary among air service operators is splitting direct operating costs into two groups: variable costs and fixed costs. In concept, this strategy is economically acceptable. However, some of the methodology operators employ to split costs into their fixed and variable components was unacceptable for the purposes of this study. For instance, the costs of flight crews, most of whom are paid annual salaries, are claimed by most operators to be variable by the hour. Plainly they are not. Unfortunately, the cost data which operators supplied, were not sufficiently detailed to permit us to make realistic economic distinction between variable costs and fixed costs.

operating costs and, thus, included in their direct operating costs. Despite these lacks of precision and certainty, the data which were supplied for our study, have been regarded as sufficiently precise for comparative analysis of the costs of operating different aircraft. The essential features of this analysis are exposed in Tables 2 and 3.

TABLE 2: DIRECT OPERATING COSTS OF AIRCRAFT USED FOR REGULAR LOCAL AIR SERVICES IN WESTERN AUSTRALIA : DGT ESTIMATES 1974/1975.

Type of aircraft	Cost item								Total cost per hour
	Fuel/oil		Crew		Maintenance and replacement		Other costs		
	Cost per hour	% of Total cost	Cost per hour	% of Total cost	Cost per hour	% of Total cost	Cost per hour	% of Total cost	
	$	%	$	%	$	%	$	%	$
Douglas DC-3	60.73	34.2	41.24	23.2	70.17	39.5	5.65	3.2	177.79
DH114-Heron	36.28	30.8	27.04	23.0	43.41	36.9	10.96	9.3	117.69
DHC-6-Twin Otter	31.44	17.4	34.70	19.1	91.87	50.8	22.89	12.7	180.90
Beech-65/A20-Queenair	25.00	23.0	19.50	18.0	41.60	38.3	22.40	20.6	108.50
Beech-65-Queenair	24.00	23.0	19.50	18.7	41.00	39.2	20.00	19.1	104.50
BN-2A Islander	11.42	15.9	17.62	24.5	24.14	33.5	18.81	26.1	71.99
Beech-58-Baron	15.23	18.8	17.62	21.7	28.30	34.9	19.93	24.6	81.08
Cessna 402	16.35	15.7	17.62	17.0	39.93	38.4	30.00	28.9	103.90
Cessna 310R	15.86	16.7	17.62	18.5	26.15	27.5	35.37	37.2	95.00
Cessna 206(F)	8.25	14.6	17.62	31.1	20.62	36.5	10.07	17.8	56.56

(a) crude DGT estimate.
Source: Operating companies.

Table 2 contains a straight comparison of the direct operating costs of aircraft used on regular local services in Western Australia. With one important exception, the total

direct operating costs per hour increase directly with carrying capacity, ranging from $56.56 for the Cessna 206(F) operated by Trans West to $177.79 for the Douglas DC-3 operated by Connair. It was anticipated that such a relationship would exist. The important exception is the DHC-6-Twin Otter operated by MMA. At $180.90 per hour, its estimated direct operating costs exceed even those of the Douglas DC-3 which has almost double its freight carrying capacity, and are about 65% greater than those of Connair's DH114-Heron which has a comparable commercial carrying capacity and greater range.

TABLE 3: DIRECT OPERATING COSTS PER UNIT OF CARRYING CAPACITY OF AIRCRAFT USED FOR REGULAR LOCAL AIR SERVICES IN WESTERN AUSTRALIA : DGT ESTIMATES 1974/1975.

Type of aircraft	Costs per hour for each kilogram of carrying capacity			Costs per tonne/ kilometre		
	Fuel/oil	Crew	Total	Fuel/oil	Crew	Total
	cents	cents	cents	cents	cents	cents
Douglas DC-3	1.9	1.3	5.5	7.5	5.1	23.1
DH114-Heron	2.1	1.5	6.7	9.0	6.7	29.2
DHC-6-Twin Otter	1.9	2.1	10.8	7.0	7.8	40.5
Beech-65/A20-Queenair	2.7	2.1	11.6	9.0	7.1	39.2
Beech-65-Queenair (a)	3.3	2.7	14.3	11.1	9.0	48.4
BN-2A Islander	1.6	2.5	10.1	6.9	10.7	43.7
Beech-58-Baron	2.6	3.0	13.9	7.8	9.0	41.6
Cessna 402	2.3	2.4	14.3	6.8	7.3	43.1
Cessna 310R	2.5	2.7	14.8	7.4	8.2	44.3
Cessna 206(F)	1.6	3.3	10.7	4.0	13.2	42.6

(a) crude estimate.
Source: Derived from Table 2 and Table 4.

The cost analysis has been refined in Table 3, in which a realistically based comparison of the direct costs of operating the various aircraft is revealed.

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In the first part of Table 3 the comparison made in Table 2 is reduced to a common weight basis.

There is not a great divergence of speeds among the aircraft subjected to analysis. They range from 230 to 330 kilometres per hour. Within this range, aircraft speeds are relatively unimportant to operators and users of local air services to remote areas. Consequently, it was possible to further reduce the comparison to a tonne/kilometre or, for a transport industry, unit of output basis. The costs of producing these units of output for each type of aircraft used on regular local air services are compared in the second part of Table 3.

We anticipated that the figures in Table 3 would give some insight into what economies of scale operators are able to take advantage of. If larger aircraft do offer economies of scale, per unit costs will decrease as capacity increases. The table shows that, by and large, this is so for the aircraft looked at. The exception, once again is the DHC-6-Twin Otter which is shown, despite its relative size, to be less cost efficient than any other aircraft. The Beech-65-Queenair also does not show up well in this comparison. However, it is not as conspicuously inefficient in this regard as the MMA DHC-6-Twin Otter.

Aircraft Capacity

It is stressed that these cost comparisons relate only to fully laden aircraft. They are per unit costs at the most efficient output which can only be achieved where demand allows it. As demand decreases, unit costs will continue to rise until it is no longer possible to reap the advantages of the economies of scale of larger aircraft and it is cheaper to use the full capacity of a smaller aircraft.

The capacities and speed of the various aircraft subjected to cost analysis are compared in Table 4. In this paper no further commentary on these figures is needed.

TABLE 4: CARRYING CAPACITIES AND SPEED OF AIRCRAFT USED FOR REGULAR LOCAL SERVICES IN WESTERN AUSTRALIA

Type of aircraft	Carrying capacity(a)			Cruising speed
	All freight	Passengers	Freight with maximum passengers	
	kgs.	no.	kgs.	kilometres/hour
Douglas DC-3	3,220	26	110	250
DH114-Heron	1,750	15(b)	390	230
DHC-6-Twin Otter	1,660	15(b)	300	270
Beech-65/A20-Queen-air	930	10	70	300
Beech-65-Queenair	730	8	-	300
BN-2A Islander	710	7	80	230
Beech-58-Baron(c)	590	5	130	330
Cessna 402	730	8	10	330
Cessna 310R	640	5	190	330
Cessna 206(F) (d)	530	5	80	250

Source: Australian Department of Transport, Air Transport Group (Perth).

(a) carrying capacity over a distance of 300 kilometres after allowing for pilot and his equipment;
(b) Air Navigation regulations require that, for passenger loads of greater than 15, a cabin attendant (hostess) must be employed on the aircraft;
(c) the Beech 95/C55-Baron has similar physical and cost characteristics to the Beech-58-Baron;
(d) the Cessna 210(L) has similar physical and cost characteristics to the Cessna 206(F).

From the comparative cost analysis and the brief look at capacity, above, two aircraft stand out as most suitable for the type of traffic offering on commuter routes to remote areas of the State. These two, which seem to offer both low

cost and flexibility, are:

- for routes where the average payloads range from 900 kg. to 1,800 k.g., the modified DH-114 Heron used by Connair;

- for routes where the average payload is less than 600 k.g., the Beech-58-Baron (or the Beech 95/C55-Baron). From the figures contained in Table 3 it would appear that most of its close rivals seem marginally substitutable for this aircraft.

As any payload, the DHC-6-Twin Otter and the Beech-65-Queenair do not seem suited to regular local air services in Western Australia.

Existing Ports of Call

The frequency and type of service received at every port of call, on the thirteen regular local air service routes in the Kimberley Region, are set out in Tables 2 and 3 in Appendix. Also shown in these tables are statistics on the quantity of freight and number of passengers using the services provided.

The demand for the regular local air services at each port of call is reflected in the freight and passenger statistics relating to it. Currently, over a one year period, the use made of the services by people at the various ports of call with which this paper is concerned varies from about 65,000 kilograms and 1,300 passengers at Hall's Creek to about 200 kilograms of freight and 4 passengers at Ord River Station and about 100 kilograms of freight and 3 passengers at Billiluna on the edge of the Great Sandy Desert.

The figure quoted for Billiluna means that, on average, about 5 kilograms of freight are available for each scheduled fortnightly call and there is one passenger to be either picked up or dropped in every 8 scheduled calls there. A situation which is patently ridiculous, particularly in an aircraft as large as the DHC-6-Twin Otter. No case could be made to justify a fortnightly air service to Billiluna, on economic or social welfare grounds. And, any service at less than fortnightly intervals could scarcely be claimed to be regular.

The Kimberley Region

As is illustrated in Map 2, attached, the regular air services in the Kimberley Region operate on characteristically round trip rather than return trip routes, with the aircraft leaving a nodal centre or hub[1] such as Derby and Kununurra, and calling once each at perhaps 6 ports of call on circular route back to the nodal centre. Nearly all freight traffic is outward bound from the nodal centres, while passenger traffic would typically be equally divided between the inward and outward direction from the hum of the system. Where there is a mixture of freight and passenger traffic, in such a situation, even on the best designed route schedules capacity can be fully utilized only on take off from the nodal centre.

Short distance internal movements probably account for less than 20% of passenger traffic and very little of the freight traffic on these routes.

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1. The nodal centre or hub could be described as the nerve centre of a system or network of transport routes. It is analogous to the hub of a spoked wheel in that it is a meeting place for routes which radiate from it. In this case, the nodal centre is where branch or feeder routes meet up with trunk or arterial routes.

AIR SERVICES TO ISOLATED AREAS

The best capacity utilization one could consistently expect on any round trip of the type flown by regular air services to the Kimberleys would be about 80-85% on departure from the nodal centre and about 60-65% on return to that centre. On a well designed route schedule of this type, it could be expected that a DHC-6-Twin Otter would carry, say, 16 passengers and 500 kilograms of freight, and, perhaps, 3 short distance passengers.

Present freight rates in the Kimberleys would yield about $800 in revenue from a round trip of this type. Such a trip would occupy about 4½ "block hours". Therefore, direct operating costs would also amount to about $800[1]. Thus, even if they made best use of capacity, the operators of a DHC-6-Twin Otter on these routes would, at present freight rates, be struggling to cover direct operating costs. When it it considered that the DH114 Herons used by Connair could complete the same task at a direct operating cost of around $550[1], it would appear that, where the DHC-6-Twin Otter is used on regular local air services, its excessively high direct operating costs would be the biggest single contributory cause of losses incurred.

In Table 5, statistics related to the utilization of available capacity on the subsidised routes are shown. These figures reflect, to some extent, the design of the route schedules and the suitability of the aircraft to the task they perform. Also shown in Table 5 are DGT estimates of average direct operating costs and revenues per round trip on these routes.

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1. See Table 2: $800 approximately = 4½ x $181 and $550 approximately = 4½ x $120.

TABLE 5: ESTIMATES OF DIRECT OPERATING COSTS AND REVENUE PER ROUND TRIP ON ROUTES OF SUBSIDISED REGULAR LOCAL AIR SERVICES IN THE KIMBERLEY REGION 1974/75.

Operator (a)	Description of service routes (a)	Flight time	Direct operating costs	Average payload		Average revenue	Excess of revenue over direct operating costs
				Freight	Passengers		
		Block hours	$	kg.	no.	$	$
MMA	Derby-Halls Creek and return via,						
	. Balgo Hills	5½	995	780	17	915	- 80
	. Christmas Creek	4	725	490	10	490	-235
	. Nicholson	5	905	440	10	475	-430
	. Ord River	5½	995	440	10	475	-520
	. Glenroy	3½	635	430	10	460	-175
	. Bedford Downs	4	725	470	14	590	-130
	. Fitzroy Crossing	3½	635	480	13	530	-105
MMA	Derby-Kalunburu - Gibb River	4½	815	430	9	500	-315
Connair/ Ord Air	Kununurra-East Kimberley stations	5	590	400	7	430	-160

(a) excludes Connair services from Alice Springs (NT) to Darwin (NT) through Kununurra and Nicholson.

AIR SERVICES TO ISOLATED AREAS

The figures in Table 5 reveal that, on one or two routes, the average payload per round trip is not all that far from the best which could be expected in the circumstances described, above, and is in fact, achieved on the Balgo Hills route. The figures in Table 5 indicate that on most routes an average of 55-60% of available capacity is utilized on departure from the nodal centre and an average of about 25-30% is utilized on return to it.

As well as emphasising the comparatively high cost of operating the MMA DHC-6-Twin Otter, the figures in Table 5 also indicate that freight rates and passenger fares may be lower than they should be for services to be economically viable, particularly when it is considered that overhead costs and returns to capital are not being taken into account in the estimates.

More detailed statistics on traffic through the various ports of call[1] arouse the suspicion that some people who are in outlying areas which are regularly served by aircraft travel to and from Hall's Creek and Fitzroy Crossing etc., where there is an almost daily service, rather than rely on a once a fortnight service to their own homesteads. While this reasoning does not apply to extremely remote areas such as Balgo Hills and Kalumburu, it would weaken the case pastoralists would put for a service direct to their homesteads and settlements.

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1. See Tables 2 and 3 in Appendix to this paper.

F.D. Gallagher

RATIONALISATION OF EXISTING SERVICES

Approach to Rationalisation

Making a number of assumptions, we have developed a fairly straightforward plan for rationalisation of regular air services to remote areas, in which the search for economic efficiency becomes a search for a low cost solution to the problem of allocating the resources available. It allows the dead wood, in terms of underutilized capacity, to be pruned away and something like optimum use to be planned for remaining capacity[1]. The rationalisation process developed operates according to the following format:

(i) Identify each of the functional regions in which a network of services operates and seek a unique solution to the problems in it.

(ii) Within each region, delete those aerodromes which cannot measure up to criteria established for their inclusion as ports of call within the network.

(iii) From an air service point of view, identify the transport hubs or nodes with the greatest development potential. A key influence on this process is the notion that regular local air services are essentially feeder services for main trunk route services.

(iv) Where possible plan a network of routes which feed into these nodal centres or hubs, and

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1. These assumptions are elucidated and commented on in the main report on this study: Gallagher (1975) (DGT 145), pages 63-65 (incl.) and 95-97 (incl.).

serve only those ports of call not deleted according to (ii) above.

(v) In developing these routes: take care to achieve, from the data available, the best combination of aircraft type, freight and passenger load and frequency of service; work out a feasible day time flight schedule; and seek a workable compromise between flexibility and the best possible utilization of capacity.

(vi) Estimate direct operating costs on each route; and the revenues which would flow to operators at various fares and freight charges.

(vii) If possible, develop a level of fares and freight charges which, although it gives reasonable returns to operator's overheads and capital, is not beyond the reach of users of the service.

(viii) If required review the subsidy situation.

The Kimberley Region

How this rationalisation procedure operates is, perhaps, best shown by illustration of how we applied it to the Kimberley Region. The illustration is developed according to the eight steps set out above.

(i) The Kimberley Region has already been identified as functional entity.

(ii) Freight and passenger statistics relating to each aerodrome, which is a port of call for

regular local air services in the Kimberleys, are set out in detail in Tables 2 and 3 in the Appendix to this Report. Out of these, the ports of call set out in Table 6 have been judged to be superfluous, for reasons stated in the table. The figures in Table 6 need little explanatory commentary. It is patently obvious that there is little demand for regular air services to most of the aerodromes referred to in it.

TABLE 6: AERODROMES DELETED FROM SERVICE IN PLAN FOR RATIONALISATION OF REGULAR LOCAL AIR SERVICES IN THE KIMBERLEY REGION

Aerodrome	Annual traffic 1974/75 (a)		Reason for deletion
	Freight	Passengers	
	kg.	no.	
Beverley Springs	17	-	insufficient demand for service
Glenroy	150	11	insufficient demand for service
Cherrabun	430	12	insufficient demand for service
Billiluna	150	7	insufficient demand for service
Ord River	110	2	insufficient demand for service
Lissadell	586	-	insufficient demand for service
Springvale	769	-	. insufficient demand for service, . too close to Hall's Creek, . close to sealed main road.
Kirkimbie (b)	(c)	(c)	too close to another aerodrome (Nicholson)
Kildirk (b)	(c)	(c)	too close to another aerodrome (Waterloo)

(a) See Table 2, Appendix 1, for previous year's traffic.
(b) Northern Territory stations.
(c) Not known, but reputed to be small.

(iii) It is suggested that a system of regular local air service routes more concentrated on Kununurra would give users greater access to markets and sources of supply and, from the operators' point of view, be more economically efficient[1]. In the rationalisation process, the orientation of the system has been altered so that areas in the east and north of the Kimberleys are served from Kununurra and those in the west from Derby. Hall's Creek, as a minor node, becomes a meeting place for routes radiating from Derby and Kununurra. In planning routes around these hubs we have endeavoured to allow stations with traditional and functional connections with the Derby area to retain these links. Lansdowne and Tableland are two examples of these.

(iv)&(v) We developed a variety of plans for route schedules connecting, as required, the ports of call not deleted as per Table 6, to Kununurra or Derby. The most economic and satisfactory of these is illustrated in Map 3, attached, as Kimberley Plan "A". In this plan existing charter operators routes are included within the schedule developed A best alternative plan was developed, excluding existing charter operators' routes. This, Kimberley Plan "B", is not illustrated in this report.

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1. If nothing else economic efficiency could be achieved through lower operating costs and shorter routes.

The essential features of Kimberley Plan "A" are summarised in Table 7.

TABLE 7: DETAILS OF KIMBERLEY PLAN "A" FOR RATIONALISING REGULAR LOCAL AIR SERVICES IN THE KIMBERLEY REGION.

Route No. (a)	Route	Frequency of service	Estimated average payload for route (e)		Distance (b)	Time for trip (b)
			Freight	Passengers		
		No. per week	Kgs.	No. (f)	Kms.	Block hours
Service 1: Derby-West Kimberley via						
1A	Hall's Creek, Lansdowne, Tableland	1	220	7	930	5.4
1B	Hall's Creek, Christmas Creek, Jubilee, Nerrima	1	310	7	950	7.1
1C	Hall's Creek, Fossil Downs, Leopold Downs	1	270	6	860	4.9
1D	Hall's Creek, Fitzroy Crossing	4	290	7	830	4.4
Service 2: Kununurra-East Kimberley via						
2A	Nicholson, Sturt Creek, Hall's Creek, Bedford Downs	1	390	5	940	7.2
Service 3: Kununurra-North Kimberley via						
3A	Forest River, Kalumburu	1	250	6	553	3.5
3B	Kalumburu, Mitchell River, Gibb River, Karunjie	1	320	5	965	7.6

(a) A reference number given to each route for the purposes of the study.
(b) DGT estimate.
(c) Does not include origin and destination.
(d) Included also in ports of call.
(e) The aircraft types for all routes is the Beech-58-Baron or a near substitute, in capacity or direct operating cost, such as Beech 95/C55-Baron or Cessna 310.
(f) Nearest whole number to average.

Under Kimberley Plan "A" the four services now operating mostly fortnightly on eleven routes, would be reduced to three services operating mostly weekly on seven routes. Under the plan, not one of the remaining ports of call would receive a less frequent service. No port of call would be served less frequently than once a week. Therefore, at 13 stations the frequency of calls and, of course, air travel opportunities would increase from once a fortnight to once a week. The number of travel opportunities open to people at Balgo Hills, Kalumburu, Hall's Creek Fitzroy Crossing, Forest River and Mitchell Plateau would also increase under Kimberley Plan "A".

According to Kimberley Plan "A", it is conceivable that the total demand for local air transport task could be met by operating two Beech-58-Baron aircraft, one out of Kununurra and the other out of Derby. It is possible that the aircraft at Derby could also carry out MMA's Yampi Sound service. This aspect has not been thoroughly researched, and remains something of a weakness in the application of the rationalisation process to the Kimberley Region.

(vi) The exposition of Kimberley Plan "A" has been continued in Table 8. In it are shown estimates of direct operating costs and revenues, under a number of alternative pricing strategies(1).

1. It is stressed that the figures in Table 7 are only estimates.

While direct operating costs include provision for depreciation and interest they do not include either provisions for returns to capital investment or overhead costs. Our educated guess is that the operators concerned would need about a 30% return to overheads before taking on services such as that envisaged in Kimberley Plan "A" and at least a 10% (after tax) return to capital invested in the service. Consequently, we would expect that revenue should exceed direct

TABLE 8: DGT ESTIMATES OF DIRECT OPERATING COSTS AND REVENUE PER ROUND TRIP IN PLAN "A" FOR RATIONALISING REGULAR LOCAL AIR SERVICES IN THE KIMBERLEY REGION.

Route No. (a)	Expected direct operating costs	Expected Revenue			
		At present rates and fares (b)	20% increase in rates and fares + $40 per call minimum charge	20% increase in rates and fares + $30 per call minimum charge	30% increase in rates and fares + $30 per call minimum charge
	$	$	$	$	$
Service 1					
1A	275	295	390	365	395
1B	320	325	510	450	470
1C	260	275	375	355	380
1D	245	315	380	380	410
Service 2					
2A	330	315	460	420	440
Service 3					
3A	180	260	310	310	340
3B	320	310	490	430	445

(a) routes as per Table 7.
(b) May 1975.

operating costs by at least 40% to make the service worthwhile for the two firms supplying the service[1].

The figures in Table 8 indicate that, even at the present level of freight rates and fares, services run according to Kimberley Plan "A" would do better than break even with direct operating costs. This would be a considerable improvement on the present situation; illustrated in Table 5.

(vii) Three alternative pricing strategies, designed to produce the required level of revenue at the existing level of demand, are compared in Table 8. Each of these include a minimum charge per call. Two of the strategies give the sort of return which would make the services a viable proposition. These are:

- 20% increase in fares and freight rates with a $40 minimum call charge[2]; and
- 30% increase in fares and freight rates with a $30 minimum call charge[2].

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1. This is a fairly crude estimate. However, it is not arrived at by simply adding 10% and 30%. It does take into account the capital invested in aircraft and some other assets.

2. It is not envisaged that this should be a flagfall type of charge. The minimum charge would operate so that if the revenue from a freight and passenger load exceeded the minimum charge at normal rates and/or fares, the consignee would be charged at normal rates and fares. Only for very small consignments or "courtesy" calls would the minimum charge be effective.

At these rates and at 1974/75 prices, we estimate that total direct operating costs would be in the order of $100,000 and revenue in the order of $150,000 per year.

(viii) The suggested increases in freight and passenger charges may be more than some users of the service can bear. If so, they have two courses of action open to them: either cease using the service or seek subsidy support. Collectively, aboriginal settlements and community and medical welfare organisations make more use of existing services in the Kimberleys than do station owners and mineral developers. The former should be well versed in the sources of and procedure for gaining subsidy assistance. The latter may also require subsidy assistance, but may find the formalities for obtaining it less well defined but certainly not without precedent. In this they may need assistance.

CONCLUSIONS

Subsidies:

- It would be difficult to justify cross subsidisation of the types of regular local air services which operate to remote areas in Western Australia. While it controls the trunk routes into which they feed, MMA cannot from an economic point of view, justify cross subsidisation of the local air services it supplies in the Kimberleys.

- There is a danger that, if applied to regular local air services, cross subsidisation and the "total service concept" approach to costing and pricing will lead to a misallocation of transport resources.

- Direct subsidisation of operators of regular local air services to remote areas has contributed to economic inefficiencies within the industry. This is because: there is no guarantee that subsidies paid to operators will flow on to users or even that there will be users of a service; direct subsidies to operators can encourage the growth of excess capacity; and/or direct subsidies to operators can encourage costing and pricing procedures inappropriate to efficient resource use.

- From the point of view of economic development, particularly of the pastoral industry, evidence suggests strongly that direct subsidies to operators of regular local air services to remote areas have been ineffective as an instrument of government policy.

- Where for reasons of economic and/or social welfare payment of a direct subsidy is unavoidable, it would be better paid to a user than an operator of a transport service.

Analyses

- Cost analyses reveal that some aircraft, particularly the DHC-6-Twin Otter operated by MMA, are unsuitable for use on regular local air services to remote areas.

- On many local air service routes, there is under-utilisation of the capacity made available. This is because: aircraft are too large for the tasks to which they are assigned; routes and schedules are poorly designed and often reflect

institutional arrangements rather than a pattern of demand; and there is insufficient demand at many ports of call serviced. This conclusion is relevant in both the Kimberley and Murchison regions.

- Many pastoralists, who as a group actively lobby for the continuation of subsidy support for operators, do not use let alone need the regular air services provided to their properties.

- Even where capacity is not under-utilised, present levels of freight rates and fares do not allow sufficient returns to overheads and capital on many regular local air service routes.

Rationalisation

- Kimberley Plan "A" illustrates that the rationalisation procedure we have developed can be used to plan regular local air services to remote areas which will be more financially sound and economically efficient than those operating at present.

- The rationalisation procedure we have developed, and for that matter Kimberley Plan "A", itself, are not so much a blue print for the industry, as an endeavour to devise a strategy for rationalisation which the industry could follow. A Working Group comprising representatives of government and the industry could put such a strategy into effect. This could also cover legal and other aspects of the situation which are not dealt with in this paper.

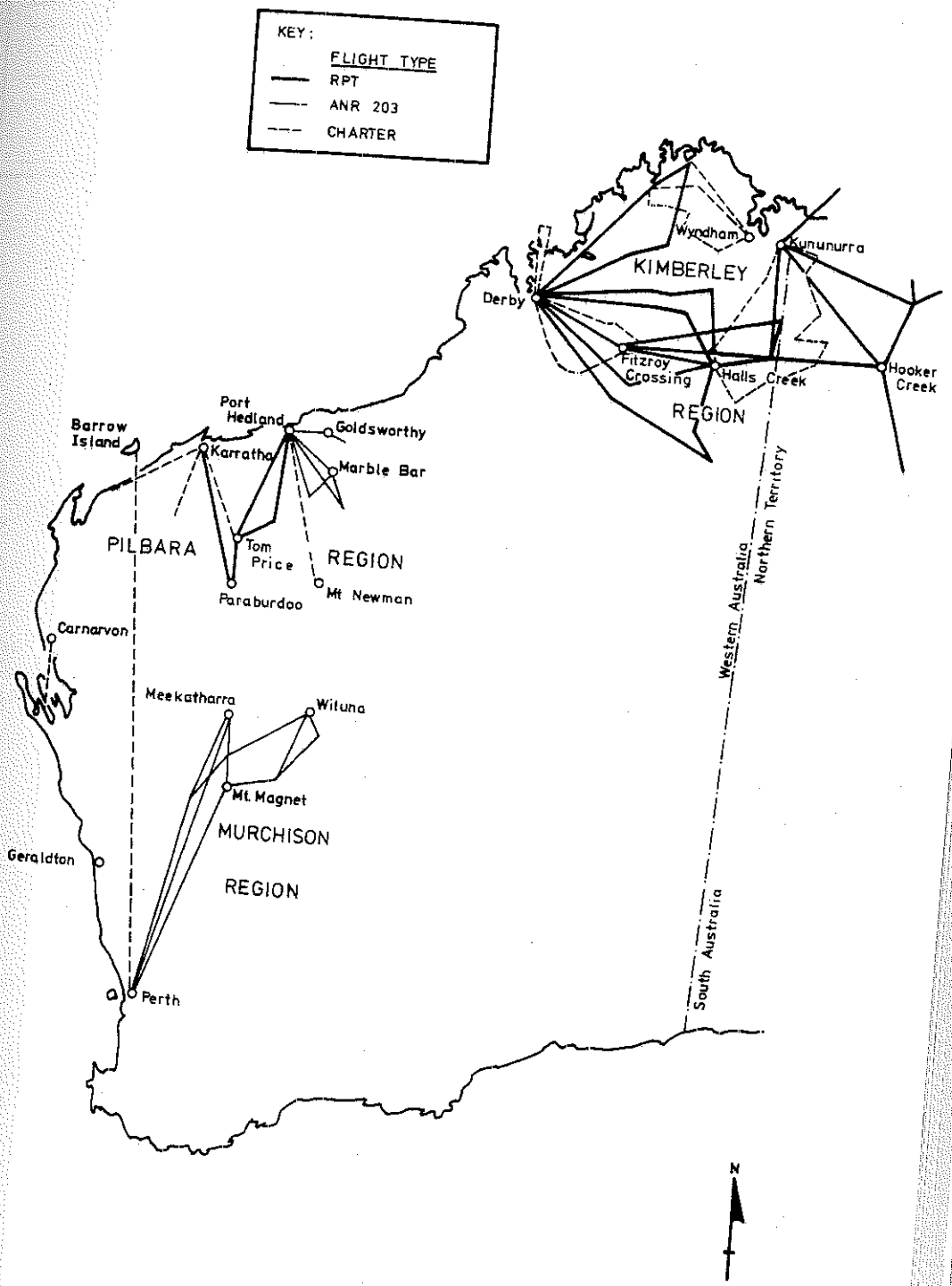
General Conclusion

This paper has illustrated how, despite divergent objectives, transport research and planning may have been not only relevant, but important to the continued operation of regular local air services to remote areas of Western Australia.

APPENDIX : TABLE 1
EXISTING REGULAR LOCAL AIR SERVICES TO THE KIMBERLEY REGION - MAY 1975.

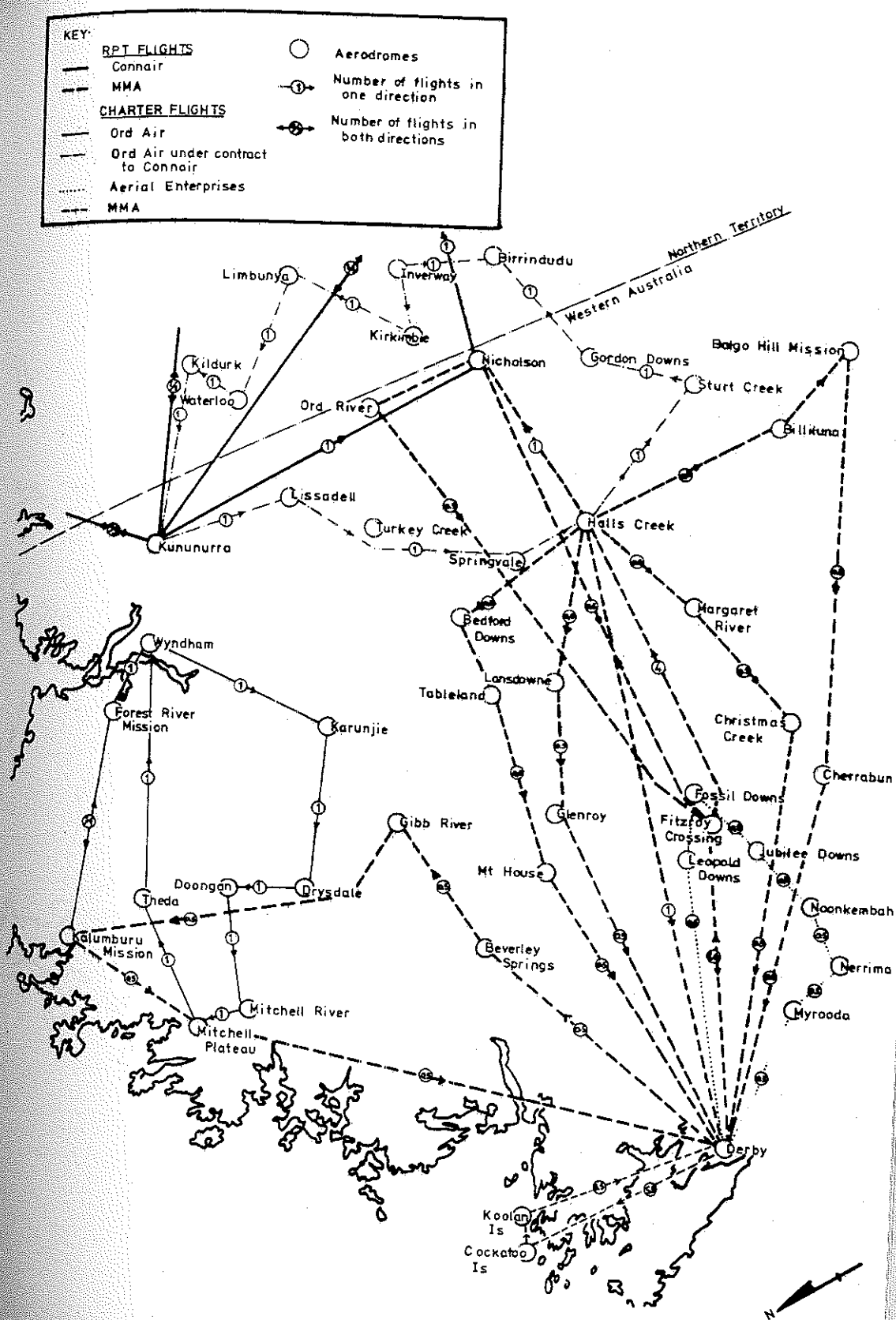
Description of service routes	Operator	Type of service	Type of aircraft used	Frequency of service: number per week	Number of calls en route (a)	Direct subsidies (b)
Alice Springs-Kununurra-Darwin	Connair	RPT	(Douglas (DC-3 (DH114- (Heron	3(i)	4(g) (h)	Cwth.
Kununurra-East Kimberley stations	Connair) Ord Air) (c)	RPT	Beech Baron (k)	1	11(i)	Cwth.
Wyndham-Drysdale River area	Ord Air	Charter	Cessna 206(F)	1	6(i)	-
Derby-Yampi Sound	MMA	Charter	DHC-6-Twin Otter	5½(e) (g)	2	-
Derby-Hall's Creek and return via 7 different routes serving Kimberley stations	MMA	RPT	DHC-6-Twin Otter	4(f)	3(g) (h)	Cwth.
Derby-Kalumburu-Gibb River	MMA	RPT	DHC-6-Twin Otter	½(f)	4	Cwth.
Derby-West Kimberley stations	Aerial Enterprises	Charter	Small Cessna (l)	1	6(i)	-

(a) excluding origin and destination.
(b) refers only to direct subsidies paid to operator for services on the routes concerned.
(c) service performed by Charter operator under contract to RPT operator.
(e) 11 flights per fortnight.
(f) some fortnightly flights on these routes.
(g) timetable and flight schedule too complex for exposition in this table, see relevant map for further details.
(h) average number (per week or per fortnight as required).
(i) includes optional stops en route.
(k) either Beech 95/C55 Baron or Beech-58-Baron.
(l) any one of the four small Cessnas operated by Aerial Enterprises.



MAP 1

WESTERN AUSTRALIA
REGULAR LOCAL AIR SERVICES
TO REMOTE AREAS

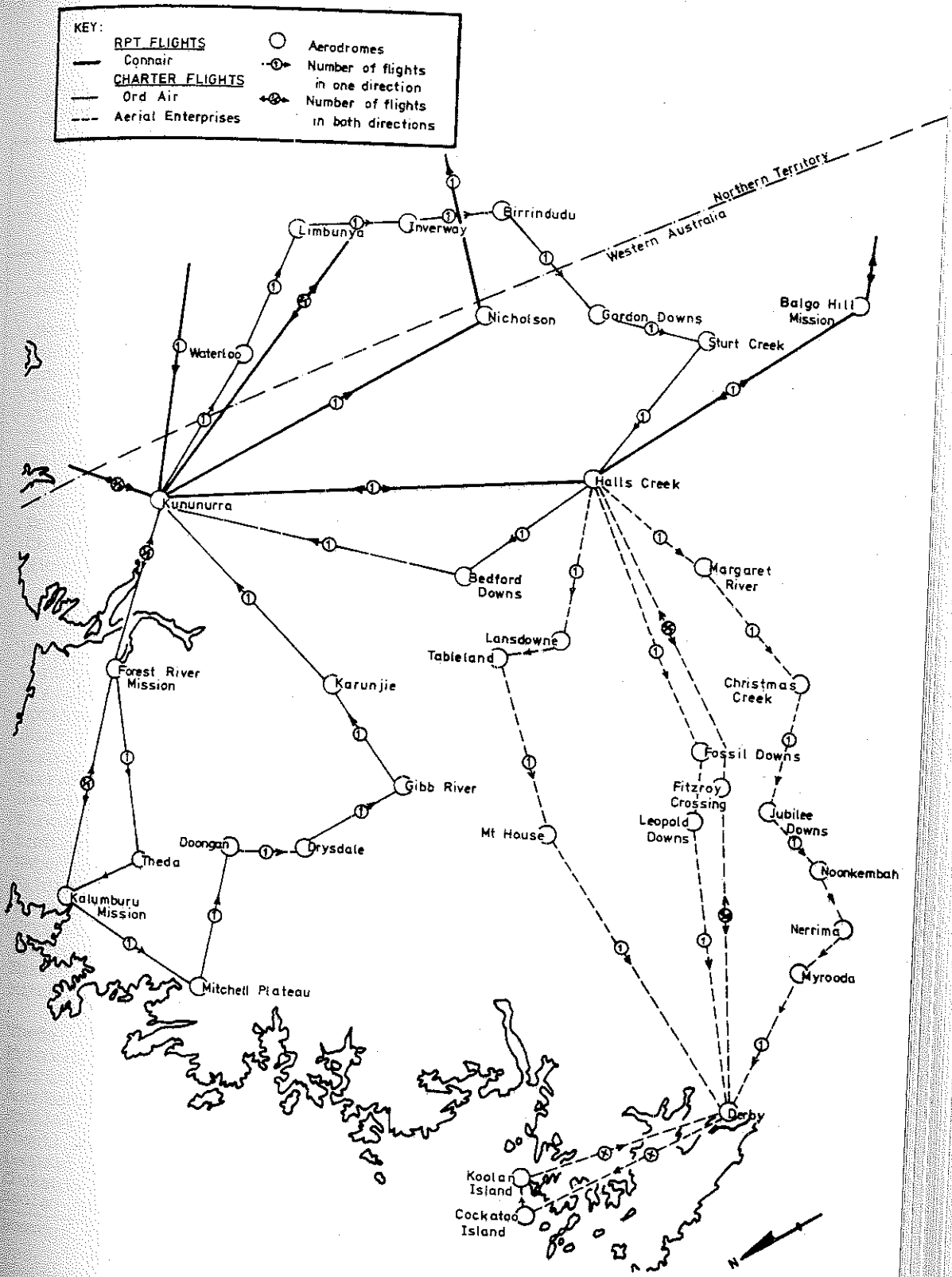


MAP 2

KIMBERLEY REGION

Present Weekly Travel Opportunities

Regular local services 5/75



MAP 3

KIMBERLEY PLAN 'A"

Weekly Travel Opportunities

APPENDIX : TABLE 2

REMOTE AREA AERODROMES SERVED BY REGULAR LOCAL AIR SERVICES IN THE KIMBERLEY REGION - SERVICE DETAILS - MAY 1975.

Aerodrome	Regular local air service details			
	Type of service	Operator	Flight nos.	Frequency calls per year
Fitzroy Crossing	RPT	MMA	460 - 467	260
Hall's Creek	RPT	MMA	460 - 467	208
	RPT	Connair	1215	52
Beverley Springs	RPT	MMA	468	26
Bedford Downs	RPT	MMA	460	26
Lansdowne	RPT	MMA	461	26
Tableland	RPT	MMA	460	26
Glenroy	RPT	MMA	461	26
Gibb River	RPT	MMA	468	26
Kalumburu	RPT	MMA	468	26
	Charter	Ord Air	-	52
Billiluna	RPT	MMA	467	26
Balgo Hills	RPT	MMA	467	26
Cherrabun	RPT	MMA	467	26
Nicholson	RPT	MMA	464 - 465	52
	RPT	Connair	1229	52
Mt. House	RPT	MMA	460	26
Ord River	RPT	MMA	465	26
Margaret River	RPT	MMA	466	26
Christmas Creek	RPT	MMA	466	26
Lissadell	RPT	Connair/Ord Air	1215	52
Springvale	RPT	Connair/Ord Air	1215	52
Sturt Creek	RPT	Connair/Ord Air	1215	52
Gordon Downs	RPT	Connair/Ord Air	1215	52
Birrindudu (NT)	RPT	Connair/Ord Air	1215	52
Inverway (NT)	RPT	Connair/Ord Air	1215	52
Kirkimbie (NT)	RPT	Connair/Ord Air	1215	52
Limbunya (NT)	RPT	Connair/Ord Air	1215	52
Waterloo (NT)	RPT	Connair/Ord Air	1215	52
Kildirk (NT)	RPT	Connair/Ord Air	1215	52
Karunjie	Charter	Ord Air	-	52
Drysdale	Charter	Ord Air	-	52
Doongan	Charter	Ord Air	-	52
Mitchell River	Charter	Ord Air	-	52
Mitchell Plateau	RPT	MMA	468	26
	Charter	Ord Air	-	52
Theda	Charter	Ord Air	-	52
Myroonda	Charter	Aerial Enterprises	-	26
Nerrima	Charter	Aerial Enterprises	-	26
Noonkemba	Charter	Aerial Enterprises	-	26
Jubilee	Charter	Aerial Enterprises	-	26
Fossil Downs	Charter	Aerial Enterprises	-	26
Leopold Downs	Charter	Aerial Enterprises	-	26
Cockatoo Island	Charter	MMA	830 - 835	286
Koolan Island	Charter	MMA	830 - 835	286

Source: Operating companies and Australian Department of Transport, Air Transport Group, Perth.

APPENDIX : TABLE 3

FREIGHT & PASSENGERS AT SELECTED AERODROMES (a) SERVED BY REGULAR LOCAL AIR SERVICES IN THE KIMBERLEY REGION.

Aerodrome	Quantity of freight handled per annum (b)		Number of passengers per annum (b)		Estimated average per call - 1974 (b)	
	1972/73	1973/74	1972/73	1973/74	Freight	Passengers
	kgs.	kgs.	no.	no.	kgs.	no. (c)
Fitzroy Crossing	27,750 (f)	28,840	755 (f)	1,150	100	4
Hall's Creek	56,560	71,190	1,305	1,701	280	5
Beverley Springs	1,920	3,300	58	73	- (d)	- (d)
Bedford Downs	1,500	1,480	59	88	40 (e)	2 (e)
Tableland	2,210	3,500	37	90	20 (e)	2
Glenroy	1,170	530	8	17	10	- (e)
Gibb River	1,740	3,080	24	39	100	2
Kalumburu	3,500	4,030	112	199	170	6
Billiluna	70	130	3	4	10	-
Balgo Hills	5,110	9,130	82	137	370	8
Lansdowne	1,010	2,240	14	12	40	-
Cherabun	690	1,200	-	27	20	- (e)
Nicholson	5,670 (f)	13,560	48 (f)	125	60	1
Mt. House	1,280	1,840	44	83	30	2
Ord River	190	830	6	24	- (c)	- (e)
Margaret River	2,590	3,050	16	15	80	-
Christmas Creek	1,400	1,030	18	27	30	1
Mitchell Plateau	10,960	3,250	57	24	160	1
Lissadell	n/a	590	n/a	-	10	-
Springvale	n/a	770	n/a	-	20	-
Sturt Creek	n/a	2,460	n/a	33	50	1
Gordon Downs	n/a	5,530	n/a	47	110	1

(a) does not include, for instance, Northern Territory aerodromes or those served only under charter arrangements.
(b) some, but not all, 1974/75 preliminary figures were available: these are included in the 1974 estimates of averages per call.
(c) to nearest whole number.
(d) demand ceased altogether in 1974/75.
(e) demand has declined rapidly over last 1½ years.
(f) does not include Connair cargo and passengers.
n/a not available.

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